4G-EZ Software Suite

VoLTE-ready

Monarch Platform LR5.1.1.0 AT Commands Reference Manual

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Preface

Legal Notices

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Document Revision History

Revision	Date	Product Application
1	August 2017	First edition of the AT Commands Reference Manual for LTE software release LR5.1.1.0. Preliminary edition.
2	September 2017	Second edition of the AT Commands Reference Manual for LTE software release LR5.1.1.0.

About this Manual

Purpose and Scope

This Reference Manual specifies the complete list of AT commands supported by the Sequans LTE User Equipment (UE) firmware. It is applicable to 4G-EZ LTE Software Release LR5.1.1.0.

Who Should Read this Document

This document is intended for engineers using Sequans LTE systems during the development and test phases.

Note: This document addresses a preliminary LR5.1.1.0 software release. It is subject to change. Please refer to the AT commands validation status in the *Software Release Note*.

Changes in this Document

The list of commands and URCs was updated for this edition of the document.

References

Reference	Document Title
ITU-T V.250 http://www.itu.int/rec/T-REC-V.250-200307-I/en	SERIES V: DATA COMMUNICATION OVER THE TELEPHONE NETWORK - Control procedures - Serial asynchronous automatic dialling and control
3GPP TS 27.007-13.6.0 http://www.3gpp.org/ftp/Specs/archive/27_series/27.007/27007-d60.zip	AT commands set for User Equipment
3GPP TS 27.005-13.0.0 http://www.3gpp.org/ftp/Specs/archive/27_series/27.005/27005-d00.zip	AT commands set for Short Message Service (SMS) and Cell Broadcast Service (CBS)
3GPP TR 21.905-9.4.0 http://www.3gpp.org/ftp/Specs/archive/21_series/21.905/21905-940.zip	Vocabulary for 3GPP Specifications

Documentation Conventions

The following typographic conventions are used in this document.

General Conventions	
Note	Important information requiring the user's attention.
Caution	A condition or circumstance that may cause damage to the equipment or loss of data.
Warning	A condition or circumstance that may cause personal injury.
Italics	Italic font style denotes • Emphasis of an important word; • First use of a new term; • Title of a document.
Screen Name	Sans serif, bold font denotes • On-screen name of a window, dialog box or field; • Keys on a keyboard; • Labels printed on the equipment.

Software Conventions	
`Code`	Regular Courier font denotes code or text displayed on-screen.
Code	Bold Courier font denotes commands and parameters that you enter exactly as shown. Multiple parameters are grouped in brackets [ ]. If you are to choose only one among grouped parameters, the choices are separated with a pipe: [parm1 | parm2 | parm3] If there is no pipe separator, you must enter each parameter: [parm1 parm2 parm3]
Code	Italic Courier font denotes parameters that require you to enter a value or variable. Multiple parameters are grouped in brackets [ ]. If you are to choose only one among grouped parameters, the choices are separated with a pipe: [parm1 | parm2 | parm3] If there is no pipe separator, you must enter a value for each parameter: [parm1 parm2 parm3]

Table of Contents

1 ITU AT Channel Configuration Commands

1.1 Received Line Signal Detector Behaviour: &C

Note: This command is described in *ITU-T V.250*. See Section *References*.

1.1.1 Syntax

Command	Possible Response(s)
AT&C[<*value*>]	

1.1.2 Description

This command defines the Circuit 109 (Received line signal detector) behavior.

This parameter determines how the state of circuit 109 relates to the detection of received line signal from the distant end. Changing the parameter will take effect immediately in both the command and online command states.

In `&C1` mode of operation, circuit 109 is not turned off until all data previously received from the remote DCE is delivered to the local DTE. However, such buffered data shall be discarded and circuit 109 turned off if the DTE turns off circuit 108 (if `&D1` or `&D2` is set).

1.1.3 Defined Values

value

Integer.

Note: The recommanded default value is 1.

Table 1-1: value

Value	Description
0	The DCE always presents the ON condition on circuit 109.
1	Circuit 109 changes in accordance with the underlying DCE, which may include functions? other than the physical layer functions (e.g., ITU-T Recs V.42, V.110, V.120 and V.13).

1.2 Data Terminal Ready Behavior: &D

Note: This command is described in *ITU-T V.250*. See Section *References*.

1.2.1 Syntax

Command	Possible Response(s)
AT&D[<*value*>]	

1.2.2 Description

This command defines the Circuit 108 (data terminal ready) behavior.

This parameter determines how the DCE responds when circuit 108/2 is changed from the ON to the OFF condition during online data state.

If the value specified is not recognized, an ERROR result code is issued. Implementation of defined values 0 and 2 is mandatory; implementation of defined value 1 is optional.

1.2.3 Defined Values

value

Integer.

Note: The recommanded default value is 1.

Table 1-2: value

Value	Description
0	DCE ignores circuit 108/2.
1	Upon an on-to-off transition of circuit 108/2, the DCE enters online command state and issues an OK result code; the call remains connected.
2	Upon an on-to-off transition of circuit 108/2, the DCE instructs the underlying DCE to perform an orderly cleardown of the call. The disposition of any data in the DCE pending transmission to the remote DCE is controlled by the +ETBM parameter (see Error control commands) if implemented; otherwise, this data is sent before the call is cleared, unless the remote DCE clears the call first (in which case pending data is discarded). The DCE disconnects from the line. Automatic answer is disabled while circuit 108/2 remains off.

1.3 Echo: E

Note: This command is described in *ITU-T V.250*. See Section *References*.

1.3.1 Syntax

Command	Possible Response(s)
ATE<*value*>	

1.3.2 Description

The setting of this parameter determines whether or not the DCE echoes characters received from the DTE during command state and online command state.

1.3.3 Defined Values

value

Integer.

Note: The default value is 0, i.e. DCE does not echo characters.

Table 1-3: value

Value	Description
0	DCE does not echo characters during command state and online command state.
1	DCE echoes characters during command state and online command state.

1.4 Set to Factory-Defined Configuration: &F

Note: This command is described in *ITU-T V.250*. See Section *References*.

1.4.1 Syntax

Command	Possible Response(s)
AT&F[<*value*>]	`OK` if value is valid. `ERROR` if value is not recognized or supported.

1.4.2 Description

This command instructs the DCE to set all parameters to default values specified by the manufacturer, which may take into consideration hardware configuration switches and other manufacturer-defined criteria.

An `OK` result code for this command is issued using the same rate, parity, and word format as the DTE command line containing the command, but using the factory-defined values for other parameters that affect the format of result codes (e.g., `Q`, `V`, `S3`, `S4`) and dependent upon other commands that may follow on the same command line.

Execution time for this action varies widely depending on manufacturer implementation. The DTE should not assume the amount of time required to execute this command, but await a result code or other positive indication from the DCE that it is ready to accept a command.

1.4.3 Defined Values

value

Integer.

Table 1-4: *value*

Value	Description
0	Set parameters to factory defaults.
Other	Reserved for manufacturer proprietary use.

1.5 Request Manufacturer Identification: +GMI

Note: This command is described in *ITU-T V.250*. See Section *References*. See also command Request Manufacturer Identification: +CGMI.

1.5.1 Syntax

Command	Possible Response(s)
AT+GMI	OK

1.5.2 Description

See note above. Please refer to 2.4 Request Manufacturer Identification: +CGMI on page 39

1.6 Request Model Identification: +GMM

Note: This command is described in *ITU-T V.250*. See Section *References*. See also command Request Model Identification: +CGMM.

1.6.1 Syntax

Command	Possible Response(s)
AT+GMM	OK

1.6.2 Description

See note above. Please refer to 2.5 Request Model Identification: +CGMM on page 40

1.7 Request Revision Identification: +GMR

Note: This command is described in *ITU-T V.250*. See Section *References*. See also command Request Revision Identification: +CGMR.

1.7.1 Syntax

Command	Possible Response(s)
AT+GMR	OK

1.7.2 Description

See note above. Please refer to 2.6 Request Revision Identification: +CGMR on page 41.

1.8 Request Product Serial Number Identification: +GSN

Note: This command is described in *ITU-T V.250*. See Section *References*. See also command Request Product Serial Number Identification: +CGSN.

1.8.1 Syntax

Command	Possible Response(s)
AT+GSN	OK

1.8.2 Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the DCE to identify the individual device. Typically, the text will consist of a single line containing a manufacturer determined alpha-numeric string, but manufacturers may choose to provide any information desired.

The total number of characters, including line terminators, in the information text returned in response to this command shall not exceed 2048 characters. Note that the information text shall not contain the sequence `"0 <CR>" (3/0, 0/13)` or `"OK<CR>" (4/15, 4/11, 0/13)`, so that DTE can avoid false detection of the end of this information text.

1.9 Request Identification Information: I

Note: This command is described in *ITU-T V.250*. See Section *References*.

1.9.1 Syntax

Command	Possible Response(s)
ATI[<*value*>]	
ATI or **ATI0**	<*manufacturer*><CR><LF><*model*><CR><LF><*ue_version*>
ATI1	<*ue_version*><CR><LF><*lr_version*>

1.9.2 Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, followed by a final result code. `<value>` may optionally be used to select from among multiple types of identifying information, specified by the manufacturer.

Note: The responses to this command may not be reliably used to determine the DCE manufacturer, revision level, feature set, or other information, and should not be relied upon for software operation. In particular, expecting a specific numeric response to an `I0` command to indicate which other features and commands are implemented in a DCE dooms software to certain failure, since there are widespread differences in manufacturer implementation among devices that may, coincidentally, respond with identical values to this command. Software implementors should use `I` commands with extreme caution, since the amount of data returned by particular implementations may vary widely from a few bytes to several thousand bytes or more, and should be prepared to encounter `ERROR` responses if the value is not recognized.

ATI or ATI0 write commands reports device MT manufacturer, MT model and the UE software version.

ATI1 write commands reports the UE and LR software versions.

1.9.3 Example

```
ATI
Sequans
VZ120Q
UE4.3.0.0-21466
OK

ATI1
UE4.3.0.0-21466
LR4.3.1.1-ER1-22900
OK
```

1.10 DTE-DCE Character Framing: +ICF

Note: This command is described in *ITU-T V.250*. See Section *References*.

1.10.1 Syntax

Command	Possible Response(s)
AT+ICF=[<*format*[,<*parity*>]]	
AT+ICF?	`+ICF:`<*format*>,<*parity*>
AT+ICF=?	`+ICF:`*(list of supported <format> values),(list of supported <parity> values)*

1.10.2 Description

This extended-format compound parameter is used to determine the local serial port start-stop (asynchronous) character framing that the DCE shall use while accepting DTE commands and while transmitting information text and result code, if this is not automatically determined; `+IPR=0` forces `+ICF=0` (see Fixed DTE Rate: +IPR). Note that the definition of fixed character format for online data state is for further study.

1.10.3 Defined Values

format

Integer. Determines the number of bits in the data bits, the presence of a parity bit, and the number of stop bits in the start-stop frame. Recommended default value is 3.

Note: The semantics of this command are derived from ITU-T Rec. V.58.

Table 1-5: *format*

Value	Description
0	autodetect
1	8 Data ; 2 Stop
2	8 Data ; 1 Parity ; 1 Stop
3	8 Data ; 1 Stop
4	7 Data ; 2 Stop
5	7 Data ; 1 Parity ; 1 Stop
6	7 Data ; 1 Stop

parity

Integer. Determines how the parity bit is generated and checked, if present. Recommended default value is 3.

Table 1-6: *parity*

Value	Description
0	Odd
1	Even
2	Mark
3	Space

1.10.4 Examples

- Read syntax

  `+ICF?`

  `+ICF:3,3` for the recommended defaults.

- Test syntax

  `+ICF=?`

  `+ICF:(0-6),(0-3)` for all defined values.

1.11 DTE-DCE Local Flow Control: +IFC

Note: This command is described in *ITU-T V.250*. See Section *References*.

1.11.1 Syntax

Command	Possible Response(s)
AT+IFC=[<*DCE_by_DTE*[,<*DTE_by_DCE*>]]	
AT+IFC?	`+IFC:`<*DCE_by_DTE*>,<*DTE_by_DCE*>
AT+IFC=?	`+IFC:`*(list of supported <DCE_by_DTE> values),(list of supported <DTE_by_DCE> values)*

1.11.2 Description

This extended-format compound parameter is used to control the operation of local flow control between the DTE and DCE during the data state when V.42 error control is being used, or when fallback to non-error control mode is specified to include buffering and flow control. It accepts two numeric subparameters:

- `<DCE_by_DTE>`, which specifies the method to be used by the DTE to control the flow of received data from the DCE;
- `<DTE_by_DCE>`, which specifies the method to be used by the DCE to control the flow of transmitted data from the DTE.

1.11.3 Defined Values

DCE_by_DTE

Integer. Specifies the method to be used by the DTE to control the flow of received data from the DCE. Recommended default value is 2.

Note: The semantics of this command are derived from ITU-T Rec. V.58.

Table 1-7: *DCE_by_DTE*

Value	Description
0	None
1	DC1/DC3 on circuit 103; do not pass DC1/DC3 characters to the remote DCE
2	Circuit 133 (Ready for Receiving)
3	DC1/DC3 on circuit 103 with DC1/DC3 characters being passed through to theremote DCE in addition to being acted upon for local flow control
4 to 127	Reserved for future standardization
Other	Reserved for manufacturer-specific use

DTE_by_DCE

Integer. Specifies the method to be used by the DCE to control the flow of transmitted data from the DTE. Recommended default value is 2.

Table 1-8: *DTE_by_DCE*

Value	Description
0	None
1	DC1/DC3 on circuit 104
2	Circuit 106 (Clear to Send/Ready for Sending)
3 to 127	Reserved for future standardization
Other	Reserved for manufacturer-specific use

1.11.4 Examples

- Read syntax

  `+IFC?`

  `+IFC:2,2` for the recommended defaults.

- Test syntax

  `+IFC=?`

  `+IFC:(0-3),(0-2)` for all defined values.

1.12 Fixed DTE Rate: +IPR

Note: This command is described in *ITU-T V.250*. See Section *References*.

1.12.1 Syntax

Command	Possible Response(s)
AT+IPR=<*rate*>	
AT+IPR?	`+IPR:`<*rate*>
AT+IPR=?	`+IPR:`*(list of supported autodetectable <rate> values)[,(list of fixed-only <rate> values)]*

1.12.2 Description

This numeric extended-format parameter specifies the data rate at which the DCE will accept commands, in addition to 1200 bit/s or 9600 bit/s (as required in 4.3). It may be used to select operation at rates at which the DCE is not capable of automatically detecting the data rate being used by the DTE. Specifying a value of 0 disables the function and allows operation only at rates automatically detectable by the DCE. The specified rate takes effect following the issuance of any result code(s) associated with the current command line.

The `<rate>` specified does not apply in online data state if Direct mode of operation is selected.

