SIM7020 Series_SAT _Application Note

LPWA Module

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About Document

Version History

Version	Date	Owner	What is new
V1.00	2019.10.31	Wenjie.Lai	First Release
V1.01	2020.6.10	Wenjie.Lai	All

Scope

This document applies to the following products

Name	Type	Size（mm）	Comments
SIM7020C	NB1	17.6*15.7	Band 1/3/5/8
SIM7020E	NB1	17.6*15.7	Band 1/3/5/8/20/28
SIM7030	NB1	16*18	Band 1/3/5/8
SIM7060	NB1+GNSS	24*24	Band 5/8
SIM7020G	NB2	17.6*15.7	Band 1/2/3/4/5/8/12/13/17/18/19/20/25/26/28/66/70/71/85
SIM7060G	NB2+GNSS	24*24	Band 1/2/3/4/5/8/12/13/17/18/19/20/25/26/28/66/70/71/85

Contents

1 Introduction

1.1 Purpose of the document

This document gives a description of the parameters and usage of the proprietary AT commands for SIM Toolkit operation.
Developers could understand and develop application quickly and efficiently based on this document.

1.2 Related documents

[1] SIM7020 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

This document gives a description of the parameters and usage of the proprietary AT commands for SIM Toolkit operation.

Distinction is drawn between the terminologies used in this document for commands; namely AT commands and Proactive commands:

AT commands are the method of communication between the Application Processor and the Modem – AT commands are sent by the Application Processor to the modem with result codes or unsolicited responses sent from the Modem to the Application Processor.

Proactive commands are those sent by the SIM/UICC to the Modem as the instruction set used to facilitate actions for Applications running on the SIM/UICC (SIM Application Toolkit). Each of these proactive commands requires some action from the modem and a response – terminology: terminal response - to be sent back to the SIM/UICC with information and/or details about the success/failure of the command. Some proactive commands require interaction with the Application Processor and the AT commands set discussed here are used for this purpose.

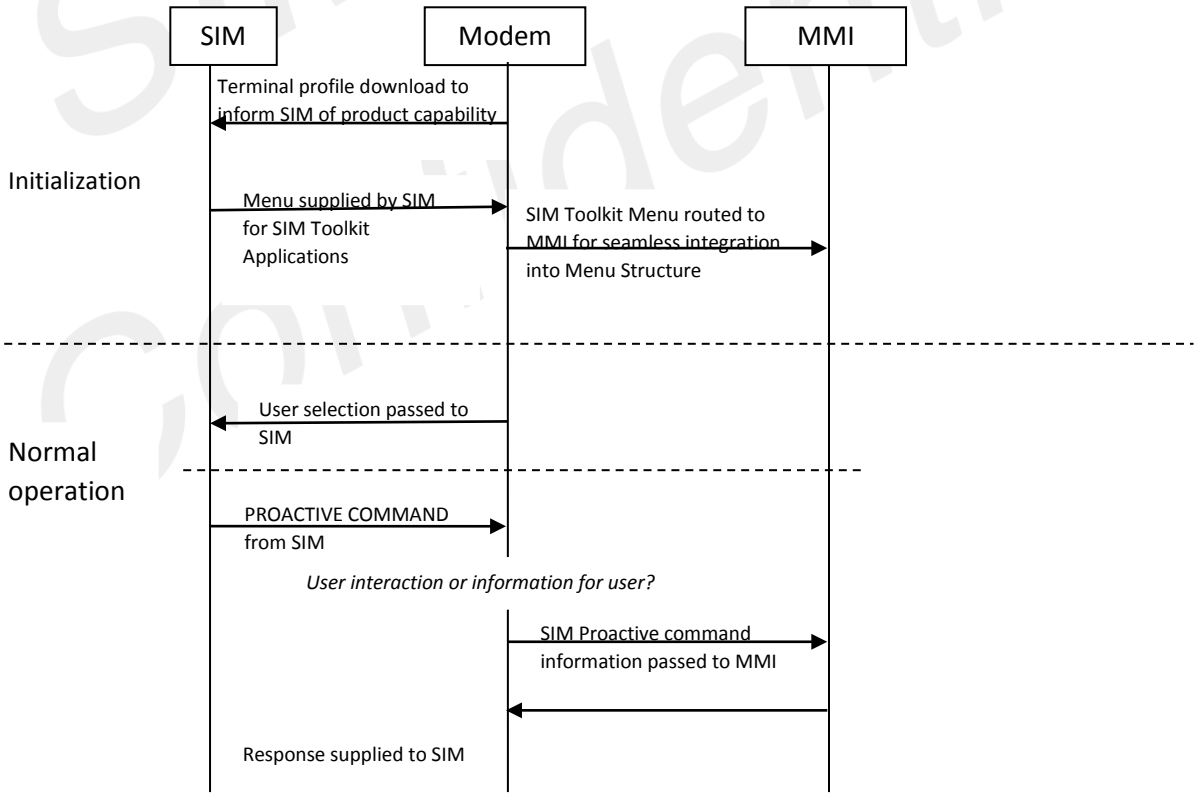


Figure 1. SIM application toolkit interaction with modem and MMI

Only one proactive command is processed by the ME at any one time. To close the operation of any one proactive command a terminal response must be received by the SIM/UICC. The SIM is then aware that a further proactive command can be sent. So even when there is an error in the processing of a proactive command or no response when one is expected – within the timeout period – a terminal response must be generated reporting the error to the SIM. If the proactive command is successful this also is reported.

A proactive session may consist of several proactive commands – this is known as a proactive session. The SIM/UICC will inform the ME when the session is complete. Where relevant this information is passed on to the Application Processor (M4).

Note: Where AT command data have default values these are shown underlined in the data field descriptions.

3 SIM Toolkit Service in NB mode

3.1 SIM Toolkit Initialization and Set-up

3.1.1 AT*MSTLOCK APP Registering for SIM Toolkit (and locking to a channel)

The STK AT interface allows communications between the SIM Toolkit element within the Modem and the Applications processor. In order to lock a channel (entity) of the modem ATCI and to identify that the Applications processor will be STK aware an AT command is sent at initialization (AT*MSTLOCK=1). This command may also be used after initialization to free the entity – this would result in de-registration of the Applications Processor for SIM Toolkit Activity – i.e. no SIM Toolkit functionality will pass over the AT interface. This will not however result in informing the SIM that SIM toolkit operations are not supported – that can only be achieved by changing the APP profile (AT*MSTPD=0) and then resetting the modem using the AT+CFUN=0, ..=1 functionality.
This command also allows setting of the timeout for the user response timer in the modem. If a response has not been received when this timer expires a terminal response is sent to the SIM to indicate that the proactive command has failed. By default the user response timer is turned off – the handling of lack of user response is then the responsibility of the APP – modem will wait for the response. It is a requirement that a terminal response is sent to the SIM for each proactive command the ME receives.

3.1.1.1 Command format

AT*MSTLOCK	APP Registering for SIM Toolkit and locking to a channel
Write Command **AT*MSTLOCK=<data>[,<timeout>]**	This command registers/de-registers the CI task with the SIMAT task so it receives any relevant SIM toolkit activity. The channel on which this AT command is received is used as the channel allocation for the unsolicited results and data. A further optional parameter supplies the length of time to set the modem user response timer. Response **OK** or **+CME ERROR: <err>** **+STC: 0**

Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

Defined Values

<data>	Decimal digit 0 Applications processor de-registers for SIM Toolkit activity 1 Register applications processor for SIM toolkit activity. (The same channel used for this command will be used for all unsolicited result codes from receipt of this.)
<timeout>	User response timer – time set in seconds. Maximum timeout value is 3600 seconds. When enabled the timeout value remains operational until the command is re-entered with a timeout value of 0 or the ME is powered down(default 0).

3.1.2 AT*MSTPD SIM Toolkit Terminal Profile Download

At initialization the Modem needs to inform the SIM of which functionalities of SIM Toolkit it supports so the SIM will only send valid Proactive Commands during normal operation. This is performed by sending the SIM Command TERMINAL PROFILE to the SIM (see ref 6 - 11.2.1 and ref 7 – 5.2). This terminal profile has both APP-specific and modem specific options.