1.12.3 Defined Values

rate

The value specified shall be the rate in bits per second at which the DTE-DCE interface should operate, e.g., "19 200" or "115 200". The rates supported by a particular DCE are manufacturer-specific; however, the +IPR parameter should permit the setting of any rate supported by the DCE during online operation. Rates which include a non-integral number of bits per second should be truncated to the next lower integer (e.g., 134.5 bit/s should be specified as 134; 45.45 bit/s should be specified as 45). If unspecified or set to 0, automatic detection is selected for the range determined as in 4.3 and the DCE manufacturer, and the character format is also forced to autodetect.

It is recommended that the default for this parameter be the automatic detection setting (0), which facilitates initial DTE-DCE communications.

1.12.4 Examples

- Read syntax

  `+IPR?`

  The DCE shall transmit a string of information text to the DTE, consisting of `+IPR:<rate>`.

  – `+IPR:0` if set for automatic rate detection.

  – `+IPR:9600` if set to 9600 bit/s.

- Test syntax

  `+IPR=?`

  The DCE shall transmit one or two strings of information text to the DTE, consisting of `+IPR:(list of supported autodetectable <rate> values)[,(list of fixed-only <rate> values)]`

  `+IPR:(0,300,1200,2400,4800,9600),(19200,38400,57600)` if the DCE can autodetect up to 9600 bit/s and can support three additional higher fixed rates.

1.13 Result Code Suppression: Q

Note: This command is described in *ITU-T V.250*. See Section *References*.

1.13.1 Syntax

Command	Possible Response(s)
ATQ[<*value*>]	OK If value is 0. (none) If value is 1 (because result codes are suppressed). ERROR For unsupported values (if previous value was Q0). (none) For unsupported values (if previous value was Q1).

1.13.2 Description

The setting of this parameter determines whether or not the DCE transmits result codes to the DTE. When result codes are being suppressed, no portion of any intermediate, final, or unsolicited result code – header, result text, line terminator, or trailer – is transmitted. Information text transmitted in response to commands is not affected by the setting of this parameter.

1.13.3 Defined Values

value

Integer.

Note: The recommanded default value is 0.

Table 1-9: value

Value	Description
0	DCE transmits result codes.
1	Result codes are suppressed and not transmitted.

1.14 Data Set Ready (DSR) Control: &S

1.14.1 Syntax

Command	Possible Response(s)
AT&S[<*value*>]	`OK` if value is valid. `ERROR` if value is not recognized or supported.

1.14.2 Description

Set command controls the RS232 DSR pin behaviour.

If value 1 is selected then DSR is tied High when the device receives from the network the GSM traffic channel indication.

In power saving mode the DSR pin is always tied Low.

If parameter is omitted, the command has the same behaviour of AT&S0

1.14.3 Defined Values

value

Integer.

Table 1-10: *value*

Value	Description
0	Always High
1	Follow the GSM traffic indication
2	High when connected
3	High when device is ready to receive commands

1.15 Command Line Termination Character: S3

Note: This command is described in *ITU-T V.250*. See Section *References*.

1.15.1 Syntax

Command	Possible Response(s)
ATS3=[<*value*>]	

1.15.2 Description

This S-parameter represents the decimal IA5 value of the character recognized by the DCE from the DTE to terminate an incoming command line. It is also generated by the DCE as part of the header, trailer, and terminator for result codes and information text, along with the `S4` parameter (see the description of the V parameter for usage).

The previous value of `S3` is used to determine the command line termination character for entry of the command line containing the `S3` setting command. However, the result code issued shall use the value of `S3` as set during the processing of the command line. For example, if `S3` was previously set to 13 and the command line "`ATS3=30`" is issued, the command line shall be terminated with a CR character (IA5 0/13), but the result code issued will use the character with the ordinal value 30 (IA5 2/14) in place of the CR.

1.15.3 Defined Values

value

Integer in range 0..127. Set command line termination character to this value. Mandatory default value is 13 carriage return character (CR, IA5 0/13).

1.16 Response Formatting Character: S4

Note: This command is described in *ITU-T V.250*. See Section *References*.

1.16.1 Syntax

Command	Possible Response(s)
ATS4=[<*value*>]	

1.16.2 Description

This S-parameter represents the decimal IA5 value of the character generated by the DCE as part of the header, trailer, and terminator for result codes and information text, along with the `S3` parameter (see the description of the V parameter for usage).

If the value of `S4 is` changed in a command line, the result code issued in response to that command line will use the new value of `S4`.

1.16.3 Defined Values

value

Integer in range 0..127. Set response formatting character to this value. Recommended default value is 10 line feed character (LF, IA5 0/10).

1.17 Command Line Editing Character: S5

Note: This command is described in *ITU-T V.250*. See Section *References*.

1.17.1 Syntax

Command	Possible Response(s)
ATS5=[<*value*>]	

1.17.2 Description

This S-parameter represents the decimal IA5 value of the character recognized by the DCE as a request to delete from the command line the immediately preceding character.

1.17.3 Defined Values

value

Integer in range 0..127. Set command line editing character to this value. Recommended default value is 8 backspace character (BS, IA5 0/8).

1.18 DCE Response Format: V

Note: This command is described in *ITU-T V.250*. See Section *References*.

1.18.1 Syntax

Command	Possible Response(s)
ATV[<*value*>]	0 If value is 0 (because numeric response text is being used). OK If value is 1. 4 For unsupported values (if previous value was V0). ERROR For unsupported values (if previous value was V1).

1.18.2 Description

The setting of this parameter determines the contents of the header and trailer transmitted with result codes and information responses. It also determines whether result codes are transmitted in a numeric form or an alphabetic (or "verbose") form. The text portion of information responses is not affected by this setting.

Table 1-11 shows the effect of the setting of this parameter on the format of information text and result codes. All references to <cr> mean "the character with the ordinal value specified in parameter S3"; all references to <lf> likewise mean "the character with the ordinal value specified in parameter S4". See Table 1-11.

Table 1-11: Effect of V Parameter on Response Formats

	V0	V1
Information Response	<text><cr><lf>	<cr><lf><text><cr><lf>
result Codes	<numeric code><cr>	<cr><lf><verbose code><cr><lf>

1.18.3 Defined Values

value

Integer.

Note: The recommanded default value is 1.

Table 1-12: value

Value	Description
0	DCE transmits limited headers and trailers and numeric text.
1	DCE transmits full headers and trailers and verbose response text.

1.19 Reset to Default Configuration: Z

Note: This command is described in *ITU-T V.250*. See Section *References*.

1.19.1 Syntax

Command	Possible Response(s)
ATZ[<*value*>]	`OK` If <*value*> is recognized. `ERROR` If <*value*> is not recognized or supported.

1.19.2 Description

This command instructs the DCE to set all parameters to their factory defaults as specified by the manufacturer. This may include taking into consideration the settings of hardware configuration switches or non-volatile parameter storage (if implemented). If the DCE is connected to the line, it is disconnected from the line, terminating any call in progress.

All of the functions of the command shall be completed before the DCE issues the result code. The DTE should not include additional commands on the same command line after the `Z` command because such commands may be ignored.

Note: Because this command may take into consideration the settings of switches and non-volatile parameter storage, it does not necessarily return the DCE to a "known state". In particular, the DCE may, as a result of execution of this command, be placed in a state in which it appears to not respond to DTE commands, or respond in a completely different format than was being used prior to execution of the command.

2 3GPP General Commands

2.1 eDRX Read Dynamic Parameters: +CEDRXRDP

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.1.1 Syntax

Command	Possible Response(s)
AT+CEDRXRDP	`+CEDRXRDP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]`
AT+CEDRXRDP=?	

2.1.2 Description

The execution command returns <AcT-type> and <Requested_eDRX_value>, <NW-provided_eDRX_value> and <Paging_time_window> if eDRX is used for the cell that the MS is currently registered to.

If the cell that the MS is currently registered to is not using eDRX, `AcT-type=0` is returned.

2.1.3 Defined Values

AcT-type

Integer type, indicates the type of access technology. This AT-command is used to specify the relationship between the type of access technology and the requested eDRX value.

Table 2-1: *AcT-type*

Value	Description
0	Access technology is not using eDRX. This parameter value is only used in the unsolicited result code.
1	EC-GSM-IoT (A/Gb mode)
2	GSM (A/Gb mode)
3	UTRAN (Iu mode)
4	E-UTRAN (WB-S1 mode)
5	E-UTRAN (NB-S1 mode)

Requested_eDRX_value

String type; half a byte in a 4 bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008. The default value, if available, is manufacturer specific.

NW-provided_eDRX_value

String type; half a byte in a 4 bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008.

Paging_time_window

String type; half a byte in a 4 bit format. The paging time window referes to bit 8 to 5 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]). For the coding and the value range, see the Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008.

2.2 eDRX Setting: +CEDRXS

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.2.1 Syntax

Command	Possible Response(s)
AT+CEDRXS=[*<mode>*,[,*<AcT-type>*[,*<Requested_eDRX_value>*]]]	`+CME ERROR:` *<err>*
AT+CEDRXS?	`[+CEDRXS: <AcT-type>,<Requested_eDRX_value>` `[<CR><LF>+CEDRXS:<AcT-type>,<Requested_eDRX_value>[...]]]`
AT+CEDRXS=?	`+CEDRXS: (list of supported <mode>s),(list of supported <AcT-type>s),(list of supported <Requested_eDRX_value>s)`

2.2.2 Description

The set command controls the setting of the UEs eDRX parameters. The command controls whether the UE wants to apply eDRX or not, as well as the requested eDRX value for each specified type of access technology.

The set command also controls the presentation of an unsolicited result code `+CEDRXP:<AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]` when <n>=2 and there is a change in the eDRX parameters provided by the network.

A special form of the command can be given as `+CEDRXS=3`. In this form, eDRX will be disabled and data for all parameters in the command `+CEDRXS` will be removed or, if available, set to the manufacturer specific default values.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

The read command returns the current settings for each defined value of `<AcT-type>`.

The test command returns the supported `<mode>`s and the value ranges for the access technology and the requested eDRX value as compound values.

2.2.3 Defined Values

mode

Integer type, indicates to disable or enable the use of eDRX in the UE. This parameter is applicable to all specified types of access technology, i.e. the most recent setting of `<mode>` will take effect for all specified values of `<AcT>`.

Table 2-2: *mode*

Value	Description
0	Disable the use of eDRX
1	Enable the use of eDRX
2	Enable the use of eDRX and enable the unsolicited result code `+CEDRXP:<AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]`
3	Disable the use of eDRX and discard all parameters for eDRX or, if available, reset to the manufacturer specific default values.

AcT-type

Integer type, indicates the type of access technology. This AT-command is used to specify the relationship between the type of access technology and the requested eDRX value.

Table 2-3: *AcT-type*

Value	Description
0	Access technology is not using eDRX. This parameter value is only used in the unsolicited result code.
1	EC-GSM-IoT (A/Gb mode)
2	GSM (A/Gb mode)
3	UTRAN (Iu mode)
4	E-UTRAN (WB-S1 mode)
5	E-UTRAN (NB-S1 mode)

Requested_eDRX_value

String type; half a byte in a 4 bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008. The default value, if available, is manufacturer specific.

NW-provided_eDRX_value

String type; half a byte in a 4 bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008.

Paging_time_window

String type; half a byte in a 4 bit format. The paging time window referes to bit 8 to 5 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]). For the coding and the value range, see the Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008.

2.3 Extended Signal Quality: +CESQ

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.3.1 Syntax

Command	Possible Response(s)
AT+CESQ	`+CESQ:` *<rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp>* `+CME ERROR:` *<err>*
AT+CESQ=?	`+CESQ:` *(list of supported <rxlev>s),(list of supported <ber>s),(list of supported <rscp>s),(list of supported <ecno>s),(list of supported <rsrq>s),(list of supported <rsrp>s)*

2.3.2 Description

Execution command returns received signal quality parameters. If the current serving cell is not a GERAN cell, `<rxlev>` and `<ber>` are set to value 99. If the current serving cell is not a UTRA FDD or UTRA TDD cell, `<rscp>` is set to 255. If the current serving cell is not a UTRA FDD cell, `<ecno>` is set to 255. If the current serving cell is not an E-UTRA cell, `<rsrq>` and `<rsrp>` are set to 255.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

Test command returns values supported as compound values.

2.3.3 Defined Values

rxlev

Integer. Received signal strength level (see 3GPP TS 45.008 [20] subclause 8.1.4).

Table 2-4: *rxlev*

Value	Description
0	rsrp < -110 dBm
1	-110 dBm ≤ rsrp < -109 dBm
2	-109 dBm ≤ rsrp < -108 dBm
...	...
61	-50 dBm ≤ rsrp < -49 dBm
62	-49 dBm ≤ rsrp < -48 dBm
63	-48 dBm ≤ rsrp
99	not known or not detectable

ber

Integer. Channel bit error rate (in percent).

Table 2-5: *ber*

Value	Description
0 .. 7	as RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4
99	not known or not detectable

rscp

Integer. Received signal code power (see 3GPP TS 25.133 [95] subclause 9.1.1.3 and 3GPP TS 25.123 [96] subclause 9.1.1.1.3).

Table 2-6: *rscp*

Value	Description
0	rscp < -120 dBm
1	-120 dBm ≤ rscp < -119 dBm

Table 2-6: *rscp* (Continued)

Value	Description
2	-119 dBm ≤ rscp < -118 dBm
...	...
94	-27 dBm ≤ rscp < -26 dBm
95	-26 dBm ≤ rscp < -25 dBm
96	-25 dBm ≤ rscp
255	not known or not detectable

ecno

Integer. Ratio of the received energy per PN chip to the total received power spectral density (see 3GPP TS 25.133 [95] subclause).

Table 2-7: *ecno*

Value	Description
0	Ec/Io < -24 dB
1	-24 dB ≤ Ec/Io < -23.5 dB
2	-23.5 dB ≤ Ec/Io < -23 dB
...	...
47	-1 dB ≤ Ec/Io < -0.5 dB
48	-0.5 dB ≤ Ec/Io < 0 dB
49	0 dB ≤ Ec/Io
255	not known or not detectable

rsrq

Integer. Reference signal received quality (see 3GPP TS 36.133 [96] subclause 9.1.7).

Table 2-8: *rsrq*

Value	Description
0	rsrq < -19.5 dB

Table 2-8: *rsrq* (Continued)

Value	Description
1	-19.5 dB ≤ rsrq < -19 dB
2	-19 dB ≤ rsrq < -18.5 dB
...	...
32	-4 dB ≤ rsrq < -3.5 dB
33	-3.5 dB ≤ rsrq < 3 dB
34	-3 dB ≤ rsrq
255	not known or not detectable

rsrp

Integer. Reference signal received power (see 3GPP TS 36.133 [96] subclause 9.1.4).

Table 2-9: *rsrp*

Value	Description
0	rsrp < -140 dBm
1	-140 dBm ≤ rsrp < -139 dBm
2	-139 dBm ≤ rsrp < -138 dBm
...	...
95	-46 dBm ≤ rsrp < -45 dBm
96	-45 dBm ≤ rsrp < -44 dBm
97	-44 dBm≤ rsrp
255	not known or not detectable

2.4 Request Manufacturer Identification: +CGMI

Note: This command is described in *3GPP TS 27.007*. See Section *References*. See also Request Manufacturer Identification: +GMI.

2.4.1 Syntax

Command	Possible Response(s)
AT+CGMI	*<manufacturer>* `+CME ERROR:` *<err>*
AT+CGMI=?	

2.4.2 Description

Execution command causes the TA to return one or more lines of information text `<manufacturer>`, determined by the MT manufacturer, which is intended to permit the user of the TA to identify the manufacturer of the MT to which it is connected to. Typically, the text will consist of a single line containing the name of the manufacturer, but manufacturers may choose to provide more information if desired.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

2.4.3 Defined Values

manufacturer

String. The total number of characters, including line terminators, in the information text shall not exceed 2048 characters. Text shall not contain the sequence 0<CR> or OK<CR>

2.5 Request Model Identification: +CGMM

Note: This command is described in *3GPP TS 27.007*. See Section *References*. See also command Request Model Identification: +GMM.

2.5.1 Syntax

Command	Possible Response(s)
AT+CGMM	*<model>* `+CME ERROR:` *<err>*
AT+CGMM=?	

2.5.2 Description

Execution command causes the TA to return one or more lines of information text `<model>`, determined by the MT manufacturer, which is intended to permit the user of the TA to identify the specific model of the MT to which it is connected to. Typically, the text will consist of a single line containing the name of the product, but manufacturers may choose to provide more information if desired.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

2.5.3 Defined Values

model

String. The total number of characters, including line terminators, in the information text shall not exceed 2048 characters. Text shall not contain the sequence 0<CR> or OK<CR>

2.6 Request Revision Identification: +CGMR

Note: This command is described in *3GPP TS 27.007*. See Section *References*. See also Request Revision Identification: +GMR.

2.6.1 Syntax

Command	Possible Response(s)
AT+CGMR	*<revision>* `+CME ERROR:` *<err>*
AT+CGMR=?	

2.6.2 Description

Execution command causes the TA to return one or more lines of information text `<revision>`, determined by the MT manufacturer, which is intended to permit the user of the TA to identify the version, revision level or date, or other pertinent information of the MT to which it is connected to. Typically, the text will consist of a single line containing the version of the product, but manufacturers may choose to provide more information if desired.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

2.6.3 Defined Values

revision

String. The total number of characters, including line terminators, in the information text shall not exceed 2048 characters. Text shall not contain the sequence 0<CR> or OK<CR>

2.7 Request Product Serial Number Identification: +CGSN

Note: This command is described in *3GPP TS 27.007*. See Section *References*. See also command Request Product Serial Number Identification: +GSN.

2.7.1 Syntax

Command	Possible Response(s)
AT+CGSN[=<*snt*>]	when `<snt>=0` (or omitted) and command successful: <*sn*> when`<snt>=1` and command successful: `+CGSN:`<*imei*> when `<snt>=2` and command successful: `+CGSN:`<*imeisv*> when `<snt>=3` and command successful: `+CGSN:`<*svn*> `+CME ERROR:` <*err*>

AT+CGSN=?	when TE supports <snt> and command successful:
	`+CGSN:`
	`OK`

2.7.2 Description

Execution command causes the TA to return IMEI (International Mobile station Equipment Identity number) and related information to identify the MT that the TE is connected to.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

Test command returns values supported as a compound value. For a TA which does not support `<snt>`, only OK is returned.

2.7.3 Defined Values

snt

Integer type indicating the serial number type that has been requested.

Table 2-10: *snt*

Value	Description
0	returns `<sn>`
1	returns the IMEI (International Mobile station Equipment Identity)
2	returns the IMEISV (International Mobile station Equipment Identity and Software Version number)
3	returns the SVN (Software Version Number)

sn

String. one or more lines of information text determined by the MT manufacturer. Typically, the text will consist of a single line containing the IMEI number of the MT, but manufacturers may choose to provide more information if desired. The total number of characters, including line terminators, in the information text shall not exceed 2048 characters. Text shall not contain the sequence `0<CR>` or `OK<CR>`

imei

String type in decimal format indicating the IMEI; refer 3GPP TS 23.003 [7], subclause 6.2.1. IMEI is composed of Type Allocation Code (TAC) (8 digits), Serial Number (SNR) (6 digits) and the Check Digit (CD) (1 digit). Character set used in <imei> is as specified by command Select TE Character Set: +CSCS.

imeisv

String type in decimal format indicating the IMEISV; refer 3GPP TS 23.003 [7], subclause 6.2.2. The 16 digits of IMEISV are composed of Type Allocation Code (TAC) (8 digits), Serial Number (SNR) (6 digits) ETSI 3GPP TS 27.007 version 12.10.0 Release 12 23 ETSI TS 127 007 V12.10.0 (2015-10) and the software version (SVN) (2 digits). Character set used in `<imeisv>` is as specified by command Select TE Character Set: +CSCS.

svn

String type in decimal format indicating the current SVN which is a part of IMEISV; refer 3GPP TS 23.003 [7], subclause 6.2.2. This allows identifying different software versions of a given mobile. Character set used in `<svn>` is as specified by command Select TE Character Set: +CSCS.

Note: The default value `<snt>=0` returns the information text `<sn>` with no command name prefixed. This has been done to retain backward compatibility. All other values of `<snt>` return the information text including command name prefix.

2.7.4 Informative examples

- To get `<sn>` which returns IMEI of the MT

```
AT+CGSN
490154203237518
OK
```

- To get `<imei>` which returns IMEI of the MT

```
AT+CGSN=1
+CGSN: "490154203237518"
OK
```

2.8 Request International Mobile Subscriber Identity: +CIMI

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.8.1 Syntax

Command	Possible Response(s)
AT+CIMI	*<IMSI>* `+CME ERROR:` *<err>*
AT+CIMI=?	

2.8.2 Description

Execution command causes the TA to return `<IMSI>`, which is intended to permit the TE to identify the individual SIM card or active application in the UICC (GSM or USIM) which is attached to MT.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for `<err>` values.

2.8.3 Defined Values

IMSI

String (without double quotes). International Mobile Subscriber Identity.

2.9 Facility Lock: +CLCK

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

See the current implementation limitation in `fac` parameter description.

2.9.1 Syntax

Command	Possible Response(s)
AT+CLCK=*<fac>,<mode>[,<passwd>[,<class>]]*	`+CME ERROR:` *<err>* when <mode>=2 and command successful: `+CLCK:` *<status>[,<class1>*[<CR><LF>`+CLCK:`*<status>,<class2> [...]]*
AT+CLCK=?	`+CLCK:` *(list of supported <fac>s)*

2.9.2 Description

Execute command is used to lock, unlock or interrogate a MT or a network facility `<fac>`. Password is normally needed to do such actions. When querying the status of a network service (`<mode>=2`) the response line for 'not active' case (`<status>=0`) should be returned only if service is not active for any `<class>`. This command should be abortable when network facilities are set or interrogated.

Call barring facilities are based on GSM/UMTS supplementary services (refer 3GPP TS 22.088 [6]). The interaction of these with other commands based on other GSM/UMTS supplementary services is described in the GSM/UMTS standard.

Test command returns facility values supported as a compound value.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

2.9.3 Defined Values

fac

String. Facility.

Caution: The “SC”, “FD” and “PN” facilities are currently implemented.

Table 2-11: *fac*

Value	Description
"CS"	CNTRL (lock CoNTRoL surface (e.g. phone keyboard))
"PS"	PH SIM (lock PHone to SIM/UICC card installed in the currently selected card slot) (MT asks password when other than current SIM/UICC card inserted; MT may remember certain amount of previously used cards thus not requiring password when they are inserted)
"PF"	lock Phone to the very First inserted SIM/UICC card (also referred in the present document as PH-FSIM) (MT asks password when other than the first SIM/UICC card is inserted)
"SC"	SIM (lock SIM/UICC card installed in the currently selected card slot) (SIM/UICC asks password in MT power up and when this lock command issued)
"AO"	BAOC (Barr All Outgoing Calls) (refer 3GPP TS 22.088 [6] clause 1)
"OI"	BOIC (Barr Outgoing International Calls) (refer 3GPP TS 22.088 [6] clause 1)
"OX"	BOIC exHC (Barr Outgoing International Calls except to Home Country) (refer 3GPP TS 22.088 [6] clause 1)
"AI"	BAIC (Barr All Incoming Calls) (refer 3GPP TS 22.088 [6] clause 2)
"IR"	BIC Roam (Barr Incoming Calls when Roaming outside the home country) (refer 3GPP TS 22.088 [6] clause 2)
"NT"	barr incoming calls from numbers Not stored to TA memory
"NM"	barr incoming calls from numbers Not stored to MT memory
"NS"	barr incoming calls from numbers Not stored to SIM/UICC memory
"NA"	barr incoming calls from numbers Not stored in Any memory
"AB"	All Barring services (refer 3GPP TS 22.030 [19]) (applicable only for <mode>=0)
"AG"	All outGoing barring services (refer 3GPP TS 22.030 [19]) (applicable only for <mode>=0)

Table 2-11: *fac* (Continued)

Value	Description
"AC"	All inComing barring services (refer 3GPP TS 22.030 [19]) (applicable only for <mode>=0)
"FD"	SIM card or active application in the UICC (GSM or USIM) fixed dialling memory feature (if PIN2 authentication has not been done during the current session, PIN2 is required as <passwd>)
"PN"	Network Personalization (refer 3GPP TS 22.022 [33])
"PU"	network sUbset Personalization (refer 3GPP TS 22.022 [33])
"PP"	service Provider Personalization (refer 3GPP TS 22.022 [33])
"PC"	Corporate Personalization (refer 3GPP TS 22.022 [33])

mode

Integer. Mode.

Table 2-12: *mode*

Value	Description
0	unlock
1	lock
2	query status

status

Integer. Status.

Table 2-13: *status*

Value	Description
0	Not active
1	Active

passwd

String. Shall be the same as password specified for the facility from the MT user interface or with command Change Password `+CPWD`.

classx

Integer. `<classx>` is a sum of integers each representing a class of information. Default is 7 - voice + data + fax.

Table 2-14: *classx*

Value	Description
1	voice (telephony)
2	data (refers to all bearer services; with <mode>=2 this may refer only to some bearer service if TA does not support values 16, 32, 64 and 128)
4	fax (facsimile services)
8	short message service
16	data circuit sync
32	data circuit async
64	dedicated packet access
128	dedicated PAD access

2.10 Subscriber Number: +CNUM

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.10.1 Syntax

Command	Possible Response(s)
AT+CNUM	+CNUM: [<*alpha1*>],<*number1*>,<*type1*>[,<*speed*>,<*service*>[,<*itc*>]][<CR><LF>+CNUM: [<*alpha2*>],<*number2*>,<*type2*>[,<*speed*>,<*service*>[,<*itc*>]][...]] +CME ERROR: <*err*>
AT+CNUM=?	

2.10.2 Description

Action command returns the MSISDNs related to the subscriber (this information can be stored in the SIM/UICC or in the MT). When storing information in the SIM/UICC, if the currently selected card slot contains a SIM card or a UICC with an active GSM application, the information is stored in the EFMSISDN under DFTelecom. If the currently selected card slot contains a UICC with an active USIM application, the information is stored in the EFMSISDN under ADFUSIM). If subscriber has different MSISDN for different services, each MSISDN is returned in a separate line. See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

2.10.3 Defined Values

alphax

String. Associated with <numberx>; used character set should be the one selected with command 2.18 Select TE Character Set: +CSCS on page 69.

numberx

String. Phone number of format specified by <typex>.

typex

Integer. Type of address octet (refer 3GPP TS 24.008 [8] subclause 10.5.4.7)

speed

As defined in subclause 6.7

service

Integer. Service related to the phone number.

Table 2-15: *service*

Value	Description
0	asynchronous modem
1	synchronous modem
2	PAD Access (asynchronous)
3	Packet Access (synchronous)
4	Voice
5	Fax
All other values below 128 are reserved	

itc

Integer. Information transfer capability.

Table 2-16: *itc*

Value	Description
0	3,1 kHz
1	UDI

2.11 Read Operator Names: +COPN

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.11.1 Syntax

Command	Possible Response(s)
AT+COPN	`+COPN:`*<numeric1>,<alpha1>*[`<CR><LF>+COPN:`*<numeric2>,<alpha2>* [...]] `+CME ERROR:` *<err>*
AT+COPN=?	

2.11.2 Description

Execute command returns the list of operator names from the MT. Each operator code `<numericn>` that has an alphanumeric equivalent `<alphan>` in the MT memory shall be returned.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

2.11.3 Defined Values

numeric*n*

String type; operator in numeric format (see `+COPS`).

alpha*n*

String type; operator in long alphanumeric format (see `+COPS`).

2.12 PLMN Selection: +COPS

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.12.1 Syntax

Command	Possible Response(s)
AT+COPS*[<mode>[,<format>[,<oper>[,<AcT>]]]]*	+CME ERROR: *<err>*
AT+COPS?	+COPS:*<mode>[,<format>,<oper>[,<AcT>]]* +CME ERROR: *<err>*
AT+COPS=?	+COPS: *[list of supported (<stat>,long alphanumeric <oper>,short alphanumeric <oper>,numeric <oper>[,<AcT>])s][,,(list of supported <mode>s),(list of supported <format>s)]* +CME ERROR: *<err>*

2.12.2 Description

Set command forces an attempt to select and register the GSM/UMTS/EPS network operator using the SIM/USIM card installed in the currently selected card slot.`<mode>` is used to select whether the selection is done automatically by the MT or is forced by this command to operator `<oper>`(it shall be given in format `<format>`) to a certain access technology, indicated in `<AcT>`. If the selected operator is not available, no other operator shall be selected (except `<mode>=4`). If the selected access technology is not available, then the same operator shall be selected in other access technology. The selected operator name format shall apply to further read commands (`+COPS?`) also.`<mode>=2` forces an attempt to deregister from the network. The selected mode affects to all further network registration (e.g. after `<mode>=2`, MT shall be unregistered until `<mode>=0` or `1` is selected). This command should be abortable when registration/deregistration attempt is made.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

Read command returns the current mode, the currently selected operator and the current Access Technology. If no operator is selected, `<format>`, `<oper>` and `<AcT>` are omitted.