3.1.2.1 Profile Download

The default settings for the APP relevant parameters of the terminal profile are stored in NVRAM in the modem. These values are read by the modem at start-up and used to populate the terminal profile for download.

It is possible to change the values stored in NVRAM - including deactivating ME SIM toolkit operation using the AT*MSTPD=x,xxx.... command, however although the values are modified in NVRAM they do not change the current profile status until there is a re-initialization – i.e. AT+CFUN= 0, AT+CFUN =1 .

If the profile is read - using AT*MSTPD?, the displayed results will be the APP settings currently being used – i.e. downloaded to the SIM – these may not be the ones stored in NVRAM if these have been changed after initialization.

3.1.2.2 Command Format

AT*MSTPD	SIM Toolkit Terminal Profile Download
Write Command **AT*MSTPD=<length>[,<data>]**	AT command to provide/modify MMI specific terminal profile parameters to the CI Task. The MMI profile is stored in NVRAM on the modem and read at start-up. The value stored in NVRAM may be changed using this command. If this is modified after SAT initialization the modified value will not be sent to the (U)SIM until after a power cycle. Response **OK** or **+CME ERROR: <err>** **+STC: 0**
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

Defined Values

<length>	Integer,determines the number of bytes of <data> used for the APP data for the terminal profile.
<data>	Hexadecimal representation of the <length> number of bytes with bits set by APP to indicates which of the parameters in the byte definition table given above are to be enabled in the terminal profile.

3.1.2.3 APP relevant profile parameters

The following information is stored in NVRAM as APP relevant profile parameters and may be modified using the AT*MSTPD=x,xxxxx... command.

Profile Item	Current Default setting	Present in byte	Set bit(1 LSB – 8MSB) Set to 1 if TRUE)
MenuSelection	FALSE	1	1
uCS2Entry	FALSE	1	2
uCS2Display	FALSE	1	3
DisplayText	FALSE	1	4

GetInkey	FALSE	1	5
GetInput	FALSE	1	6
PlayTone	FALSE	1	7
SelectItem	FALSE	1	8
Set up Menu	FALSE	2	1
UserActivity	FALSE	2	2
IdleScreenAvailable	FALSE	2	3
BrowserTermination	FALSE	2	4
Display Parameters Change	FALSE	2	5
SetUpIdleModeText	FALSE	2	6
LaunchBrowser	FALSE	2	7
SelectItemSoftKeys	FALSE	3	1
Setup MenuSoftKeys	FALSE	3	2
Screen Sizing Parameters Support	FALSE	3	3
VariableSizeFonts	FALSE	3	4
CanResizeDisplay	FALSE	3	5
TextWrapping Supported	FALSE	3	6
TextScrollingSupported	FALSE	3	7
Text Attributes supported	FALSE	3	8
Number of SoftKeysAvailable	0	4	1-8
Number Characters Supported Down Display	15	5	1-5
DisplayTextVariable Timeout	FALSE	5	6
GetInkeyVariable Timeout	FALSE	5	7
GetInkeyHelp	FALSE	5	8
Number Characters Supported AcrossDisplay	127	6	1-7
MaxWidthReductionInMenu	7	7	1-3
Text attribute – alignment left	n/a	8	1
Text attribute – alignment center	n/a	8	2
Text attribute – alignment right	n/a	8	3

Text attribute – font size normal	n/a	8	4
Text attribute – font size large	n/a	8	5
Text attribute – font size small	n/a	8	6
Text attribute – style normal	n/a	9	1
Text attribute – style bold	n/a	9	2
Text attribute – style italic	n/a	9	3
Text attribute – style underlined	n/a	9	4
Text attribute –style strikethrough	n/a	9	5
Text attribute foreground color	n/a	9	6
Text attribute background color	n/a	9	7

Currently, to set values for all parameters the length byte would be set to 9 and the 9 bytes would be set as shown in the table above.

3.1.3 AT*MSTMODE Setting format for SIM Toolkit Output

By default all output generated for strings is controlled by the +CMGF AT command. This command allow the separate setting of this format specifically for SIM Toolkit operations.

AT*MSTMODE	Setting format for SIM Toolkit Output
Test Command **AT*MSTMODE=?**	AT Command for setting the format of SIM Application Toolkit output. The format may be set to PDU or Text Mode. Response ***MSTMODE:** (list of supported **<mode>**s) or **+CME ERROR: <err>**
Read Command **AT*MSTMODE?**	Response ***MSTMODE: <mode>** or **+CME ERROR: <err>**
Write Command **AT*MSTMODE=<mode>**	Response **OK** or

	+CME ERROR: <err>
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

Defined Values

<mode>	Integer 0 PDU Mode 1 Text Mode 2 CMGF Mode (default, will use AT+CMGF setting)

3.1.4 AT*MSTICREC&AT*MSTICIMG Obtaining Icon information

There is icon information present on the SIM/UICC used for display by SIM Toolkit on the APP – identified by icon tags. It is assumed that the icon records and image instance data will be read as part of the initialization so that if an icon record is identified in proactive command it can be displayed at part of the user interaction. Currently there is no AT command sequence to achieve this functionality but the proposed solution is detailed below.

The icon information is encoded as icon image records which refer to image instance data that is stored in several different transparent files – data stored as bytes rather than records. The particular file identifier, the offset into the instance file and the number of bytes of data to be read for each image instance is defined in the record.

AT*MSTICREC	Obtaining Icon Records
Test Command **AT*MSTMODE=?**	AT Command for setting the format of SIM Application Toolkit output. The format may be set to PDU or Text Mode. Response ***MSTMODE:** (list of supported **<mode>**s) or **+CME ERROR: <err>**
Read Command **AT*MSTICREC?**	AT command for obtaining ICON image record information. – proactive commands may include an icon record in command data – this should be displayed as part of any user interaction for the proactive command. Response ***MSTICREC: <number of icon records on the SIM/UICC>** or **+CME ERROR: <err>**
Write Command **AT*MSTICREC=<rNum>**	Response ***MSTICREC: <rNum>,<numInstances>,[<CR><LF>*MSTICREC:**

	<width>,<height>,<cs>,<efId>,<offset>,<length>[...]] or **+CME ERROR: <err>**
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

Defined Values

<rNum>	Integer,the number of the icon record to be read from the SIM/UICC.
<numInstances>	Integer, the number of instance data records within this image record.
<width>	Integer, width of this image instance expressed in raster image points.
<height>	Integer, height of this image instance expressed in raster image points.
<cs>	Integer, coding scheme. 0 basic coding(default) 1 color coding
<efId>	Hexadecimal representation of the Image Instance file to be read onthe SIM/UICC – two bytes of data ordered MSB LSB.
<offset>	Integer, number of bytes offset from start of the file to begin reading.
<length>	Integer, number of bytes to be read.

AT*MSTICIMG	**Obtaining Icon image**
Write Command **AT*MSTICIMG=<efID>[,<offset>],<length>**	AT command to get ICON image instance data. This image instance data is referenced in the icon record to make up the icon to display. Response ***MSTICIMG: <length>,<data>** or **+CME ERROR: <err>**
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

Defined Values

<efId>	Hexadecimal representation of the Image Instance file to be read onthe SIM/UICC – two bytes of data ordered MSB LSB.
<offset>	Integer, number of bytes offset from start of the file to begin reading.
<length>	Integer, number of bytes to be read.
<data>	String containing a list of hex values for bytes of image instance data.

3.2 SIM Toolkit Normal Operation

3.2.1 *MSTC :<cmdid> Proactive Command Indication

The unsolicited result code *MSTC: informs the application processor (M4) that there is a proactive command that requires some APP activity awaiting retrieval.

*MSTC:<cmdid>	Proactive Command Indication
*MSTC:<cmdid>	The unsolicited result code *MSTC: informs the application processor (M4) that there is a proactive command that requires some APP activity awaiting retrieval.
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

Defined Values

<cmdId>	Decimal format of Type of Command. Unique identifier for the current SIM Toolkit proactive command issued by the SIM. The following values are supported: ‘01’ Refresh ‘05’ Set Up Event List command ‘15’ Launch Browser command ‘20’ Play Tone command ‘21’ Display Text command ‘22’ Get Inkey command ‘23’ Get Input command ‘24’ Select Item command ‘25’ Set Up Menu command ‘28’ Set Up Idle Mode Text command ‘40’ Open Channel ‘42’ Receive Data ‘43’ Send Data ‘81’ End of proactive session

NOTE

- The special case *MSTC: 0 is issued when there are no SIM Toolkit applications accessible on the

SIM/UICC i.e. a non-proactive SIM is being used.

- Receipt of this result code by the application processor (M4) – except in the special cases of *MSTC: 0 and *MSTC: 81 - should result in an AT*MSTGC=<cmdId> being sent by to request the associated proactive command information. This information is supplied in the AT command result.

3.2.1.1 *MSTC:81 End of Proactive Session

This command indication is sent when the SIM/UICC has indicated that the current session of proactive command activity is completed. Several proactive commands may be sent in a session and until this unsolicited response is received, the Application Processor (M4) should expect further proactive commands related to this session to be sent.

3.2.2 AT*MSTGC APP request for parameters associated with a previously reported Proactive Command

AT*MSTGC	APP request for parameters associated with a previously reported Proactive Command
Write Command **AT*MSTGC=<cmdId>**	AT command to Get Command parameters for a proactive SIM command from the CI Task. This will be sent from the application after unsolicited result code *MSTC: <cmdId> informs it the SIM has issued a proactive SIM command which requires user interaction. Response ***MSTGC: <cmdId>,<data>** or **+CME ERROR: <err>**
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

Defined Values

<cmdId>	Decimal notation, Command Type value.
<data>	Proactive command specific data, dependent on <cmdId>.

In this case the application sends the AT*MSTGC=<cmdId> and the response to this ‘Set’ AT command supplies the data associated with the specified proactive command.

The <data> varies dependent upon <cmdId>. The different formats of result codes supplied to the application on a command-by-command basis are outlined in the following subsections:

3.2.2.1 Get Command <cmdid 01> -REFRESH response data

This data associated with the result code informs the application of the type of REFRESH that is being requested and if relevant the particular files that are being refreshed. This may result in a full power-down, power up cycle, re-reading of all the data read at start-up from the SIM/UICC or the need to update cached data based upon SIM/UICC files which have been modified.

Command data for REFRESH proactive command	
Result Code ***MSTGC: 01,<refreshType>,<numFiles>[,<fileList>]**	Parameters 01, Decimal notation: Command Type value. **<refreshType>** Integer: indicates the type of the refresh. 0 SIM Initialization and full file change notification 1 File change notification 2 SIM Initialization and file change notification 3 SIM Initialization 4 SIM Reset 5 Application Reset (USIM only) 6 Session Reset **<fileList>** String containing the hex format IDs of files (as defined In ref 5) comma delimited, which have been modified on SIM/UICC. For refresh types 0,1, and 6 the file list is mandatory.
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note ● <eventList> value of FF is used to remove existing list of events as value 0 can be confused with the event MT Call value. ● *These events are only monitored for once – once they have occurred and are reported they should be removed from the Event List automatically.

3.2.2.2 Get Command <cmdid 05> -Set Up Event List response data

Command data for Set Up Event List proactive command

Result Code ***MSTGC: 05,<eventList>**	Parameters 05 Decimal notation: Command Type value. **<eventList>** hex: denotes applicable event identifiers. 05 User activity event* 06 Idle Screen Available event* 08 Language Selection event 09 Browser termination event 0C Display Parameters Changed event FF Remove existing event list
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note ● <eventList> value of FF is used to remove existing list of events as value 0 can be confused with the event MT Call value. ● *These events are only monitored for once – once they have occurred and are reported they should be removed from the Event List automatically.

3.2.2.3 Get Command <cmdid 15> -Launch Browser response data

Command data for Launch Browser proactive command	
Result Code ***MSTGC: 15,<comQual>,<url>[,<browserId>[,<bearer>[,<numFiles>,<provFiles>[,<dcs>,<gateway>[,<alphaId>[,<iconId>,<dispMode>[,<formatStart>,<formatLength>,<txtAlignment>,<txtFontSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>]]]]]]]**	Parameters 15 Decimal notation: Command Type value. **<comQual>** Decimal notation: command qualifier information from Command Details Data Object: 0 launch browser if not already launched 2 use existing browser using a new browser session 3 close existing browser, launch new browser session All other values are invalid **<url>** String format: 8-bit data using GSM default 7-bit alphabet. Special case: <url>="" – Null value, so use default URL **<browserId>** Decimal notation: Browser Id to use. Available values: '00' Use default browser **<bearer>** Decimal notation: list of allowed bearers in priorityorder. Possible values: '00' SMS '01' CSD '02' USSD '03' GPRS

	<numFiles> Integer: denotes the number of provisioning files given. **<provFiles>** String type, hex notation file ids: List of Provisioning File Reference ids. Full Paths are given, delimited within the string by a comma. **<dcs>** Integer: data coding scheme used for <text>.The schemes used are as per 3GPP 23.038 for SMS. 0 7bit GSM default alphabet (packed) 4 8bit data 8 UCS2 alphabet **<gateway>** String format: text string in <dcs> format **<alphaId>** String format: using either SMS default alphabet or UCS2 alpha field coding. **<iconId>** If present this numeric tag references the icon to be displayed – corresponds to the index in the Image file on the SIM (see 4.4.4) 1..255, Icon tag **<dispMode>** Integer: denotes use of associated icon 0 display icon only (replaces any text string or alphaId) 1 display with alphaId or text string **<txt...>** text attributes for alphaId. Coded as detailed in section “Get Command <cmdId 21>” – these optional data objects can only present if optional alpha id is present – as they are optional , they may not be present even when the alpha id is.
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note

3.2.2.4 Get Command <cmdid 20> -Play tone response data

Command data for Play tone proactive command	
Result Code ***MSTGC: 20[,<alphaId[,<tone>[,<duration unit>,<duration value>[,<iconId>,<dispMode>[,<formatStart>,<formatLength>,<txtAlignment>,<txtFontSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>]]]]]**	Parameters 20 Decimal notation: Command Type value. **<alphaId>**string format: using either SMS default alphabet (see) or UCS2 alpha field coding.If alpha ID is present and non-NULL this is the information passed to the user. If alpha ID is present and it is an empty string – either “” in text mode or NULL char – no information regarding the command should be passed to the user. If alphaId field is not present, it is up to the Application Processor to decide whether to inform the user. **<tone>** Decimal notation: identifies requested tone type.

	0 Tone generation handled in modem 1 Dial (SST) 2 Called subscriber busy (SST) 3 Congestion (SST) 4 Radio Path acknowledge (SST) 5 Radio path not available / Call dropped (SST) 6 Error / Special information (SST) 7 Call waiting (SST) 8 Ringing Tone (SST) 10 General Beep (MPT) 11 Positive Ack (MPT) 12 Negative Ack or Error (MPT) 13 User-selected Ring-tone (MPT) 14 User-selected Alert-tone (MPT) **<duration unit>** if present, this indicates the unit which the duration value is defined in. 0 minutes 1 seconds 2 tenths of seconds **<duration interval>** this parameter must be present if the last parameter was present. 1..255 value of the duration in units defined above **<iconId>** if present this numeric tag references the icon to be displayed – corresponds to the index in the Image file on the SIM (see 4.4.4) 1..255 Icon tag **<dispMode>** integer: denotes use of associated icon 0 display icon only (replaces any text string or alphaId) 1 display with alphaId or text string **<txt....>** Coded as detailed in section “Get command <cmdId 21> - Display Text response data” – these optional data objects can only present if optional alpha id is present – as they are optional , they may not be present even when the alpha id is.
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note ● SST denotes a Standard Supervisory Tone. ● MPT denotes an ME Proprietary Tone. ● If no tone is specified the default is General Beep SST. ● If no duration is specified a default value is chosen.