Test command returns a set of five parameters, each representing an operator present in the network. A set consists of an integer indicating the availability of the operator `<stat>`, long and short alphanumeric format of the name of the operator, numeric format representation of the operator and access technology. Any of the formats may be unavailable and should then be an empty field. The list of operators shall be in order: home network, networks referenced in SIM or active application in the UICC (GSM or USIM) in the following order: HPLMN selector, User controlled PLMN selector, Operator controlled PLMN selector and PLMN selector (in the SIM or GSM application), and other networks.

It is recommended (although optional) that after the operator list TA returns lists of supported `<mode>`s and `<format>`s. These lists shall be delimited from the operator list by two commas.

The access technology selected parameters, `<AcT>`, should only be used in terminals capable to register to more than one access technology. Selection of `<AcT>` does not limit the capability to cell reselections, even though an attempt is made to select an access technology, the phone may still re-select a cell in another access technology.

2.12.3 Defined Values

mode

Integer.

Table 2-17: *mode*

Value	Description
0	automatic (<oper> field is ignored)
1	manual (<oper> field shall be present, and <AcT> optionally)
2	deregister from network
3	set only <format> (for read command +COPS?), do not attempt registration/deregistration (<oper> and <AcT> fields are ignored); this value is not applicable in read command response
4	manual/automatic (<oper> field shall be present); if manual selection fails, automatic mode (<mode>=0) is entered

format

Integer.

Table 2-18: *format*

Value	Description
0	long format alphanumeric <oper>
1	short format alphanumeric <oper>
2	numeric <oper>

oper

String type; <format> indicates if the format is alphanumeric or numeric; long alphanumeric format can be upto 16 characters long and short format up to 8 characters (refer GSM MoU SE.13 [9]); numeric format is the GSM Location Area Identification number (refer 3GPP TS 24.008 [8] subclause 10.5.1.3) which consists of a three BCD digit country code coded as in ITU T Recommendation E.212 [10] Annex A, plus a two BCD digit network code, which is administration specific; returned <oper> shall not be in BCD format, but in IRA characters converted from BCD; hence the number has structure: (country code digit 3)(country code digit 2)(country code digit 1)(network code digit 3)(network code digit 2)(network code digit 1).

stat

Integer.

Table 2-19: *stat*

Value	Description
0	unknown
1	available
2	current
3	forbidden

AcT

Integer. The parameter sets/shows the access technology selected.

Table 2-20: *AcT*

Value	Description
0	GSM
1	GSM Compact
2	UTRAN
3	GSM w/EGPRS (see NOTE 1)
4	UTRAN w/HSDPA (see NOTE 2)
5	UTRAN w/HSUPA (see NOTE 2)
6	UTRAN w/HSDPA and HSUPA (see NOTE 2)
7	E-UTRAN

NOTE 1:3GPP TS 44.060 [71] specifies the System Information messages which give the information about whether the serving cell supports EGPRS.

NOTE 2:3GPP TS 25.331 [74] specifies the System Information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.

2.13 Enter PIN: +CPIN

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.13.1 Syntax

Command	Possible Response(s)
AT+CPIN= *<pin>[,<newpin>]*	`+CME ERROR:` *<err>*
AT+CPIN?	`+CPIN:` *<code>* `+CME ERROR:` *<err>*
AT+CPIN=?	

2.13.2 Description

The "Set" command sends to the MT a password which is necessary before it can be operated (SIM PIN, SIM PUK, PH SIM PIN, etc.). If the PIN is to be entered twice, the TA shall automatically repeat the PIN. If no PIN request is pending, no action is taken towards MT and an error message, +CME ERROR, is returned to TE.

Notes:

1. SIM PIN, SIM PUK, PH-SIM PIN, PH-FSIM PIN, PH-FSIM PUK, SIM PIN2 and SIM PUK2 refer to the PIN of the selected application on the UICC. For example, in an UTRAN context, the selected application on the currently selected UICC should be a USIM and the SIM PIN then represents the PIN of the selected USIM. See 3GPP TS 31.101 [65] for further details on application selection on the UICC.

   If the PIN required is SIM PUK or SIM PUK2, the second pin is required. This second pin, <newpin>, is used to replace the old pin in the SIM.

2. Commands which interact with MT that are accepted when MT is pending SIM PIN, SIM PUK, or PH SIM are: +CGMI, +CGMM, +CGMR, +CGSN, D112; (emergency call), +CPAS, +CFUN, +CPIN, +CPINR, +CDIS (read and test command only), and +CIND (read and test command only).

Read command returns an alphanumeric string indicating whether some password is required or not.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

2.13.3 Defined Values

pin

String. PIN code.

newpin

String. New PIN code.

code

<code> values reserved by the present document:

Table 2-21: *code*

Value	Description
READY	MT is not pending for any password
SIM PIN	MT is waiting SIM PIN to be given
SIM PUK	MT is waiting SIM PUK to be given
PH-SIM PIN	MT is waiting phone to SIM card password to be given
PH-FSIM PIN	MT is waiting phone-to-very first SIM card password to be given
PH-FSIM PUK	MT is waiting phone-to-very first SIM card unblocking password to be given
SIM PIN2	MT is waiting SIM PIN2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PIN2 authentication failure (i.e. +CME ERROR: 17); if PIN2 is not entered right after the failure, it is recommended that MT does not block its operation)
SIM PUK2	MT is waiting SIM PUK2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PUK2 authentication failure (i.e. +CME ERROR: 18); if PUK2 and new PIN2 are not entered right after the failure, it is recommended that MT does not block its operation)
PH-NET PIN	MT is waiting network personalization password to be given
PH-NET PUK	MT is waiting network personalization unblocking password to be given
PH-NETSUB PIN	MT is waiting network subset personalization password to be given

Table 2-21: *code* (Continued)

Value	Description
PH-NETSUB PUK	MT is waiting network subset personalization unblocking password to be given
PH-SP PIN	MT is waiting service provider personalization password to be given
PH-SP PUK	MT is waiting service provider personalization unblocking password to be given
PH-CORP PIN	MT is waiting corporate personalization password to be given
PH-CORP PUK	MT is waiting corporate personalization unblocking password to be given

2.14 Remaining PIN Retries: +CPINR

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

See the current implementation limitation in `sel_code` parameter description.

2.14.1 Syntax

Command	Possible Response(s)
AT+CPINR= *[<sel_code>]*	`+CME ERROR:` *<err>*
AT+CPINR=?	

2.14.2 Description

Execution command cause the MT to return the number of remaining PIN retries for the MT passwords with intermediate result code `+CPINR:` `<code>,<retries>[,<default_retries>]` for standard PINs. One line with one intermediate result code is returned for every `<code>` or `<ext_code>` selected by `<sel_code>`.

When execution command is issued without the optional parameter `<sel_code>`, intermediate result codes are returned for all `<code>`s and `<ext_code>`s.

In the intermediate result codes, the parameter `<default_retries>` is an optional (manufacturer specific) parameter, per `<code>` and `<ext_code>`.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for `<err>` values.

2.14.3 Defined Values

Caution: Restriction for `sel_code` parameter: only "SIM PIN" and "SIM PUK" codes are supported. Wildcard matching by "*" is not supported.

retries

Integer type. Number of remaining retries per PIN.

default_retries

Integer type. Number of default/initial retries per PIN.

code

Type of PIN. All values listed under the description of the AT+CPIN command, `<code>` parameter, except 'READY'.

ext_code

Extended, manufacturer specific codes.

sel_code

String type. Same values as for the `<code>` and `<ext_code>` parameters. These values are strings and shall be indicated within double quotes. It is optional to support wildcard match by '*', meaning match any (sub-)string.

Example:`AT+CPINR="SIM*"` will return the lines:

```
+CPINR: SIM PIN,<retries>,<default_retries>
+CPINR: SIM PUK,<retries>,<default_retries>
+CPINR: SIM PIN2,<retries>,<default_retries>
+CPINR: SIM PUK2,<retries>,<default_retries>
```

Example:`AT+CPINR="*SIM*"` will additionally return the lines:

```
+CPINR: PH-SIM PIN,<retries>,<default_retries>
+CPINR: PH-FSIM PIN,<retries>,<default_retries>
+CPINR: PH-FSIM
PUK,<retries>,<default_retries>
```

2.15 Selection of Preferred PLMN List: +CPLS

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.15.1 Syntax

Command	Possible Response(s)
AT+CPLS<*list*>	`+CME ERROR:` <*err*>
AT+CPLS?	`+CPLS:`<*list*> `+CME ERROR:` <*err*>
AT+CPLS=?	`+CPLS:` *(list of supported* <*list*>*s)* `+CME ERROR:` <*err*>

2.15.2 Description

This command is used to select one PLMN selector with Access Technology list in the SIM card or active application in the UICC (GSM or USIM), that is used by `+CPOL` command.

Execute command selects a list in the SIM/USIM.

Read command returns the selected PLMN selector list from the SIM/USIM.

Test command returns the whole index range supported lists by the SIM/USIM.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

2.15.3 Defined Values

list

Integer type

Table 2-22: *list*

Value	Description
0	User controlled PLMN selector with Access Technology $EF_{PLMNwAcT}$, if not found in the SIM/UICC then PLMN preferred list EFPLMNsel (this file is only available in SIM card or GSM application selected in UICC)
1	Operator controlled PLMN selector with Access Technology $EF_{OPLMNwAcT}$
2	HPLMN selector with Access Technology $EF_{HPLMNwAcT}$

2.16 Preferred PLMN List: +CPOL

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.16.1 Syntax

Command	Possible Response(s)
AT+CPOL*[[<index>][,<format>[,<oper>[,<GSM_AcT>,<GSM_Compact_AcT>,<UTRAN_AcT>,<E-UTRAN_AcT>]]]]*	`+CME ERROR:` *<err>*
AT+CPOL?	`+CPOL:`*[<index1>,<format>,<oper1>[,<GSM_AcT1>,<GSM_Compact_AcT1>,<UTRAN_AcT1>,<E-UTRAN_AcT1>]* `[<CR><LF>+CPOL:`*<index2>,<format>,<oper2>[,<GSM_AcT2>,<GSM_Compact_AcT2>,<UTRAN_AcT2>,<E-UTRAN_AcT2>] [...]]* `+CME ERROR:` *<err>*
AT+CPOL=?	`+CPOL:` *(list of supported <index>s),(list of supported <format>s)* `+CME ERROR:` *<err>*

2.16.2 Description

This command is used to edit the PLMN selector with Access Technology lists in the SIM card or active application in the UICC (GSM or USIM).

Execute command writes an entry in the SIM/USIM list of preferred PLMNs, previously selected by the command `+CPLS`. If no list has been previously selected, the User controlled PLMN selector with Access Technology, EFPLMNwAcT, is the one accessed by default. If `<index>` is given but `<oper>` is left out, entry is deleted. If `<oper>` is given but `<index>` is left out, `<oper>` is put in the next free location. If only `<format>` is given, the format of the `<oper>` in the read command is changed. The Access Technology selection parameters, `<GSM_AcT>`, `<GSM_Compact_AcT>` and `<UTRAN_AcT>` and `<E-UTRAN_AcT>` are required when writing User controlled PLMN selector with Access Technology, EFPLMNwAcT, Operator controlled PLMN selector with Access Technology EFOPLMNwAcT and HPLMN selector with Access Technology EFHPLMNwAcT, see 3GPP TS 31.102 [59].

Notes:

1. MT can also update the User controlled PLMN selector with Access Technology, EFPLMNwAcT, automatically when new networks are selected.
2. The Operator controlled PLMN selector with Access Technology EFOPLMNwAcT, can only be written if the write access condition in the SIM/USIM has been previously verified.

Read command returns all used entries from the SIM/USIM list of preferred PLMNs, previously selected by the command +CPLS, with the Access Technologies for each PLMN in the list.

Test command returns the whole index range supported by the SIM.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

2.16.3 Defined Values

index*n*

Integer type; the order number of operator in the SIM/USIM preferred operator list

format

Integer type

Table 2-23: *format*

Value	Description
0	Long format alphanumeric <oper>
1	Short format alphanumeric <oper>
2	Numeric <oper>

oper*n*

String type; <format> indicates if the format is alphanumeric or numeric (see +COPS)

GSM_AcT*n*

Integer type; GSM access technology

Table 2-24: *GSM_AcTn*

Value	Description
0	Access technology not selected
1	Access technology selected

GSM_Compact_AcT*n*

Integer type; GSM compact access technology

Table 2-25:

Value	Description
0	Access technology not selected
1	Access technology selected

UTRAN_AcT*n*

Integer type; UTRAN access technology

Table 2-26: *UTRAN_AcTn*

Value	Description
0	Access technology not selected
1	Access technology selected

E-UTRAN_AcT*n*

Integer type; E-UTRAN access technology

Table 2-27: *E-UTRAN_AcTn*

Value	Description
0	Access technology not selected
1	Access technology selected

2.17 Change Password: +CPWD

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

See the current implementation limitation in `fac` parameter description.

2.17.1 Syntax

Command	Possible Response(s)
AT+CPWD=<*fac*>,<*oldpwd*>, <*newpwd*>	`+CME ERROR:` <*err*>
AT+CPWD=?	`+CPWD:` *list of supported (<fac>,<pwdlength>)s*

2.17.2 Description

Action command sets a new password for the facility lock function defined by command Facility Lock `+CLCK`.

Test command returns a list of pairs which present the available facilities and the maximum length of their password.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

2.17.3 Defined Values

fac

String. Facility. See 2.9 Facility Lock: +CLCK on page 46 for other values.

Caution:	**Only the “SC” and “P2” facilities are currently implemented.**

Table 2-28: *fac*

Value	Description
"P2"	SIM PIN2

oldpwd, newpwd

String. `<oldpwd>` shall be the same as password specified for the facility from the MT user interface or with command Change Password `+CPWD` and `<newpwd>` is the new password; maximum length of password can be determined with `<pwdlength>`.

pwdlength

Integer. Maximum length of the password for the facility

2.18 Select TE Character Set: +CSCS

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.18.1 Syntax

Command	Possible Response(s)
AT+CSCS= *<chset>*	`OK`
AT+CSCS?	`+CSCS:`*<chset>* `OK`
AT+CSCS=?	`+CSCS:` *(list of supported <chset>s)* `OK`

2.18.2 Description

The “Set” command informs TA which character set <chset> is used by the TE. TA is then able to convert character strings correctly between TE and MT character sets.

When TA TE interface is set to 8 bit operation and used TE alphabet is 7 bit, the highest bit shall be set to zero.

Note: It is manufacturer specific how the internal alphabet of MT is converted to/from the TE alphabet.

Read command shows current setting and test command displays conversion schemes implemented in the TA.