3.2.2.5 Get Command <cmdid 21> -Display Text response data

Command data for Display Text proactive command

Result Code	Parameters
***MSTGC: 21,<dcs>,<text>,<priority>,<clear>[,<iconId>,<dispMode>[,<response>,[<duration unit>, <duration value>[,<formatStart>,<formatLength>,<txtAlignment>,<txtFontSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>]]]]**	21 Decimal notation: Command Type value. **<dcs>** integer: data coding scheme used for <text>.The schemes used are as per 3GPP 23.038 for SMS (see ref 9). 0, 7-bit GSM default alphabet (packed) 4 8-bit data 8 UCS2 alphabet **<text>,** string format: text string in <dcs> format **<priority>,** integer: display priority information 0 Normal priority 1 High priority **<clear>,** integer: mode of clearing message 0 Clear after delay 1 User clears message **<iconId>,** if present this indicates the numeric tag for the icon to be displayed – corresponds to the index in the Image file on the SIM/UICC(see 4.4.4, "Obtaining Icon information *MSTICREC and *MSTICIMG") 1..255, Icon tag **<dispMode>,** integer: denotes use of associated icon 0 display icon only (replaces any text string or alphaId) 1 display with alpha Id or text string **<response>** 0 normal response expected 1 immediate response expected. **<duration unit>** if present, this indicates the unit which the duration value is defined in. 0 minutes 1 seconds 2 tenths of seconds **<duration value>**, this parameter must be present if the last parameter was present. 1..255 value of the duration in units defined above If text attributes are present the following parameters are displayed (text formatting scheme as per ref 6) **<formatStart>** Integer value indicating the character number in the string where the following formatting parameters start to be applied. **<formatLength>** Integer value indicating the number of characters starting from formatStart for which the formatting should be applied. **<txtAlign>,** integer. this defines text alignment- left aligned

	center aligned right aligned default –(language dependent) **<txtSize>,**integer - font for text string Normal Large Small **<txtBold>**, integer - if text string is bold Not Bold Bold typeface **<txtItalic>,** integer - if text string is italicized Italic off Italic on **<txtUnderline>** integer - if text string is underlined 0 Underline off 1 Underline on **<txtStrike>** integer - this defines if strikethrough is on strikethrough off strikethrough on **<txtForeColour>** **<txtBackColour>**, integer representing the color for foreground/background for text display encoded as. Black Dark grey Dark red Dark yellow Dark green Dark cyan Dark blue Dark magenta Grey White Bright red Bright yellow Bright green Bright cyan Bright blue Bright magenta
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note

3.2.2.6 Get Command <cmdid 22> -Get Inkey response data

Command data for Get Inkey proactive command

Result Code ***MSTGC: 22,<dcs>,<text>,<response>,<displayResp>,<helpInfo>[,<iconId>,<dispMode>[,<durationUnit>,<durationValue>[,<formatStart>,<formatLength>,<txtAlign>,<txtSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>]]]**	Parameters 22 Decimal notation: Command Type value. **<dcs>** integer: data coding scheme used for <text> The schemes used are as per 3GPP 23.038 for SMS (see ref 9) 0 7-bit GSM default alphabet (packed) 4 8-bit data 8 UCS2 alphabet **<text>** string format: text string in <dcs> format **<response>** integer: expected response character format. 0 Digits (0-9, *, # and +) only 1 SMS default alphabet 2 UCS2 alphabet 3 Yes/No response only **<dispResp>** User response is displayed alteration or confirmationallowed1 immediate digit response requested (0-9,*and # only) digit is not displayed and may not be modified. **<helpInfo>** 0 no help information available 1 help information available **<iconId>,** if present this numeric tag identifies the icon to be displayed – corresponds to the index in the Image file on the SIM (see4.4.4, "Obtaining Icon information *MSTICREC and *MSTICIMG") 1..255, Icon tag **<dispMode>** integer: denotes use of associated icon 0 display icon only (replaces any text string or alphaId) 1 display with alpha Id or text string **<duration unit>** if present, this indicates the unit which the duration value is defined in. minutes seconds tenths of seconds **<duration interval>** this parameter must be present if the last parameter was present. 1..255, value of the duration in units defined above **<txt....>,** Coded as detailed in section "Get command <cmdId 21> - Display Text response data"
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note Entry of the 'Digits only' response is the same regardless of alphabet set – coding of this response is performed within the modem when creating the Terminal Response.

3.2.2.7 Get Command <cmdid 23> -Get Input response data

Command data for Get Input proactive command	
Result Code ***MSTGC: 23,<dcs>,<text>,<response>,<echo>,<helpInfo>,<minLgth>,<maxLgth>[,<dcs>,<default>[,<iconId>,<dispMode>[,<formatStart>,<formatLength>,<txtAlign>,<txtSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,txtBackColour>]]]**	Parameters 23 Decimal notation: Command Type value. **<dcs>** integer: data coding scheme used for <text> or <default>. The schemes used are as per 3GPP 23.038 for SMS (see ref 9). 0 7bit GSM default alphabet (packed) 4 8bit data 8 UCS2 alphabet **<text>** string format: text string in <dcs> format **<response>,** integer: expected response characters and their format. 1 Digits (0-9, *, # and +) only from SMS default alphabet (unpacked) 2 Digits (0-9, *, # and +) only from SMS default alphabet (packed) 3 Digits from UCS2 alphabet 4 SMS default alphabet (unpacked) 5 SMS default alphabet (packed) 6 UCS2 alphabet **<echo>** 0 echo input to display 1 no echo allowed (see Note 1) **<helpInfo>** 0 no help information available 1 help information available **<minLgth>,** Integer: 0..255 minimum length of expected response can be any number in this range. (0 indicates no minimum length requirement) **<maxLgth>,** Integer: 1..255 maximum length of expected response can be any number in this range. (255 indicates no maximum length requirement) **<default>,** default text for the terminal to display – text formatting – if present - does not apply to this string. **<iconId>,** if present this numeric tag indicates the icon to be displayed – corresponds to the index in the Image file on the SIM (see4.4.4, "Obtaining Icon information *MSTICREC and *MSTICIMG") 1..255 Icon tag **<dispMode>** integer: denotes use of associated icon 0 display icon only (replaces any text string or alphaId) 1 display with alpha Id or text string **<txt....>** Coded as detailed in section "Get command <cmdId 21> -

	Display Text response data"
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note ● Actual input string may not be displayed in this case but can alternatively be masked to indicate key entry using characters from the set (0-9, * and #). ● If <minLgth> and <maxLgth> are equal, the response string is to be of fixed length.

3.2.2.8 Get Command <cmdid 24> -Select Item response data

Command data for Select Item proactive command	
Result Code ***MSTGC: 24,<numItems>,[default Item],<selection>,<helpInfo>[,<alphaId>][,<iconId>,<dispMode>][,<formatStart>,<formatLength>,<txtAlign>,<txtSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,txtBackColour>]<CR><LF>*MSTGC: <itemId>,<itemText>[,<iconId>,<dispMode>][,<nai>][,<formatStart>,<formatLength>,<txtAlign>,<txtSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>]<CR><LF>[*MSTGC: <itemId>,<itemText>[,<iconId>,<dispMode>][,<nai>][,<formatStart>,<formatLength>,<txtAlign>,<txtSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>]]<CR><LF>[…]]]]]]**	Parameters 24 Decimal notation: Command Type value. **<numItems>** integer: indicates the number of items accessible in the menu structure. A special case, indicating the existing menu is to be removed from the ME's menu structure. **<default item>** integer: if present this value indicates which of the items in the item list is to be the default item - the value can be between 1 and numItems (if present and set to zero there is no default item).If not present there is no default item. **<selection>** integer: gives preferred user selection method 0 no selection preference 1 soft key selection preferred **<helpInfo>** 0 no help information available 1 help information available **<alphaId>** string format: if present using either SMS default alphabet or UCS2 alpha field. **<iconId>** If present, the numeric tag specifying which icon is to be displayed – corresponds to the index in the Image file on the SIM (see 4.4.4, "Obtaining Icon information *MSTICREC and *MSTICIMG") 1..255, Icon tag **<dispMode>** integer: denotes use of associated icon 0, display icon only (replaces any text string or alphaId) 1, display with alpha Id or text string **<itemId>** integer: denotes the identifier of the item **<itemText>** string format: using either SMS default alphabet or UCS2 alpha field coding.

	<nai> Decimal notation: next action indicator – this takes one of the allowed values from the Command Type range – this parameter allows the ME to indicate to the user the consequence of selecting the item. **<txt....>** Coded as detailed in section "Get command <cmdId 21> - Display Text response data"
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note

3.2.2.9 Get Command <cmdid 25> -Set Up Menu response data

Command data for Set Up Menu proactive command	
Result Code ***MSTGC: 25,<numItems>,<selection>,<removemenu>,<helpInfo>,<alphaId>[,<iconId>,<dispMode>][,<formatStart>,<formatLength>,<txtAlign>,<txtSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>]<CR><LF>*MSTGC: <itemId>,<itemText>[,<iconId>,<dispMode>][,<nai>][,<formatStart>,<formatLength>,<txtAlign>,<txtSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>]<CR><LF>[*MSTGC: <itemId>,<itemText>[,<iconId>,<dispMode>],[<nai>][,<formatStart>,<formatLength>,<txtAlign>,<txtSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>]]<CR><LF>[…]]]]]]**	Parameters 25 Decimal notation: Command Type value. **<numItems>,** integer: indicates the number of items accessible in the menu structure. (0 is a special case, indicating the existing menu is to be removed from the ME's menu structure.) **<selection>**, integer: gives preferred user selection method 0 no selection preference 1 soft key selection preferred **<removeMenu>**, integer: indicates if menu should be removed and no items will follow display menu remove menu **<helpInfo>** 0 no help information available 1 help information available **<alphaId>**, string format: using either SMS default alphabet or UCS2 alpha field coding **<iconId>,** If present this numeric tag specifies the icon to be displayed – corresponds to the index in the Image file on the SIM (see 4.4.4, "Obtaining Icon information *MSTICREC and *MSTICIMG") 1..255, Icon tag **<dispMode>** integer: denotes use of associated icon 0 display icon only (replaces any text string or alphaId) 1 display with alpha Id or text string **<itemId>,** integer: denotes the identifier of the item **<itemText>**, string format: using either SMS default alphabet or UCS2 alpha field coding **<nai>**, Decimal notation: next action indicator – this takes one of the allowed values from the Command Type range- this allows the ME to

	indicate to the user the consequence of selecting the item Valid nai values: 0 NO ITEM INDICATED, 11 SEND_SS, 12 SEND_USSD, 13 SEND_SM, 15 LAUNCH_BROWSER, 20 PLAY_TONE, 21 DISPLAY_TEXT, 22 GET_INKEY, 23 GET_INPUT, 24 SELECT_ITEM, 25 SET_UP_MENU, 40 OPEN_CHANNEL, 41 CLOSE_CHANNEL, 42 RECEIVE_DATA, 43 SEND_DATA, 44 GET_CHAN_STATUS, 81 PROACTIVE_SESSION_END **<txt....>,** Coded as detailed in section "Get command <cmdId 21> - Display Text response data"
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note The maximum amount of data sent in one proactive command is 256 bytes – so for an average length of 10 bytes per text string the maximum number of items in a menu will be 18.

3.2.2.10 Get Command <cmdid 28> -Set Up Idle Mode Text response data

Command data for Set Up Idle Mode Text proactive command	
Result Code ***MSTGC: 28,<dcs>,<text>[,<iconId>,<dispMode>[,<formatStart>,<formatLength>,<txtAlign>,<txtSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,txtBackColour>]]**	Parameters 28 Decimal notation: Command Type value. **<dcs>** integer: data coding scheme used for <text>.The schemes used are as per 3GPP 23.038 for SMS (see ref 9). 0 7-bit GSM default alphabet (packed) 4 8-bit data 8 UCS2 alphabet **<text>** string format: text string in <dcs> format see Note below. **<iconId>** if present this numeric tag specifies the icon to be displayed – corresponds to the index in the Image file on the SIM (see

	4.4.4, "Obtaining Icon information *MSTICREC and *MSTICIMG") 1..255, Icon tag **<dispMode>** integer: denotes use of associated icon 0, display icon only (replaces any text string oralphaId) 1, display with alphaId or text string **<txt....>** Coded as detailed in section "Get command <cmdId 21> - Display Text response data"
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note ● If the text string given in the result code is Null (i.e. zero length and set as “” in the result code) it implies the existing Idle Mode Text is to be removed. ● If idle mode text is competing with other information to be displayed in the same area, for instance a CB message, the idle mode text should be replaced with the other information.

3.2.2.11 Get Command <cmdid 40> -OPEN CHANNEL response data

Command data for Open Channel proactive command	
Result Code ***MSTGC: 40[,<alphaId>[,<iconId>,<dispMode>[,<formatStart>,<formatLength>,<txtAlignment>,<txtFontSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>]]]**	Parameters 40 Decimal notation: Command Type value. **<alphaId>,** string format: using either SMS default alphabet or UCS2 alpha field coding. If alpha ID is present and non-NULL this should be the only information passed to the user. If alpha ID is present and it is an empty string – either “” in text mode or NULL char – no information regarding the command should be passed to the user. If alphaId field is not present, it is up to the Application Processor to decide whether to inform the user. **<txt....>** Coded as detailed in section "Get command <cmdId 21> - Display Text response data" – these optional data objects can only present if optional alpha id is present – as they are optional , they may not be present even when the alpha id is. **<iconId>** if present this indicates the numeric tag for the icon to be displayed – corresponds to the index in the Image file on the SIM/UICC. 1..255 Icon tag <dispMode> integer: denotes use of associated icon 0 display icon only (replaces any text string or alphaId) 1 display with alphaId or text string

Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note

3.2.2.12 Get Command <cmdid 42> -RECEIVE DATA response data

Command data for Receive Data proactive command	
Result Code ***MSTGC: 42,[,<alphaId>[,<iconId>,<dispMode>[,<formatStart>,<formatLength>,<txtAlignment>,<txtFontSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>]]]**	Parameters 42 Decimal notation: Command Type value. See Section "SIM Toolkit Unsolicited Data *MSTUD" for values. **<alphaId>** string format: using either SMS default alphabet or UCS2 alpha field coding to inform user of current transaction this should be the only information passed to the user. If alpha ID is present and it is an empty string – either “” in text mode or NULL char – no information regarding the command should be passed to the user. If alphaId field is not present, it is up to the Application Processor to decide whether to inform the user. **<txt....>** Coded as detailed in section "Get command <cmdId 21> - Display Text response data" – these optional data objects can only present if optional alpha id is present – as they are optional , they may not be present even when the alpha id is. **<iconId>** Numeric tag for the icon to be displayed – corresponds to the index in the Image file on the SIM. 1..255 Icon tag **<dispMode>** integer: denotes use of associated icon 0 display icon only (replaces any text string or alphaId) 1 display with alphaId or text string
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note

3.2.2.13 Get Command <cmdid 43> -RECEIVE DATA response data

Command data for Receive Data proactive command	
Result Code ***MSTGC: 43,,[,<alphaId>**	Parameters 43 Decimal notation: Command Type value. See Section "SIM Toolkit Unsolicited Data *MSTUD" for values.

[,<iconId>,<dispMode>[,<formatStart>,<formatLength>,<txtAlignment>,<txtFontSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>]]]	**<alphaId>** string format: using either SMS default alphabet (see or UCS2 alpha field coding to inform user of current transaction; this should be the only information passed to the user. If alpha ID is present and it is an empty string – either “” in text mode or NULL char – no information regarding the command should be passed to the user. If alphaId field is not present, it is up to the Application Processor to decide whether to inform the user. **<txt....>,** Coded as detailed in section "Get command <cmdId 21> - Display Text response data" – these optional data objects can only present if optional alpha id is present – as they are optional , they may not be present even when the alpha id is. **<iconId>,** Numeric tag for the icon to be displayed – corresponds to the index in the Image file on the SIM. 1..255 Icon tag **<dispMode>,** integer: denotes use of associated icon 0 display icon only (replaces any text string or alphaId) 1 display with alphaId or text string
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note

3.2.3 AT*MSTCR APP Informing PS of Response to Proactive Command

Once a proactive command has been processed, a response needs to be sent to the SIM in the form of a TERMINAL RESPONSE command. Some proactive commands will require responses from the application processor order to generate this terminal response. The application will issue command *MSTCR for those proactive commands it already retrieved via the +MSTGC AT command.