2.18.3 Defined Values

chset

Character: character set as a string type (conversion schemes not listed here can be defined by manufacturers)

Table 2-29: *chset*

Value	Description
"GSM"	GSM 7 bit default alphabet (3GPP TS 23.038 [25]); this setting causes easily software flow control (XON/XOFF) problems. Note: If MT is using GSM 7 bit default alphabet, its characters shall be padded with 8th bit (zero) before converting them to hexadecimal numbers (i.e. no SMS style packing of 7 bit alphabet).
"HEX"	Character strings consist only of hexadecimal numbers from 00 to FF; e.g. "032FE6" equals three 8-bit characters with decimal values 3, 47 and 230; no conversions to the original MT character set shall be done.
"IRA"	International reference alphabet (see ITU T Recommendation T.50 [13]).
"PCCPxxx"	PC character set Code Page xxx
"PCDN"	PC Danish/Norwegian character set
“UCS2"	16-bit universal multiple-octet coded character set (see ISO/IEC10646 [32]); UCS2 character strings are converted to hexadecimal numbers from 0000 to FFFF; e.g. "004100620063" equals three 16-bit characters with decimal values 65, 98 and 99.
"UTF-8"	Octet (8-bit) lossless encoding of UCS characters (see RFC 3629 [69]); UTF-8 encodes each UCS character as a variable number of octets, where the number of octets depends on the integer value assigned to the UCS character. The input format shall be a stream of octets. It shall not be converted to hexadecimal numbers as in "HEX" or "UCS2". This character set requires an 8-bit TA - TE interface.
"8859-n"	ISO 8859 Latin n (1 6) character set
"8859-C"	ISO 8859 Latin/Cyrillic character set
"8859-A"	ISO 8859 Latin/Arabic character set
"8859-G"	ISO 8859 Latin/Greek character set
"8859-H"	ISO 8859 Latin/Hebrew character set

2.19 Signal quality: +CSQ

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.19.1 Syntax

Command	Possible Response(s)
AT+CSQ	`+CSQ:` *<rssi>,<ber>* `+CME ERROR:` *<err>*
AT+CSQ=?	`+CSQ:` *(list of supported <rssi>s),(list of supported <ber>s)*

2.19.2 Description

Execution command returns received signal strength indication `<rssi>` and channel bit error rate `<ber>` from the MT.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

Test command returns values supported as compound values.

2.19.3 Defined Values

rssi

Integer. Received signal strength indication.

Table 2-30: *rssi*

Value	Description
0	-113 dBm or less
1	-111 dBm
2 .. 30	-109 .. -53 dBm
31	-51 dBm or greater
99	not known or not detectable

ber

Integer. Channel bit error rate (in percent).

Table 2-31: *ber*

Value	Description
0 .. 7	as RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4
99	not known or not detectable

2.20 Time Zone Reporting: +CTZR

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.20.1 Syntax

Command	Possible Response(s)
AT+CTZR=<*reporting*>	`+CME ERROR:` <*err*>
AT+CTZR?	`+CTZR:` <*reporting*> `+CME ERROR:` <*err*>
AT+CTZR=?	`+CTZR:` *(list of supported* <*reporting*>*s* `+CME ERROR:` <*err*>

2.20.2 Description

This set command controls the time zone change event reporting. If reporting is enabled the MT returns the unsolicited result code `+CTZV: <tz>`, or `+CTZE: <tz>,<dst>,[<time>]` whenever the time zone is changed. The MT also provides the time zone upon network registration if provided by the network. If setting fails in an MT error, `+CME ERROR: <err>` is returned.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

Read command returns the current reporting settings in the MT.

Test command returns supported <reporting>-values.

Note: The Time Zone reporting is not affected by the Automatic Time Zone setting command, +CTZU.

2.20.3 Defined Values

reporting

Integer.

Table 2-32: *reporting*

Value	Description
0	disable time zone change event reporting.
1	Enable time zone change event reporting by unsolicited result code `+CTZV: <tz>`.
2	Enable extended time zone reporting by unsolicited result code `+CTZE: <tz>,<dst>,[<time>]`.

tz

String type value representing the sum of the local time zone (difference between the local time and GMT expressed in quarters of an hour) plus daylight saving time. The format is "±zz", expressed as a fixed width, two digit integer with the range -48 ... +56. To maintain a fixed width, numbers in the range -9 ... +9 are expressed with a leading zero, e.g. "-09", "+00" and "+09".

dst

Integer. Value indicating whether `<tz>` includes daylight savings adjustment.

Table 2-33: *dst*

Value	Description
0	`<tz>` includes no adjustment for Daylight Saving Time
1	includes +1 hour (equals 4 quarters in `<tz>`) adjustment for daylight saving time
2	`<tz>` includes +2 hours (equals 8 quarters in `<tz>`) adjustment for daylight saving time

time

String type value representing the local time. The format is "YYYY/MM/DD,hh:mm:ss", expressed as integers representing year (YYYY), month (MM), date (DD), hour (hh), minute (mm) and second (ss). This parameter can be provided by the network at the time of delivering time zone information and will be present in the extended time zone reporting unsolicited result code if provided by the network.

2.21 Automatic Time Zone Update: +CTZU

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.21.1 Syntax

Command	Possible Response(s)
AT+CTZU=<*onoff*>	`+CME ERROR:` <*err*>
AT+CTZU?	`+CTZU:` <*onoff*> `+CME ERROR:` <*err*>
AT+CTZU=?	`+CTZU:` *(list of supported* <*onoff*>*s* `+CME ERROR:` <*err*>

2.21.2 Description

Set command enables and disables automatic time zone update via NITZ. If setting fails in an MT error, `+CME ERROR: <err>` is returned.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

Read command returns the current settings in the MT.

Test command returns supported on- and off-values.

2.21.3 Defined Values

onoff

Integer. Indicator.

Table 2-34: *onoff*

Value	Description
0	Disable automatic time zone update via NITZ.
1	Enable automatic time zone update via NITZ..

2.22 PCCA STD 101 [17] Select Wireless Network: +WS46

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

2.22.1 Syntax

Command	Possible Response(s)
AT+WS46<*n*>	
AT+WS46?	<*n*>
AT+WS46=?	*[list of supported <n>s*

2.22.2 Description

Set command selects the WDS side stack `<n>`to be used by the TA. Read command shows current setting and test command displays side stacks implemented in the TA.

2.22.3 Defined Values

n (Query)

Integer. The values in <n> for Query are mutually exclusive. If one value (e.g. "25") is returned, other values shall not be returned.

Table 2-35: *n (Query)*

Value	Description
12	GSM Digital Cellular Systems (GERAN only)
22	UTRAN only
25	3GPP Systems (GERAN, UTRAN and E-UTRAN)
28	E-UTRAN only
29	GERAN and UTRAN
30	GERAN and E-UTRAN
31	UTRAN and E-UTRAN

n (Set)

Integer. Refer PCCA STD 101 [17] for other values.

Table 2-36: *n (Set)*

<table>
<tr><th>Value</th><th>Description</th></tr>
<tr><td>12</td><td>3GPP System</td></tr>
<tr><td>22</td><td rowspan="6">Not used. If received, the value shall be treated as if 12 had been received or an ERROR shall be returned.</td></tr>
<tr><td>25</td></tr>
<tr><td>28</td></tr>
<tr><td>29</td></tr>
<tr><td>30</td></tr>
<tr><td>31</td></tr>
</table>

3 3GPP Commands for Packet Domain

3.1 UE Modes of Operation for EPS: +CEMODE

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

See the current implementation limitation in `mode` parameter description.

3.1.1 Syntax

Command	Possible Response(s)
AT+CEMODE	`+CME ERROR:` *<err>*
AT+CEMODE?	`+CEMODE:` *<mode>*
AT+CEMODE=?	`+CEMODE:` *(list of supported <mode>s)*

3.1.2 Description

The set command is used to set the MT to operate according to the specified mode of operation for EPS, see 3GPP TS 24.301 [83]. If the requested mode of operation is not supported, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for `<err>` values.

The read command returns the mode of operation set by the TE, independent of the current serving cell capability and independent of the current serving cell Access Technology.

The test command is used for requesting information on the supported MT mode of operation.

3.1.3 Defined Values

Caution: Only `<mode>` 0 and 2 are currently implemented.

mode

Integer. Indicates the mode of operation.

Table 3-1: *mode*

Value	Description
0	PS mode 2 of operation
1	CS/PS mode 1 of operation
2	CS/PS mode 2 of operation
3	PS mode 1 of operation

NOTE:the definition for UE modes of operation can be found in 3GPP TS 24.301 [83]

3.2 EPS Network Registration Status: +CEREG

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

3.2.1 Syntax

Command	Possible Response(s)
AT+CEREG=<*n*>	+CME ERROR: <*err*>
AT+CEREG?	When <n>=0, 1, 2 or 3 and command successful: +CEREG: *<n>,<stat>[,[<tac>],[<ci>],[<AcT>[,<cause_type>,<reject_cause>]]]* When <n>=4 or 5 and command successful: +CEREG:*<n>,<stat>[,[<lac>],[<ci>],[<AcT>],[<rac>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]*
AT+CEREG=?	+CEREG: *(list of supported <n>s))*

3.2.2 Description

The set command controls the presentation of an unsolicited result code +CEREG: <stat> when <n>=1 and there is a change in the MT's EPS network registration status in E-UTRAN, or unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>]] when <n>=2 and there is a change of the network cell in E-UTRAN. The parameters <AcT>, <tac> and <ci> are sent only if available.The value <n>=3 further extends the unsolicited result code with [,<cause_type>,<reject_cause>], when available, when the value of <stat> changes.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

Note: If the EPS MT in GERAN/UTRAN/E-UTRAN also supports circuit mode services and/or GPRS services, the +CREG command and +CREG: result codes and/or the +CGREG command and +CGREG: result codes apply to the registration status and location information for those services.

The read command returns the status of result code presentation and an integer <stat> which shows whether the network has currently indicated the registration of the MT. Location information elements <tac>, <ci> and

<AcT>, if available, are returned only when <n>=2 and MT is registered in the network. The parameters [,<cause_type>,<reject_cause>], if available, are returned when <n>=3.

Test command returns values supported as a compound value.

3.2.3 Defined Values

n

Integer.

Table 3-2: *n*

Value	Description
0	disable network registration unsolicited result code
1	enable network registration unsolicited result code +CEREG: <stat>
2	enable network registration and location information unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>]]
3	enable network registration, location information and EMM cause value information unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]]
4	For a UE that wants to apply PSM, enable network registration and location information unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,,[,[<Active-Time>],[<Periodic-TAU>]]]]
5	For a UE that wants to apply PSM, enable network registration, location information and EMM cause value information unsolicited result code +CEREG:<stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]

stat

Integer. Indicates the EPS registration status.

Table 3-3: *stat*

Value	Description
0	not registered, MT is not currently searching an operator to register to
1	registered, home network

Table 3-3: *stat* (Continued)

Value	Description
2	not registered, but MT is currently trying to attach or searching an operator to register to
3	registration denied
4	unknown (e.g. out of E-UTRAN coverage)
5	registered, roaming
6	registered for "SMS only", home network (not applicable)
7	registered for "SMS only", roaming (not applicable)
8	attached for emergency bearer services only (See NOTE 2)
9	registered for "CSFB not preferred", home network (not applicable)
10	registered for "CSFB not preferred", roaming (not applicable)

NOTE 2:3GPP TS 24.008 [8] and 3GPP TS 24.301 [83] specify the condition when the MS is considered as attached for emergency bearer services.

tac

String type; two byte tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal).

ci

String type; four byte E-UTRAN cell ID in hexadecimal format

AcT

Integer. The parameter sets/shows the access technology of the serving cell.

Table 3-4: *AcT*

Value	Description
0	GSM (not applicable)
1	GSM Compact (not applicable)
2	UTRAN (not applicable)
3	GSM w/EGPRS (see NOTE 3) (not applicable)
4	UTRAN w/HSDPA (see NOTE 4) (not applicable)
5	UTRAN w/HSUPA (see NOTE 4) (not applicable)

Table 3-4: *AcT* (Continued)

Value	Description
6	UTRAN w/HSDPA and HSUPA (see NOTE 4) (not applicable)
7	E-UTRAN

NOTE 3:3GPP TS 44.060 [71] specifies the System Information messages which give the information about whether the serving cell supports EGPRS.

NOTE 4:3GPP TS 25.331 [74] specifies the System Information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.

cause_type

Integer. Indicates the type of<reject_cause>.

Table 3-5: *cause_type*

Value	Description
0	Indicates that <reject_cause> contains an EMM cause value, see 3GPP TS 24.301 [83] Annex A.
1	Indicates that <reject_cause> contains a manufacturer-specific cause.

reject_cause

Integer type; contains the cause of the failed registration. The value is of type as defined by <cause_type>.

Active-Time

string type; one byte in an 8 bit format. Indicates the Active Time value (T3324) allocated to the UE in E-UTRAN. The Active Time value is coded as one byte (octet 3) of the GPRS Timer 2 information element coded as bit format (e.g. "00100100" equals 4 minutes). For the coding and the value range, see the GPRS Timer 2 IE in 3GPP TS 24.008 [8] Table 10.5.163/3GPP TS 24.008. See also 3GPP TS 23.682 [149] and 3GPP TS 23.401 [82].

Periodic-TAU

string type; one byte in an 8 bit format. Indicates the extended periodic TAU value (T3412) allocated to the UE in E-UTRAN. The extended periodic TAU value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. "01000111" equals 70 hours). For the coding and the value range, see the GPRS Timer 3 IE in 3GPP TS 24.008 [8] Table 10.5.163a/3GPP TS 24.008. See also 3GPP TS 23.682 [149] and 3GPP TS 23.401 [82].

3.3 PDP Context Activate or Deactivate: +CGACT

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

3.3.1 Syntax

Command	Possible Response(s)
AT+CGACT=*[<state>[,<cid>[,<cid>[,...]]]]*	`+CME ERROR:` *<err>*
AT+CGACT?	`+CGACT:` *[<cid>,<state>]* `[<CR><LF>+CGACT:`*<cid>,<state> [...]]*
AT+CGACT=?	`+CGACT:` *(list of supported <state>s)*

3.3.2 Description

The execution command is used to activate or deactivate the specified PDP context (s). After the command has completed, the MT remains in V.250 command state. If any PDP context is already in the requested state, the state for that context remains unchanged. If the requested state for any specified context cannot be achieved, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command. If the MT is not PS attached when the activation form of the command is executed, the MT first performs a PS attach and then attempts to activate the specified contexts. If the attach fails then the MT responds with ERROR or, if extended error responses are enabled, with the appropriate failure-to-attach error message.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

For EPS, if an attempt is made to disconnect the last PDN connection, then the MT responds with ERROR or, if extended error responses are enabled, a +CME ERROR.

Note: If the initial PDP context is supported, the context with `<cid>=0` is automatically defined at startup, see subclause 10.1.0.

For EPS, the activation request for an EPS bearer resource will be answered by the network by either an EPS dedicated bearer activation or EPS bearer modification request. The request must be accepted by the MT before the PDP context can be set in to established state.

If no `<cid>`s are specified the activation form of the command activates all defined contexts.

If no `<cid>`s are specified the deactivation form of the command deactivates all active contexts.

The read command returns the current activation states for all the defined PDP contexts.

The test command is used for requesting information on the supported PDP context activation states.

Note: This command has the characteristics of both the V.250 action and parameter commands. Hence it has the read form in addition to the execution/set and test forms.

3.3.3 Defined Values

state

Integer. Indicates the state of PDP context activation.

Table 3-6: *state*

Value	Description
0	deactivated
1	activated

cid

Integer type; specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

3.4 PS Attach or Detach: +CGATT

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

3.4.1 Syntax

Command	Possible Response(s)
AT+CGATT=<*state*>	`+CME ERROR:` <*err*>
AT+CGATT?	`+CGATT:` <*state*>
AT+CGATT=?	`+CGATT:` *(list of supported <state>s)*

3.4.2 Description

The execution command is used to attach the MT to, or detach the MT from, the Packet Domain service. After the command has completed, the MT remains in V.250 command state. If the MT is already in the requested state, the command is ignored and the OK response is returned. If the requested state cannot be achieved, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

Note: If the initial PDP context is supported, the context with `<cid>=0` is automatically defined at startup, see subclause 10.1.0.

Any active PDP contexts will be automatically deactivated when the attachment state changes to detached.

The read command returns the current Packet Domain service state.

The test command is used for requesting information on the supported Packet Domain service states.

Note: NOTE 2:This command has the characteristics of both the V.250 action and parameter commands. Hence it has the read form in addition to the execution/set and test forms.

3.4.3 Defined Values

state

Integer. Indicates the state of PS attachment.

Table 3-7: *state*

Value	Description
0	detached
1	attached

3.5 Define PDP Context Authentication Parameters: +CGAUTH

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

3.5.1 Syntax

Command	Possible Response(s)
AT+CGAUTH=*<cid>[,<auth_prot>[,<userid>[,<password>]]]*	`+CME ERROR:` *<err>*
AT+CGAUTH?	`[+CGAUTH:` *<cid>,<auth_prot>,<userid>,<password>]* `[<CR><LF>+CGAUTH:`*<cid>,<auth_prot>,<userid>,<password> [...]]*
AT+CGAUTH=?	`+CGAUTH:` *(range of supported <cid>s),(list of supported <auth_prot>s),(range of supported <userid>s),(range of supported <password>s)*

3.5.2 Description

Set command allows the TE to specify authentication parameters for a PDP context identified by the (local) context identification parameter `<cid>` used during the PDP context activation and the PDP context modification procedures. Since the `<cid>` is the same parameter that is used in the +CGDCONT and +CGDSCONT commands, +CGAUTH is effectively as an extension to these commands.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for `<err>` values.

The read command returns the current settings for each defined context.

The test command returns values supported as a compound value.

3.5.3 Defined Values

cid

Integer type. Specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

auth_prot

Integer type. Authentication protocol used for this PDP context.

Table 3-8: *auth_prot*

Value	Description
0	None. Used to indicate that no authentication protocol is used for this PDP context. Username and password are removed if previously specified.
1	PAP
2	CHAP

userid

String type. User name for access to the IP network.

password

String type. Password for access to the IP network.

3.6 PDP Context Modify: +CGCMOD

Note:	This command is described in *3GPP TS 27.007*. See Section *References*.

3.6.1 Syntax

Command	Possible Response(s)
AT+CGCMOD*[=<cid>[,<cid >[,...]]]*	`+CME ERROR:` *<err>*
AT+CGCMOD=?	`+CGCMOD:` *(list of <cid>s with active contexts)*

3.6.2 Description

The execution command is used to modify the specified PDP context (s) with repect to QoS profiles and TFTs. After the command has completed, the MT returns to V.250 online data state. If the requested modification for any specified context cannot be achieved, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

For EPS, the modification request for an EPS bearer resource will be answered by the network by an EPS bearer modification request. The request must be accepted by the MT before the PDP context is effectively changed.

If no <cid>s are specified the activation form of the command modifies all active contexts.

The test command returns a list of <cid>s associated with active contexts.

3.6.3 Defined Values

cid

Integer type; specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

3.7 PDP Context Read Dynamic Parameters: +CGCONTRDP

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

3.7.1 Syntax

Command	Possible Response(s)
AT+CGCONTRDP*[=<cid>]*	`[+CGCONTRDP:` *<cid>,<bearer_id>,<apn>[,<local_addr and subnet_mask>[,<gw_addr>[,<DNS_prim_addr>[,<DNS_sec_addr>[,<P-CSCF_prim_addr>[,<P-CSCF_sec_addr>[,<IM_CN_Signalling_Flag>[,<LIPA_indication>]]]]]]]]* `] [<CR><LF>+CGCONTRDP:`*<cid>,<bearer_id>,<apn>[,<local_addr and subnet_mask>[,<gw_addr>[,<DNS_prim_addr>[,<DNS_sec_addr>[,<P-CSCF_prim_addr>[,<P-CSCF_sec_addr>[,<IM_CN_Signalling_Flag>[,<LIPA_indication>]]]]]]]]*[...]]
AT+CGCONTRDP=?	`+CGCONTRDP:` *(list of <cid>s associated with active contexts)*

3.7.2 Description

The execution command returns the relevant information `<bearer_id>`, `<apn>`, `<local_addr and subnet_mask>`, `<gw_addr>`, `<DNS_prim_addr>`, `<DNS_sec_addr>`, `<P-CSCF_prim_addr>`, `<P-CSCF_sec_addr>`, `<IM_CN_Signalling_Flag>` and `<LIPA_indication>` for an active non secondary PDP context with the context identifier `<cid>`.

If the MT indicates more than two IP addresses of P-CSCF servers or more than two IP addresses of DNS servers, multiple lines of information per `<cid>` will be returned.

If the MT has dual stack capabilities, at least one pair of lines with information is returned per `<cid>`. First one line with the IPv4 parameters followed by one line with the IPv6 parameters. If this MT with dual stack capabilities indicates more than two IP addresses of P-CSCF servers or more than two IP addresses of DNS servers, multiple of such pairs of lines are returned.

Note: If the MT doesn't have all the IP addresses to be included in a line, e.g. in case the UE received four IP addresses of DNS servers and two IP addresses of P-CSCF servers, the parameter value representing an IP address that can not be populated is set to an empty string or an absent string.

If the parameter `<cid>` is omitted, the relevant information for all active non secondary PDP contexts is returned.

The test command returns a list of `<cid>`s associated with active non secondary contexts.

3.7.3 Defined Values

cid

Integer type; specifies a particular non secondary PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands (see the +CGDCONT and +CGDSCONT commands).

bearer_id

Integer type; identifies the bearer, i.e. the EPS bearer in EPS and the NSAPI in UMTS/GPRS.

apn

String type; a logical name that was used to select the GGSN or the external packet data network.

local_addr, subnet_mask

String type; shows the IP address and subnet mask of the MT. The string is given as dot-separated numeric (0-255) parameters on the form: `"a1.a2.a3.a4.m1.m2.m3.m4"` for IPv4 or`"a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16"` for IPv6.

When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.

gw_addr

String type; shows the Gateway Address of the MT. The string is given as dot-separated numeric (0-255) parameters.

When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.

DNS_prim_addr

String type; shows the IP address of the primary DNS server.

When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.

DNS_sec_addr

String type; shows the IP address of the secondary DNS server.

When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.

P_CSCF_prim_addr

String type; shows the IP address of the primary P-CSCF server.

When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.

P_CSCF_sec_addr

String type; shows the IP address of the secondary P-CSCF server.

When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGCONTRDP.

IM_CN_Signalling_Flag

Integer type; shows whether the PDP context is for IM CN subsystem-related signalling only or not.

Table 3-9: *IM_CN_Signalling_Flag*

Value	Description
0	PDP context is not for IM CN subsystem-related signalling only
1	PDP context is for IM CN subsystem-related signalling only

LIPA_indication

Integer type; indicates that the PDP context provides connectivity using a LIPA PDN connection. This parameter cannot be set by the TE.

Table 3-10: *LIPA_indication*

Value	Description
0	indication not received that the PDP context provides connectivity using a LIPA PDN connection
1	indication received that the PDP context provides connectivity using a LIPA PDN connection

3.8 Enter Data State: +CGDATA

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

3.8.1 Syntax

Command	Possible Response(s)

AT+CGDATA*[=<L2P>[,<cid>[,<cid>[,...]]]]*	`CONNECT`
	`ERROR`
	`+CME ERROR:`*<err>*

AT+CGDATA=?	`+CGDATA:` *(list of supported <L2Ps>)*

3.8.2 Description

The execution command causes the MT to perform whatever actions are necessary to establish communication between the TE and the network using one or more Packet Domain PDP types. This may include performing a PS attach and one or more PDP context activations. If the `<L2P>` parameter value is unacceptable to the MT, the MT shall return an `ERROR` or `+CME ERROR` response. Otherwise, the MT issues the intermediate result code `CONNECT` and enters V.250 online data state.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for `<err>` values.

Note: If the initial PDP context is supported, the context with `<cid>=0` is automatically defined at startup, see subclause 10.1.0.

Commands following `+CGDATA` command in the AT command line shall not be processed by the MT.

The detailed behaviour after the online data state has been entered is dependent on the PDP type. It is described briefly in 3GPP TS 27.060 [34] and in more detail in 3GPP TS 29.061 [39] and the specifications for the relevant PDPs. PS attachment and PDP context activation procedures may take place prior to or during the PDP startup if they have not already been performed using the PS Attach or Detach: +CGATT and PDP Context Activate or Deactivate: +CGACT commands.

If context activation takes place during the PDP startup, one or more `<cid>`s may be specified in order to provide the information needed for the context activation request(s).

During each PDP startup procedure the MT may have access to some or all of the following information:

- The MT may have a priori knowledge, for example, it may implement only one PDP type.
- The command may have provided an `<L2P>` parameter value.
- The TE may provide a PDP type and/or PDP address to the MT during in the PDP startup procedure.

If any of this information is in conflict, the command will fail.

Any PDP type and/or PDP address present in the above information shall be compared with the PDP type and/or PDP address in any context definitions specified in the command in the order in which their <cid>s appear. For a context definition to match:

- The PDP type must match exactly.
- The PDP addresses are considered to match if they are identical or if either or both addresses are unspecified. For example, a PPP NCP request specifying PDP type = IP and no PDP address would cause the MT to search through the specified context definitions for one with PDP type = IP and any PDP address.

The context shall be activated using the matched value for PDP type and a static PDP address if available, together with the other information found in the PDP context definition. If a static PDP address is not available then a dynamic address is requested.

If no `<cid>` is given or if there is no matching context definition, the MT shall attempt to activate the context with whatever information is available to the MT. The other context parameters shall be set to their default values.

If the activation is successful, data transfer may proceed.

After data transfer is complete, and the layer 2 protocol termination procedure has completed successfully, the V.250 command state is re-entered and the MT returns the final result code `OK`.

In the event of an erroneous termination or a failure to start up, the V.250 command state is re-entered and the MT returns the final result code NO CARRIER or, if enabled, `+CME ERROR`. Attach, activate and other errors may be reported.

The test command is used for requesting information on the supported layer 2 protocols.

This command may be used in both normal and modem compatibility modes.

3.8.3 Defined Values

cid

Integer. Parameter specifies a particular PDP context definition (see Define PDP Context: +CGDCONT parameter `<cid>`).

Note: If this parameter is omitted, `<cid>=3` (Internet PDN) is the default value for all implementations except CAT-M.
For CAT-M implementation, `<cid>=1` (Internet PDN) is the default value.

L2P

String. Layer 2 protocol to be used between the TE and MT.

Table 3-11: *L2P*

Value	Description
“PPP”	Layer 2 protocol PPP

Other values are obsolete or specific and are not supported.

3.9 Define PDP Context: +CGDCONT

Note:	This command is described in *3GPP TS 27.007*. See Section *References*.

3.9.1 Syntax

Command	Possible Response(s)
AT+CGDCONT=*[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>[,<IPv4AddrAlloc>[,<emergency indication>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>]]]]]]]]]]*	`+CME ERROR:` *<err>*
AT+CGDCONT?	`[+CGDCONT:`*<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<IPv4AddrAlloc>[,<emergency indication>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>]]]]]* `[<CR><LF>+CGDCONT:`*<cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<IPv4AddrAlloc>[,<emergency indication>[,<P-CSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>]]]]*[...]]
AT+CGDCONT=?	`+CGDCONT:` *(range of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s),(list of supported <IPv4AddrAlloc>s),(list of supported <emergency indication>s),(list of supported <P-CSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s)* `[<CR><LF>+CGDCONT:` *(range of supported <cid>s),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s),(list of supported <IPv4AddrAlloc>s),(list of supported <emergency indication>s),(list of supported <P-CSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s)*[...]]

3.9.2 Description

The set command specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter, `<cid>`. The number of PDP contexts that may be in a defined state at the same time is given by the range returned by the test command.

For EPS the PDN connection and its associated EPS default bearer is identified herewith. For EPS the `<PDP_addr>` parameter value shall be omitted.

A special form of the set command, `+CGDCONT=<cid>` causes the values for context number `<cid>` to become undefined.

If the initial PDP context is supported, the context with `<cid>=0` is automatically defined at startup, see subclause 10.1.0. As all other contexts, the parameters for `<cid>=0` can be modified with +CGDCONT. If the initial PDP context is supported, `+CGDCONT=0` resets context number 0 to its particular default settings.

The read command returns the current settings for each defined context.

The test command returns values supported as a compound value. If the MT supports several PDP types, `<PDP_type>`, the parameter value ranges for each `<PDP_type>` are returned on a separate line.

3.9.3 Defined Values

cid

Integer type; specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value = 1 or if the initial PDP context is supported (see subclause 10.1.0), minimum value = 0) is returned by the test form of the command.

Note: The `<cid>`s for network-initiated PDP contexts will have values outside the ranges indicated for the `<cid>` in the test form of the commands +CGDCONT and +CGDSCONT.

PDP_type

String type; specifies the type of packet data protocol

Table 3-12: *PDP_type*

Value	Description
X.25	ITU-T/CCITT X.25 layer 3 (Obsolete)
IP	Internet Protocol (IETF STD 5 [103])
IPV6	Internet Protocol, version 6 (see RFC 2460 [106])
IPV4V6	Virtual <PDP_type> introduced to handle dual IP stack UE capability. (See 3GPP TS 24.301 [83])
OSPIH	Internet Hosted Octect Stream Protocol (Obsolete)
PPP	Point to Point Protocol (IETF STD 51 [104])

Note: Only IP, IPV6 and IPV4V6 values are supported for EPS services.

APN

String type; a logical name that is used to select the GGSN or the external packet data network.