When the proactive command is sent to the application processor, a timer is started. If no response to the proactive command is received by the CI task – no AT*MSTCR set command has been received when the timer expires - a terminal response is generated to inform the SIM/UICC that there has been no user response. If the AT*MSTCR set command is received after timer expiry it is discarded. There is an option to disable the use of response timers in which case non-response by the user is handled by the application layer.

The general format of the AT command is shown below:

AT*MSTCR	
Write command **AT*MSTCR=<cmdId>,<result>[,<data>]**	Response **OK** or

	+CME ERROR: <err>
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

Defined Values

<result>	Decimal notation: dependent on the command type – see following sections for each proactive command supported. The values given in the result field for each set of proactive command response parameters are used for setting of the general result parameter returned to the SIMAT task in the next phase of signaling for building the Terminal Response command. The 'no response' result option indicates the result as processed when the modem timer – set following the AT*MSTGC command response - times out.
<data>	additional data provided for certain commands, as required for the Terminal Response returned to the SIM after processing a proactive SIM command.

The <data> supplied by the application varies dependent upon <cmdId>. The different formats are outlined in the following subsections:

3.2.3.1 Command response <cmdid 01> Refresh

The APP needs to confirm if the REFRESH is allowed – not permitted if user screen is busy.

AT*MSTCR	Command response from Application for refresh proactive command
Write command **AT*MSTCR=01,<result>**	Parameters 01 Decimal notation: Command Type value. **<result>** integer: possible values: 0 REFRESH allowed – screen not busy 1 REFRESH rejected – screen busy 2 REFRESH rejected – ME in a call No response, REFRESH rejected - screen busy
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

3.2.3.2 Command response <cmdid 05> Set-UP Event List

If this command indicates that the event list was set up successfully, when one of the events occurs the application will send an AT command AT*MSTEV.

AT*MSTCR	Command response from Application for Set Up Event List proactive command
Write command **AT*MSTCR=05,<result>**	Parameters 05 Decimal notation: Command Type value. **<result>,** integer: possible values: 0 command performed successfully 1 cannot perform command No response : cannot perform command
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

3.2.3.3 Command response <cmdid 15>LAUNCH BROWSER

AT*MSTCR	Command response for Launch Browser proactive command
Write command **AT*MSTCR=15,<result>**	Parameters 15 Decimal notation: Command Type value. **<result>,** integer: possible values: 0 command performed OK 1 browser problem: bearer not available 2 browser problem: browser not available 3 browser problem: unable to read provisioning data 4 cannot perform command – non-specific browser problem No response: browser problem - unknown
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

3.2.3.4 Command response <cmdid 20>Play Tone

AT*MSTCR	Command response for Play Tone proactive command
Write command **AT*MSTCR=20,<result>**	Parameters 20 Decimal notation: Command Type value. **<result>** integer: possible values: 0 command performed OK 1 user request to terminate proactive session 2 tone not played 3 tone not supported 4 command performed ok but ICON could not be displayed No response : tone not played
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

3.2.3.5 Command response <cmdid 21>Display Text

AT*MSTCR	Command response for Display Text proactive command
Write command **AT*MSTCR=21,<result>**	Parameters 21 Decimal notation: Command Type value. **<result>** integer: possible values: 0 message displayed ok 1 user request to terminate proactive session 2 screen is busy 3 backward move requested by user 4 command performed OK but ICON could not be displayed 5 no response from user No response: no response from user
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

3.2.3.6 Command response <cmdid 22>Get Inkey

AT*MSTCR	Command response for Get Inkey proactive command

Write command **AT*MSTCR=22,<result>[,<dcs>,<text>]**	Parameters 22 Decimal notation: Command Type value. **<result>,** integer: possible values: 0 data entered OK 1 user request to terminate proactive session 2 help information requested 3 backward move requested 4 screen busy 5 command performed OK but ICON could not be displayed 6 no response from user No response : no response from user **<dcs>,** integer: data coding scheme used for <text>. The schemes used are as per 3GPP 23.038 for SMS 0 7-bit GSM default alphabet (packed) 4 8bit data 8 UCS2 alphabet **<text>,** string format: text string in <dcs> format Special cases are: “00” Negative response entered “01” Positive response entered
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note The <dcs> and <text> information must be provided for <result>=0 as the SIM expects the input to be provided in a Text String Data Object in the Terminal Response SIM command when data has been input.

3.2.3.7 Command response <cmdid 23>Get Input

AT*MSTCR	**Command response for Get Input proactive command**
Write command **AT*MSTCR=23,<result>[,<dcs>,<text>]**	Parameters 23 Decimal notation: Command Type value. **<result>** integer: possible values: 0 data entered OK 1 user request to terminate proactive session 2 help information requested 3 backward move requested 4 screen busy 5 command performed OK but ICON could not be displayed 6 no response from user No response: no response from user **<dcs>** integer: data coding scheme used for <text>

	The schemes used are as per 3GPP 23.038 for SMS 0 7-bit GSM default alphabet (packed) 4 8-bit data 8 UCS2 alphabet **<text>** string format: text string in <dcs> format. The length of this string should be between the maximum and minimum lengths as defined in the command data.
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note If the <dcs> is present but <text> is an empty string this indicates a null text string data object must be sent to the SIM. This is caused by the user making an 'empty' input.

3.2.3.8 Command response <cmdid 24>Select Item

AT*MSTCR	Command response for Select Item proactive command
Write command **AT*MSTCR=24,<result>[,<itemId>]**	Parameters 24, Decimal notation: Command Type value. **<result>,** integer: possible values: 0 item selected OK 1 user request to terminate proactive session 2 help information requested 3 backward move requested 4 screen busy 5 command performed OK but ICON could not be displayed 6 no response from user No response: no response from user **<itemId>** integer: denotes identifier of item selected
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

3.2.3.9 Command response <cmdid 25>Set Up Menu

AT*MSTCR	Command response for Set Up Menu proactive command
Write command **AT*MSTCR=25,<result>**	Parameters 25 Decimal notation: Command Type value.

	<result> integer: possible values: 0 menu successfully added/removed 1 problem with menu operation 2 command performed OK but ICON could not be displayed No response : problem with menu operation
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

3.2.3.10 Command response <cmdid 28>Set Up Idle Mode Text

AT*MSTCR	Command response for Set Up Idle Mode Text proactive command
Write command **AT*MSTCR=28,<result>**	Parameters 28 Decimal notation: Command Type value. **<result>** integer: possible values: 0 text successfully added/removed 1 problem performing command No response : problem performing command
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

3.2.3.11 Command response <cmdid 40>OPEN CHANNEL

AT*MSTCR	Command response for Open Channel proactive command
Write command **AT*MSTCR=40,<result>**	Parameters 40 Decimal notation: Command Type value. **<result>**integer: possible values: 0 user accepted proactive command 1 user did not accept proactive command 2 user request to terminate proactive session 3 user did not cancel command but icon failed to be displayed 4 no response from user (user did not accept command) No response: user did not accept command
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

3.2.3.12 Command response <cmdid 42>RECEIVE DATA

AT*MSTCR	Command response for Receive Data proactive command
Write command **AT*MSTCR=42,<result>**	Parameters 42 Decimal notation: Command Type value. **<result>** integer: possible values: 0 user did not request session termination 1 user request to terminate proactive session 2 no session termination request but icon failed to be displayed 3 no response from user (no request for session termination) No response: no request for session termination
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

3.2.3.13 Command response <cmdid 43>SEND DATA

AT*MSTCR	Command response for Send Data proactive command
Write command **AT*MSTCR=43,<result>**	Parameters 43 Decimal notation: Command Type value. **<result>** integer: possible values: 0 user did not request session termination 1 user request to terminate proactive session 2 no session termination request but icon failed to be displayed 3 no response from user (no request for session termination) No response: no request for session termination
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

3.2.4 *MSTUD SIM Toolkit Unsolicited Data

The *MSTUD unsolicited result code is used to supply information concerning SIM Toolkit activity; it is distributed to the application for proactive indications. This is for information only and does not require a

user response. The data will be sent on the channel that has been assigned for SIM Toolkit activity - this will be set as the channel that the original terminal profile information is received from the APP at initialization.