If the value is null or omitted, then the subscription value will be requested.

PDP_addr

String type; identifies the MT in the address space applicable to the PDP.

If the parameter value is null or omitted, then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested.

The read form of the command will continue to return the null string even if an address has been allocated during the PDP startup procedure. The allocated address(es) may be read using the +CGPADDR command.

When +CGPIAF is supported, its settings can influence the format of this parameter returned with the read form of +CGDCONT.

Note: For EPS, this field or the parameter value of the field is omitted.

d_comp

Integer type; controls PDP data compression (applicable for SNDCP only) (refer 3GPP TS 44.065 [61])

Table 3-13: *d_comp*

Value	Description
0	off
1	on (manufacturer preferred compression)
2	V.42bis
3	V.44

h_comp

Integer type; controls PDP header compression (refer 3GPP TS 44.065 [61] and 3GPP TS 25.323 [62])

Table 3-14: *h_comp*

Value	Description
0	off
1	on (manufacturer preferred compression)
2	RFC 1144 [105] (applicable for SNDCP only)

Table 3-14: *h_comp* (Continued)

Value	Description
3	RFC 2507 [107]
4	RFC 3095 [108] (applicable for PDCP only)

IPv4AddrAlloc

Integer type; controls how the MT/TA requests to get the IPv4 address information

Table 3-15: *IPv4AddrAlloc*

Value	Description
0	IPv4 Address Allocation through NAS Signalling
1	IPv4 Address Allocated through DHCP

emergency indication

Integer type; indicates whether the PDP context is for emergency bearer services or not.

Table 3-16: *emergency indication*

Value	Description
0	PDP context is not for emergency bearer services
1	PDP context is for emergency bearer services

P-CSCF_discovery

Integer type; influences how the MT/TA requests to get the P-CSCF address, see 3GPP TS 24.229 [89] annex B and annex L.

Table 3-17: *P-CSCF_discovery*

Value	Description
0	Preference of P-CSCF address discovery not influenced by +CGDCONT
1	Preference of P-CSCF address discovery through NAS Signalling
2	Preference of P-CSCF address discovery through DHCP

IM_CN_Signalling_Flag_Ind

Integer type; indicates to the network whether the PDP context is for IM CN subsystem-related signalling only or not.

Table 3-18: *IM_CN_Signalling_Flag_Ind*

Value	Description
0	UE indicates that the PDP context is not for IM CN subsystem-related signalling only
1	UE indicates that the PDP context is for IM CN subsystem-related signalling only

3.10 Define Secondary PDP Context: +CGDSCONT

Note:	This command is described in *3GPP TS 27.007*. See Section *References*.

3.10.1 Syntax

Command	Possible Response(s)
AT+CGDSCONT=*[<cid>,<p_cid>[,<d_comp>[,<h_comp>[,<IM_CN_Signalling_Flag_Ind>]]]]*	
AT+CGDSCONT?	`[+CGDSCONT:`*<cid>,<p_cid>,<d_comp>,<h_comp>,<IM_CN_Signalling_Flag_Ind>]*`[<CR><LF>+CGDSCONT:`*<cid>,<p_cid>,<d_comp>,<h_comp>,<IM_CN_Signalling_Flag_Ind>[...]]*
AT+CGDSCONT=?	`+CGDSCONT:` *(range of supported <cid>s),(list of <p_cid>s for active primary contexts),(list of supported <d_comp>s),(list of supported <h_comp>s),(list of supported <IM_CN_Signalling_Flag_Ind>s)*

3.10.2 Description

The set command specifies PDP context parameter values for a Secondary PDP context identified by the (local) context identification parameter, `<cid>`. The number of PDP contexts that may be in a defined state at the same time is given by the range returned by the test command.

In EPS the command is used to define traffic flows.

A special form of the set command, `+CGDSCONT=<cid>` causes the values for context number <cid> to become undefined.

Note:	If the initial PDP context is supported, the context with `<cid>=0` is automatically defined at startup, see subclause 10.1.0.

The read command returns the current settings for each defined context.

The test command returns values supported as a compound value.

3.10.3 Defined Values

cid

Integer type; which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of permitted values (minimum value = 1) is returned by the test form of the command.

Note: The `<cid>`s for network-initiated PDP contexts will have values outside the ranges indicated for the `<cid>` in the test form of the commands +CGDCONT and +CGDSCONT.

p_cid

Integer type; specifies a particular PDP context definition which has been specified by use of the +CGDCONT command. The parameter is local to the TE-MT interface. The list of permitted values is returned by the test form of the command.

d_comp

Integer type; controls PDP data compression (applicable for SNDCP only) (refer 3GPP TS 44.065 [61])

Table 3-19: *d_comp*

Value	Description
0	off
1	on (manufacturer preferred compression)
2	V.42bis
3	V.44

h_comp

Integer type; controls PDP header compression (refer 3GPP TS 44.065 [61] and 3GPP TS 25.323 [62])

Table 3-20: *h_comp*

Value	Description
0	off
1	on (manufacturer preferred compression)
2	RFC 1144 [105] (applicable for SNDCP only)
3	RFC 2507 [107]

Table 3-20: *h_comp* (Continued)

Value	Description
4	RFC 3095 [108] (applicable for PDCP only)

IM_CN_Signalling_Flag_Ind

Integer type; indicates to the network whether the PDP context is for IM CN subsystem-related signalling only or not.

Table 3-21: *IM_CN_Signalling_Flag_Ind*

Value	Description
0	UE indicates that the PDP context is not for IM CN subsystem-related signalling only
1	UE indicates that the PDP context is for IM CN subsystem-related signalling only

3.11 Define EPS Quality Of Service: +CGEQOS

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

3.11.1 Syntax

Command	Possible Response(s)
AT+CGEQOS=*[<cid>[,<QCI>[,<DL_GBR>,<UL_GBR>[,<DL_MBR>,<UL_MBR]]]]*	`+CME ERROR:`*<err>*
AT+CGEQOS?	`[+CGEQOS:`*<cid>,<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>]*`] [<CR><LF>+CGEQOS:` *<cid>,<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>] [...]]*
AT+CGEQOS=?	`+CGEQOS:` *(range of supported <cid>s),(list of supported <QCI>s),(list of supported <DL_GBR>s),(list of supported <UL_GBR>s),(list of supported <DL_MBR>s),(list of supported <UL_MBR>s)*

3.11.2 Description

The set command allows the TE to specify the EPS Quality of Service parameters `<cid>, <QCI>, [<DL_GBR>` and `<UL_GBR>]` and `[<DL_MBR>` and `<UL_MBR>]` for a PDP context or Traffic Flows (see 3GPP TS 24.301 [83] and 3GPP TS 23.203 [85]). When in UMTS/GPRS the MT applies a mapping function to UTMS/GPRS Quality of Service.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for `<err>` values.

A special form of the set command, +CGEQOS= <cid> causes the values for context number `<cid>` to become undefined.

The read command returns the current settings for each defined QoS.

The test command returns the ranges of the supported parameters.

3.11.3 Defined Values

cid

Integer type; specifies a particular EPS Traffic Flows definition in EPS and a PDP Context definition in UMTS/GPRS (see the +CGDCONT and +CGDSCONT commands).

QCI

Integer type; specifies a class of EPS QoS (see 3GPP TS 24.301 [83]).

Table 3-22: *QCI*

Value	Description
0	QCI is selected by network
1 to 4	value range for guaranteed bit rate Traffic Flows
5 to 9	value range for non-guarenteed bit rate Traffic Flows
128 to 254	value range for Operator-specific QCIs

DL_GBR

Integer type; indicates DL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [83]).

UL_GBR

Integer type; indicates UL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [83]).

DL_MBR

Integer type; indicates DL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [83]).

UL_MBR

Integer type; indicates UL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [83]).

3.12 EPS Quality Of Service Read Dynamic Parameters: +CGEQOSRDP

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

3.12.1 Syntax

Command	Possible Response(s)
AT+CGEQOSRDP	[+CGEQOSRDP:*<cid>,<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>][,<DL_AMBR>,<UL_AMBR>]*] [<CR><LF>+CGEQOSRDP:*<cid>,<QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>,<UL_MBR>][,<DL_AMBR>,<UL_AMBR>] [...]]*
AT+CGEQOSRDP=?	+CGEQOSRDP: *(list of <cid>s associated with active contexts)*

3.12.2 Description

The execution command returns the Quality of Service parameters <QCI>, [<DL_GBR> and <UL_GBR>] and [<DL_MBR> and <UL_MBR>] of the active secondary or non secondary PDP context associated to the provided context identifier <cid>.

If the parameter <cid> is omitted, the Quality of Service parameters for all secondary and non secondary active PDP contexts are returned.

The test command returns a list of <cid>s associated with secondary or non secondary active PDP contexts.

Parameters of both network and MT/TA initiated PDP contexts will be returned.

3.12.3 Defined Values

cid

Integer type; specifies a particular Traffic Flows definition in EPS and a PDP Context definition in UMTS/GPRS (see the +CGDCONT and +CGDSCONT commands).

QCI

Integer type; specifies a class of EPS QoS (see 3GPP TS 24.301 [83]).

Table 3-23: *QCI*

Value	Description
0	QCI is selected by network
1 to 4	value range for guranteed bit rate Traffic Flows
5 to 9	value range for non-guarenteed bit rate Traffic Flows
128 to 254	value range for Operator-specific QCIs

DL_GBR

Integer type; indicates DL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [83]).

UL_GBR

Integer type; indicates UL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [83]).

DL_MBR

Integer type; indicates DL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [83]).

UL_MBR

Integer type; indicates UL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [83]).

DL_AMBR

Integer type; indicates DL APN aggregate MBR (see 3GPP TS 24.301 [83]). The value is in kbit/s.

UL_AMBR

Integer type; indicates UL APN aggregate MBR (see 3GPP TS 24.301 [83]). The value is in kbit/s.

Note: If multiple lines in a response belong to the same PDN connection they contain the same <DL_AMBR> <UL_AMBR> values.

3.13 Packet Domain Event Reporting: +CGEREP

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

3.13.1 Syntax

Command	Possible Response(s)
AT+CGEREP=*[<mode>[,<bfr>]]*	`+CME ERROR:` *<err>*
AT+CGEREP?	`+CGEREP:` *<mode>,<bfr>*
AT+CGEREP=?	`+CGEREP:` *(list of supported <mode>s),(list of supported <bfr>s)*

3.13.2 Description

Set command enables or disables sending of unsolicited result codes, +CGEV: XXX from MT to TE in the case of certain events occurring in the Packet Domain MT or the network. `<mode>` controls the processing of unsolicited result codes specified within this command. `<bfr>` controls the effect on buffered codes when <mode> 1 or 2 is entered. If a setting is not supported by the MT, ERROR or +CME ERROR: is returned.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for `<err>` values.

Read command returns the current mode and buffer settings

Test command returns the modes and buffer settings supported by the MT as compound values.

3.13.3 Defined Values

mode

Integer.

Table 3-24: *mode*

Value	Description
0	buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE.
1	discard unsolicited result codes when MT TE link is reserved (e.g. in on line data mode); otherwise forward them directly to the TE
2	buffer unsolicited result codes in the MT when MT TE link is reserved (e.g. in on line data mode) and flush them to the TE when MT TE link becomes available; otherwise forward them directly to the TE

bfr

Integer type

Table 3-25: *bfr*

Value	Description
0	MT buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered
1	MT buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1 or 2 is entered (OK response shall be given before flushing the codes)

3.14 Show PDP address(es): +CGPADDR

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

3.14.1 Syntax

Command	Possible Response(s)
AT+CGPADDR*[=<cid>[,<cid>[,...]]]*	[+CGPADDR: *<cid>[,<PDP_addr_1>[,<PDP_addr_2>]]]* [<CR><LF>+CGPADDR: *<cid>,[<PDP_addr_1>[,<PDP_addr_2>]] [...]]*
AT+CGPADDR=?	+CGPADDR: *(list of defined <cid>s)*

3.14.2 Description

The execution command returns a list of PDP addresses for the specified context identifiers. If no `<cid>` is specified, the addresses for all defined contexts are returned.

The test command returns a list of defined `<cid>`s.

3.14.3 Defined Values

cid

Integer type; specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

PDP_addr_1, PDP_addr_2

Each is a string type that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the +CGDCONT and +CGDSCONT commands when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. Both `<PDP_addr_1>` and `<PDP_addr_2>` are omitted if none is available. Both `<PDP_addr_1>` and `<PDP_addr_2>` are included when both IPv4 and IPv6 addresses are assigned, with `<PDP_addr_1>` containing the IPv4 address and `<PDP_addr_2>` containing the IPv6 address.

The string is given as dot-separated numeric (0-255) parameter of the form:`a1.a2.a3.a4` for IPv4 and `a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16` for IPv6.

When +CGPIAF is supported, its settings can influence the format of the IPv6 address in parameter `<PDP_addr_1>` or `<PDP_addr_2>` returned with the execute form of +CGPADDR.

Note: In dual-stack terminals (<PDP_type> IPV4V6), the IPv6 address will be provided in <PDP_addr_2>. For terminals with a single IPv6 stack (<PDP_type> IPV6) or due to backwards compatibility, the IPv6 address can be provided in parameter <PDP_addr_1>.

3.15 Secondary PDP Context Read Dynamic Parameters: +CGSCONTRDP

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

3.15.1 Syntax

Command	Possible Response(s)
AT+CGSCONTRDP[=<cid>]	[+CGSCONTRDP:<cid>,<p_cid>,<bearer_id>[,<IM_CN_Signalling_Flag>]] [<CR><LF>+CGSCONTRDP: <cid>,<p_cid>,<bearer_id>[,<IM_CN_Signalling_Flag>][...]]
AT+CGSCONTRDP=?	+CGSCONTRDP: (list of <cid>s associated with active contexts)

3.15.2 Description

The execution command returns `<p_cid>`, `<bearer_id>` and `<IM_CN_Signalling_Flag>` for an active secondary PDP context with the context identifier `<cid>`.

If the parameter `<cid>` is omitted, the `<cid>`, `<p_cid>`, `<bearer_id>` and `<IM_CN_Signalling_Flag>` are returned for all active secondary PDP contexts.

In EPS, the Traffic Flow parameters are returned.

Note: Parameters for UE initiated and network initiated PDP contexts are returned.

The test command returns a list of `<cid>`s associated with active secondary PDP contexts.

3.15.3 Defined Values

cid

Integer type; specifies a particular active secondary PDP context or Traffic Flows definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands (see the +CGDCONT and +CGDSCONT commands).

p_cid

Integer type; specifies a particular PDP context definition or default EPS context Identifier which has been specified by use of the +CGDCONT command. The parameter is local to the TE-MT interface (see the +CGDSCONT command).

bearer_id

Integer type; identifies the bearer, EPS Bearer in EPS and NSAPI in UMTS/GPRS.