*MSTUD	
Result code ***MSTUD:<cmdId>,<data>**	Parameters **<cmdId>** decimal format of Type of Command. Unique identifier for the proactive command that the supplied information is related to. The following values are supported: '13' Send SMS '34' Run AT Command '35' Language Notification '41' Close Channel **<data>**proactive command specific data, dependent on <cmdId>
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

The <data> varies dependent upon <cmdId>. The different formats of result codes supplied to the application on a command-by-command basis are outlined in the following subsections:

3.2.4.1 Send SMS

Command data for Send Short Message unsolicited data from proactive command	
Result Code ***MSTUD: 13[,<alphaId>[,<formatStart>,<formatLength>,<txtAlignment>,<txtFontSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>[,<iconId>,<dispMode>]]]**	Parameters 13 Decimal notation: Command Type value. **<alphaId>** string format: using either SMS default alphabet or UCS2 alpha field coding to inform user of current transaction; this should be the only information passed to the user. If alpha ID is present and it is an empty string – either "" in text mode or NULL char – no information regarding the command should be passed to the user. If alphaId field is not present, it is up to the Application Processor to decide whether or not to inform the user. **<txt....>** Coded as detailed in section "Get command <cmdId 21> - Display Text response data" – these optional data objects can only present if optional alpha id is present – as they are optional, they may not be present even when the alpha id is. <iconId>Numeric tag for the icon to be displayed – corresponds to the index in the Image file on the SIM.

	1..255 Icon tag **<dispMode>** integer: denotes use of associated icon 0 display icon only (replaces any text string or alphaId) display with alphaId or text string.
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

3.2.4.2 Run AT Command

Command data for Run AT Command unsolicited data from proactive command	
Result Code ***MSTUD: 34[,<alphaId>[,<formatStart>,<formatLength>,<txtAlignment>,<txtFontSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>[,<iconId>,<dispMode>]]]**	Parameters 34 Decimal notation: Command Type value. **<alphaId>** string format: using either SMS default alphabet or UCS2 alpha field coding to inform user of current transaction; this should be the only information passed to the user. If alpha ID is present and it is an empty string – either “” in text mode or NULL char – no information regarding the command should be passed to the user. If alphaId field is not present it is up to the Application Processor to decide whether or not to inform the user. **<txt....>** Coded as detailed in section "Get command <cmdId 21> - Display Text response data" – these optional data objects can only present if optional alpha id is present – as they are optional , they may not be present even when the alpha id is. **<iconId>** Numeric tag for the icon to be displayed – corresponds to the index in the Image file on the SIM 1..255 Icon tag <dispMode> integer: denotes use of associated icon 0 display icon only (replaces any text string or alphaId) 1 display with alphaId or text string
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

3.2.4.3 Language Notification

Command data for Language Notification unsolicited data from proactive command

Result Code ***MSTUD: 35[,<language>]**	Parameters 35 Decimal notation: Command Type value. **<language>** language code: string coded as pair of alphanumeric characters, as given in ISO 639.
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	Note The language parameter is optional. Its inclusion in the result code indicates a specific language notification. Omission from the result code indicates a non-specific language notification, which cancels a previous specific language notification.

3.2.4.4 Close Channel

Command data for Close Channel unsolicited data from proactive command	
Result Code ***MSTUD: 41[,<alphaId>[,<formatStart>,<formatLength>,<txtAlignment>,<txtFontSize>,<txtBold>,<txtItalic>,<txtUnderline>,<txtStrike>,<txtForeColour>,<txtBackColour>[,<iconId>,<dispMode>]]]**	Parameters 41 Decimal notation: Command Type value. **<alphaId>** string format: using either SMS default alphabet or UCS2 alpha field coding to inform user of current transaction; this should be the only information passed to the user. If alpha ID is present and it is an empty string – either “” in text mode or NULL char – no information regarding the command should be passed to the user. If alphaId field is not present, it is up to the Application Processor to decide whether to inform the user. **<txt....>** Coded as detailed in section "Get command <cmdId 21> - Display Text response data" – these optional data objects can only present if optional alpha id is present – as they are optional , they may not be present even when the alpha id is. **<iconId>** Numeric tag for the icon to be displayed – corresponds to the index in the Image file on the SIM. 1..255 Icon tag **<dispMode>** integer: denotes use of associated icon 0 display icon only (replaces any text string or alphaId) 1 display with alphaId or text string
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

3.2.5 AT*MSTMS Menu Selection by User

An application integrates the SIM Toolkit Main menu upon receipt of the Set Up Menu SIM Toolkit proactive command – see section "Get command <cmdId 25> - Set Up Menu response data". The user may select an item from the menu and when this selection is made the following AT command is used to convey the selection to the ATCI to pass the information on to the SIM/UICC. As a result of this an ENVELOPE command is sent to the SIM/UICC with the result of the user selection encapsulated in this.

AT*MSTMS	Menu Selection by User
Test Command **AT*MSTMS=?**	AT Command for selecting a menu option. On power-up the SIM will send the Set-Up-Menu proactive indication. The Application Processor (M4) loads and displays the menu structure. This AT command is used when an item from this menu is selected. Response ***MSTMS: <first menu item id – last menu item id>,<0-1>** or **+CME ERROR: <err>**
Write Command **AT*MSTMS=<item>[,<help>]**	Response **OK** or **+CME ERROR: <err>**
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

Defined Values

<mode>	Integer, identifying an item in the menu items list.
<help>	Integer. 0 no help requested 1 help requested

NOTE

- For example, AT*MSTMS=2,1 will select item 2 from the main menu with help. (This response would result in an ENVELOPE command being passed to the SIM/UICC to indicate the item and that help is requested – as a result of this a proactive command – DISPLAY TEXT would be generated to supply the help information to the user)

3.2.6 AT*MSTEV APP-specific monitored event occurrence

Following on from receipt of a Set-Up Event list proactive command when one of the events in the list occurs, the application informs the MS of this occurrence using this command.

AT*MSTEV	APP specific monitored event occurence
Test Command **AT*MSTEV=?**	This command is used to inform the MS that an MMI specific event has occurred. Response ***MSTEV: (supported <event> list)** or **+CME ERROR: <err>**
Write Command **AT*MSTEV=<event>[,<language>][,<charsDownDisplay>[,<sizingSupported>[,<charsAcrossDisplay>[,<variableFontSupport>[,<displayResize>[,<textWrapping>[,<textScrolling>[,<menuWidthReduction>]]]]]]]]**	Response **OK** or **+CME ERROR: <err>**
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

Defined Values

<event>	Hex two digits. 05 User Activity Event* 06 Idle Screen Available Event* 08 Language Selection Event 0C Display Parameters Changed
<language>	two character string representation of the language code.
<charsDownDisplay>	numeric type to indicate how many characters down are displayed (1 – 15)
<sizingSupported>	numeric type 0 or 1 to indicate FALSE/TRUE.
<charsAcrossDisplay>	numeric type to indicate how many characters across are displayed (1 – 127).
<variableFontSupport>	numeric type 0 or 1 to indicate FALSE/TRUE.
<displayResize>	numeric type 0 or 1 to indicate FALSE/TRUE.
<textWrapping>	numeric type 0 or 1 to indicate FALSE/TRUE.
<textScrolling>	numeric type 0 or 1 to indicate FALSE/TRUE.
<menuWidthReduction>	numeric type to indicate the allowed menu size reduction (0 – 7).

NOTE

- The <language> parameter is applicable only to Language Selection Event. For example, AT*MSTEV=08,"en" indicates that a language selection of English. The language code mapping is as per reference 11.
- The display parameters are only valid for the Display Parameters Changed event.
- These events are only monitored for once – once they have occurred and are reported they should be removed from the Event List automatically.

3.2.7 *MCCST Call Control on SIM

The result of the call control action is reported as an unsolicited response on the channel that passed the request, or if this is the result of call control applied to a proactive command, the unsolicited data is supplied to the channel supporting STK proactive command reporting.

The format of the unsolicited data is as follows:

Unsolicited response for CALL CONTROL ON SIM	
Result Code ***MCCST: <ccType>,<ccEvent>[,<alphaId>]**	Parameters **<ccType>** 1 MO SMS 4 Packet Data Context **<ccEvent>** 0 Allowed 1 Modified 2 Barred 5 **<alphaId>** string format: using either SMS default alphabet or UCS2 alpha field coding to inform user of current transaction; 1
Parameter Saving Mode	NO_SAVE
Max Response Time	
Reference	

Note: This reporting is part of the general Call/GPRS Context Activation handling when Packet data call Control is enabled – as part of the information passed for responses – for example to AT +CGACT, ATD*99# - and needs to be handled by the Application Processor when responses are received as part of the general operation for these activities.

Reporting the results of Call control operation to the User:

The following conditions apply in relation to what should be reported to the user when a call control operation has been performed:

- ccEvent = 0 SMS/Packet Data Context Activation allowed
  - o if an alpha identifier is provided and is not a null this string should be displayed to the user to supply info about the call control activity;
  - o if an alpha identifier is provided and this is a null data object “” in text mode or NULL Char then there should be no modification of the display from the original user request;
  - o if there is no alpha identifier the user can be informed what has happened but it is not a requirement to do this.
- ccEvent = 1, 3 or 4 Operation Allowed but Modified
  - o if an alpha identifier is provided and is not a null this string should be displayed to the user – no other information on the changes made as a result of the call control should be passed to the user;
  - o if an alpha identifier is provided and this is a null data object “” in text mode or NULL Char then no information regarding the changes should be supplied to the user. There should be no modification of the display from the original user request;
  - o if there is no alpha identifier then the user can be informed that the initial user request has been changed but it is not a requirement to do this.
- ccEvent = 2 Operation Barred
  - o if an alpha identifier is provided and is not a null this string should be displayed to the user – no other information on the barring should be passed to the user ;
  - o if an alpha identifier is provided and this is a null data object “” in text mode or NULL Char or no alpha identifier is provided then the user can be informed about the barring but it is not a requirement to do this.

3.3 CME Errors relevant to SIM Toolkit Operations(NB)

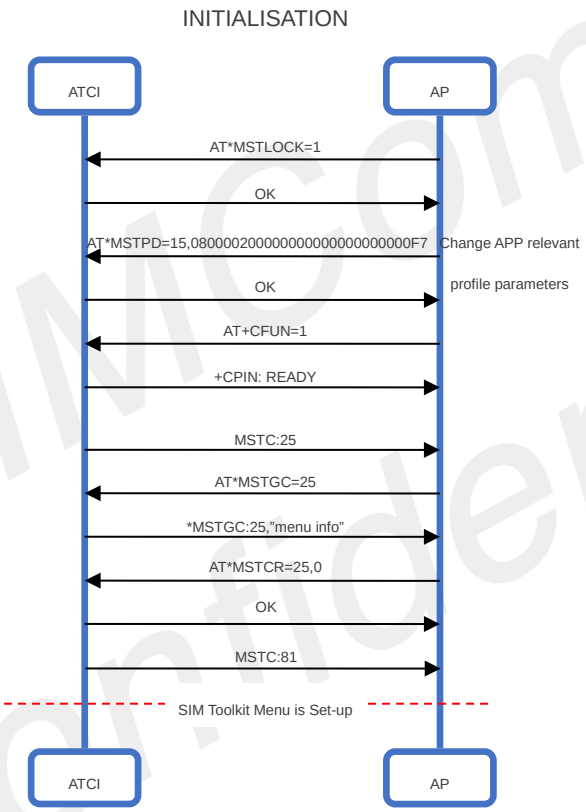
The following CME errors are used for reporting of SIM Toolkit specific problems:

Verbose CME Error	CME error code	Used in response to commands	Description
sim toolkit not enabled	707	MSTGC; MSTCR; MSTEV; MSTMS;	There is no current SIM Toolkit session
sim toolkit already in use	706	MSTGC; MSTCR; MSTEV; MSTMS;	A proactive SIM Toolkit session is already running for a different entity.

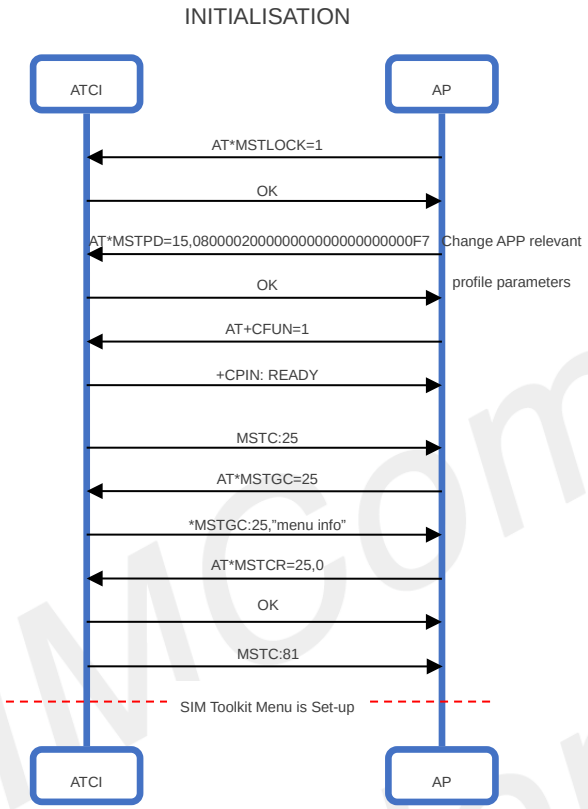
sim toolkit menu has not been configured	705	MSTMS;	Either there are no menu, or items in the STK menu or the menu has been removed
APP profile not updated	709	MSTPD;	The new APP profile download has failed
invalid SIM toolkit proactive command ID	710	MSTCR;	The command id entered for the MSTCR does not conform with the current proactive command
invalid SIM proactive command response data	711	MSTCR;	The input data associated with the current proactive command is not valid.
Invalid characters in text string	25	MSTEV; MSTMS;	Invalid characters in string (i.e. characters in expected numeric string)
Invalid index	21	MSTMS;	The operation failed because the menu or the help item index was not for a valid option

4 SAT Examples

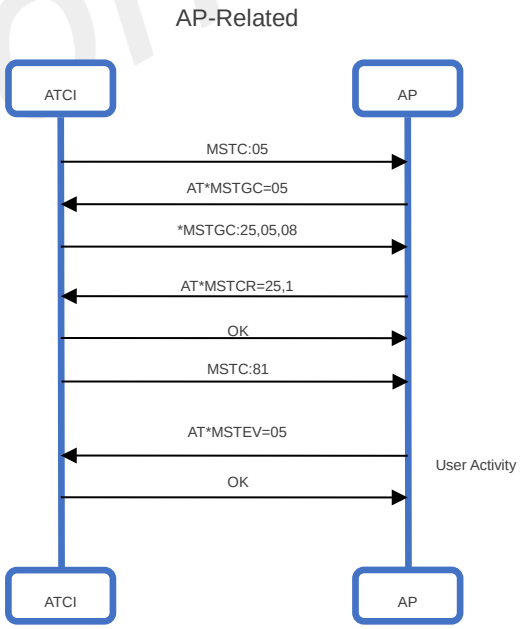
4.1 Menu Set up



4.2 Menu Selection



4.3 AP-Releated Event



4.4 Open/Close channel with Alpha ID