IM_CN_Signalling_Flag

Integer type; shows whether the PDP context is for IM CN subsystem-related signalling only or not.

Table 3-26: *IM_CN_Signalling_Flag*

Value	Description
0	PDP context is not for IM CN subsystem-related signalling only
1	PDP context is for IM CN subsystem-related signalling only

3.16 Select Service for MO SMS Messages: +CGSMS

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

See the current implementation limitation in `service` parameter description.

3.16.1 Syntax

Command	Possible Response(s)
AT+CGSMS=*[<service>]*	
AT+CGSMS?	`+CGSMS:` *<service>*
AT+CGSMS=?	`+CGSMS:` *(list of supported <service>s)*

3.16.2 Description

The set command is used to specify the service or service preference that the MT will use to send MO SMS messages.

The read command returns the currently selected service or service preference.

The test command is used for requesting information on the currently available services and service preferences.

3.16.3 Defined Values

Restriction: only `<service>` 0 and 2 are currently implemented.

service

Integer type; indicates the service or service preference to be used

Table 3-27: *service*

Value	Description
0	Packet Domain
1	circuit switched
2	Packet Domain preferred (use circuit switched if GPRS not available)
3	circuit switched preferred (use Packet Domain if circuit switched not available)

3.17 Traffic Flow Template: +CGTFT

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

3.17.1 Syntax

Command	Possible Response(s)
AT+CGTFT=*[<cid>,[<packet filter identifier>,<evaluation precedence index>[,<remote address and subnet mask>[,<protocol number (ipv4) / next header (ipv6)>[,<local port range>[,<remote port range>[,<ipsec security parameter index (spi)>[,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>[,<flow label (ipv6)>[,<direction>]]]]]]]]]]*	`+CME ERROR:` *<err>*
AT+CGTFT?	`[+CGTFT:` *<cid>,<packet filter identifier>,<evaluation precedence index>,<remote address and subnet mask>,<protocol number (ipv4) / next header (ipv6)>,<local port range>,<remote port range>,<ipsec security parameter index (spi)>,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>,<flow label (ipv6)>,<direction>]* `[<CR><LF>+CGTFT:` *<cid>,<packet filter identifier>,<evaluation precedence index>,<remote address and subnet mask>,<protocol number (ipv4) / next header (ipv6)>,<local port range>, <remote port range>,<ipsec security parameter index (spi)>,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>,<flow label (ipv6)>,<direction> [...]]*
AT+CGTFT=?	`+CGTFT:`*<PDP_type>,(list of supported <packet filter identifier>s),(list of supported <evaluation precedence index>s),(list of supported <remote address and subnet mask>s),(list of supported <protocol number (ipv4) / next header (ipv6)>s),(list of supported <local port range>s),(list of supported <remote port range>s),(list of supported <ipsec security parameter index (spi)>s),(list of supported <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>s),(list of supported <flow label (ipv6)>s),(list of supported <direction>s)* `[<CR><LF>+CGTFT:`*<PDP_type>,(list of supported <packet filter identifier>s),(list of supported <evaluation precedence index>s),(list of supported <remote address and subnet mask>s),(list of supported <protocol number (ipv4) / next header (ipv6)>s),(list of supported <local port range>s),(list of supported <remote port range>s),(list of supported <ipsec security parameter index (spi)>s),(list of supported <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>s),(list of supported <flow label (ipv6)>s),(list of supported <direction>s) [...]]*

3.17.2 Description

This command allows the TE to specify a Packet Filter - PF for a Traffic Flow Template - TFT that is used in the GGSN in UMTS/GPRS and Packet GW in EPS for routing of packets onto different QoS flows towards the TE. The concept is further described in the 3GPP TS 23.060 [47]. A TFT consists of from one and up to 16 Packet Filters, each identified by a unique <packet filter identifier>. A Packet Filter also has an <evaluation precedence index> that is unique within all TFTs associated with all PDP contexts that are associated with the same PDP address.

The set command specifies a Packet Filter that is to be added to the TFT stored in the MT and used for the context identified by the (local) context identification parameter, <cid>. The specified TFT will be stored in the GGSN in UMTS/GPRS and Packet GW in EPS only at activation or MS-initiated modification of the related context. Since this is the same parameter that is used in the +CGDCONT and +CGDSCONT commands, the +CGTFT command is effectively an extension to these commands. The Packet Filters consist of a number of parameters, each of which may be set to a separate value.

A special form of the set command, +CGTFT=<cid> causes all of the Packet Filters in the TFT for context number <cid> to become undefined. At any time there may exist only one PDP context with no associated TFT amongst all PDP contexts associated to one PDP address. At an attempt to delete a TFT, which would violate this rule, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for `<err>` values.

The read command returns the current settings for all Packet Filters for each defined context.

The test command returns values supported as a compound value. If the MT supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line. TFTs shall be used for PDP-type IP and PPP only. For PDP-type PPP a TFT is applicable only when IP traffic is carried over PPP. If PPP carries header-compressed IP packets, then a TFT cannot be used.

3.17.3 Defined Values

cid

Integer type. Specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands).

PDP_type

String type. Specifies the type of packet data protocol (see the +CGDCONT command).

packet filter identifier

Integer type. Value range is from 1 to 16. See also 3GPP TS 23.060 [47]

evaluation precedence index

Integer type. The value range is from 0 to 255. See also 3GPP TS 23.060 [47]

remote address, subnet mask

String type. The string is given as dot-separated numeric (0-255) parameters on the form: `"a1.a2.a3.a4.m1.m2.m3.m4"` for IPv4 or `"a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16"`, for IPv6.

When +CGPIAF is supported, its settings can influence the format of this parameter returned with the read form of +CGTFT.

protocol number (ipv4) / next header (ipv6)

Integer type. Value range is from 0 to 255.

local port range

String type. The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".

remote port range

String type. The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".

ipsec security parameter index (spi)

Numeric value in hexadecimal format. The value range is from 00000000 to FFFFFFFF.

type of service (tos) (ipv4) and mask, traffic class (ipv6) and mask

String type. The string is given as dot-separated numeric (0-255) parameters on the form `"t.m"`.

flow label (ipv6)

Numeric value in hexadecimal format. The value range is from 00000 to FFFFF. Valid for IPv6 only.

direction

Integer type. Specifies the transmission direction in which the packet filter shall be applied.

Table 3-28: *direction*

Value	Description
0	Pre-Release 7 TFT filter (see 3GPP TS 24.008 [8], table 10.5.162)
1	Uplink
2	Downlink
3	Birectional (Up & Downlink)

Some of the above listed attributes may coexist in a Packet Filter while others mutually exclude each other, the possible combinations are shown in 3GPP TS 23.060 [47].

3.18 Traffic Flow Template Read Dynamic Parameters: +CGTFTRDP

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

3.18.1 Syntax

Command	Possible Response(s)
AT+CGTFTRDP*[=<cid>]*	`[+CGTFTRDP:` *<cid>,<packet filter identifier>,<evaluation precedence index>,<remote address and subnet mask>,<protocol number (ipv4) / next header (ipv6)>,<local port range>,<remote port range>,<ipsec security parameter index (spi)>,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>,<flow label (ipv6)>,<direction>,<NW packet filter Identifier>]* `[<CR><LF>+CGTFTRDP:`*<cid>,<packet filter identifier>,<evaluation precedence index>,<remote address and subnet mask>,<protocol number (ipv4) / next header (ipv6)>,<local port range>, <remote port range>,<ipsec security parameter index (spi)>,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>,<flow label (ipv6)>,<direction>,<NW packet filter Identifier> [...]]*
AT+CGTFTRDP=?	`+CGTFTRDP:` *(list of <cid>s associated with active contexts)*

3.18.2 Description

The execution command returns the relevant information about Traffic Flow Template for an active secondary or non secondary PDP context specified by `<cid>` together with the additional network assigned values when established by the network. If the parameter `<cid>` is omitted, the Traffic Flow Templates for all active secondary and non secondary PDP contexts are returned.

Parameters of both network and MT/TA initiated PDP contexts will be returned.

The test command returns a list of `<cid>`s associated with active secondary and non secondary contexts.

3.18.3 Defined Values

cid

Integer type; Specifies a particular secondary or non secondary PDP context definition or Traffic Flows definition (see +CGDCONT and +CGDSCONT commands).

packet filter identifier

Integer type. The value range is from 1 to 16.

evaluation precedence index

Integer type. The value range is from 0 to 255.

remote address, subnet mask

String type. The string is given as dot-separated numeric (0-255) parameters on the form: `"a1.a2.a3.a4.m1.m2.m3.m4"` for IPv4 or `"a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16"` for IPv6.

When +CGPIAF is supported, its settings can influence the format of this parameter returned with the execute form of +CGTFTRDP.

protocol number (ipv4) / next header (ipv6)

Integer type. The value range is from 0 to 255.

local port range

String type. The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".

remote port range

String type. The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".

ipsec security parameter index (spi)

Numeric value in hexadecimal format. The value range is from 00000000 to FFFFFFFF.

type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask

String type. The string is given as dot-separated numeric (0-255) parameters on the form `"t.m"`.

flow label (ipv6)

Numeric value in hexadecimal format. The value range is from 00000 to FFFFF. Valid for IPv6 only.

direction

Integer type. Specifies the transmission direction in which the Packet Filter shall be applied.

Table 3-29: *direction*

Value	Description
0	Pre Release 7 TFT Filter (see 3GPP TS 24.008 [8], table 10.5.162)
1	Uplink
2	Downlink
3	Bidirectional (Used for Uplink and Downlink)

NW packet filter Identifier

Integer type. The value range is from 1 to 16. In EPS the value is assigned by the network when established

NOTE:Some of the above listed attributes can coexist in a Packet Filter while others mutually exclude each other. The possible combinations are shown in 3GPP TS 23.060 [47].

4 3GPP Mobile Termination Control and Status Commands

4.1 Close Logical Channel: +CCHC

Note:	This command is described in *3GPP TS 27.007*. See Section *References*.

4.1.1 Syntax

Command	Possible Response(s)
AT+CCHC=<*sessiondd*>	`+CCHC` `+CME ERROR:` <*err*>
AT+CCHC=?	`+CME ERROR:` <*err*>

4.1.2 Description

This command asks the ME to close a communication session with the active UICC. The ME shall close the previously opened logical channel. The TE will no longer be able to send commands on this logical channel. The UICC will close the logical channel when receiving this command.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

4.1.3 Defined Values

sessionid

Integer type value, a session Id to be used in order to target a specific application on the smart card (e.g. (U)SIM, WIM, ISIM) using logical channels mechanism

4.2 Open Logical Channel: +CCHO

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

4.2.1 Syntax

Command	Possible Response(s)
AT+CCHO=<*dfname*>	`<sessionid>` `+CME ERROR:` <*err*>
AT+CCHO=?	`+CME ERROR:` <*err*>

4.2.2 Description

Execution of the command causes the MT to return `<sessionid>` to allow the TE to identify a channel that is being allocated by the currently selected UICC, which is attached to ME. The currently selected UICC will open a new logical ETSI 3GPP TS 27.007 version 12.10.0 Release 12 141 ETSI TS 127 007 V12.10.0 (2015-10) channel; select the application identified by the `<dfname>` received with this command and return a session Id as the response. The ME shall restrict the communication between the TE and the UICC to this logical channel.

This `<sessionid>` is to be used when sending commands with Restricted UICC Logical Channel access +CRLA or Generic UICC Logical Channel Access: +CGLA commands.

Note: The logical channel number is contained in the CLASS byte of an APDU command, thus implicitly contained in all APDU commands sent to a UICC. In this case it will be up to the MT to manage the logical channel part of the APDU CLASS byte and to ensure that the chosen logical channel is relevant to the `<sessionid>` indicated in the AT command. See 3GPP TS 31.101 [65] for further information on logical channels in APDU commands protocol.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

4.2.3 Defined Values

dfname

All selectable applications in the UICC are referenced by a DF name coded on 1 to 16 bytes

sessionid

Integer type value, a session Id to be used in order to target a specific application on the smart card (e.g. (U)SIM, WIM, ISIM) using logical channels mechanism

4.3 Extended Error Report: +CEER

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

4.3.1 Syntax

Command	Possible Response(s)
AT+CEER	`+CEER:` *<report>*
AT+CEER=?	

4.3.2 Description

Execution command causes the TA to return one or more lines of information text `<report>`, determined by the MT manufacturer, which should offer the user of the TA an extended report of the reason for:

- the failure in the last unsuccessful call setup (originating or answering) or in call modification;
- the last call release;
- the last unsuccessful GPRS attach or unsuccessful PDP context activation;
- the last GPRS detach or PDP context deactivation.

Typically, the text will consist of a single line containing the cause information given by GSM/UMTS network in textual format.

Test command returns a list of pairs which present the available facilities and the maximum length of their password.

4.3.3 Defined Values

report

Integer. The total number of characters, including line terminators, in the information text shall not exceed 2041 characters. Text shall not contain the sequence 0<CR> or OK<CR>.

4.4 Set Phone Functionality: +CFUN

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

See the current implementation limitation in `fun` parameter description.

4.4.1 Syntax

Command	Possible Response(s)
AT+CFUN=*[<fun>[,<rst>]]*	`+CME ERROR:` *<err>*
AT+CFUN?	`+CFUN:`*<fun>* or `+CME ERROR:` *<err>*
AT+CFUN=?	`+CFUN:`*(list of supported <fun>s),(list of supported <rst>s)*

4.4.2 Description

Set command selects the level of functionality `<fun>` in the MT. Level "full functionality" is where the highest level of power is drawn. "Minimum functionality" is where minimum power is drawn. Level of functionality between these may also be specified by manufacturers. When supported by manufacturers, MT resetting with `<rst>` parameter may be utilized.

Note: It is manufacturer specific if this command affects network registration. Command Operator Selection `+COPS` is used to force registration/deregistration.

Test command returns values supported by the MT as a compound value.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for `<err>` values.

4.4.3 Defined Values

Caution: **Restriction: only functionality levels 0, 1, and 4? can be set:**

- **`AT+CFUN=0`** is used to configure the minimum functionality level
- **`AT+CFUN=1`** is used to configure the full functionality level
- **`AT+CFUN=4`** is used to disable both transmit and receive RF circuits. In this mode, access to the SIM card is allowed

fun

Integer. Functionality code.

Table 4-1: *fun*

Value	Description
0	minimum functionality
1	full functionality
2	disable phone transmit RF circuits only
3	disable phone receive RF circuits only
4	disable phone both transmit and receive RF circuits
5..127	reserved for manufacturers as intermediate states between full and minimum functionality

rst

Integer. Reset required indication.

Table 4-2: *rst*

Value	Description
0	do not reset the MT before setting it to <fun> power levelNote:This shall be always default when `<rst>` is not given.
1	reset the MT before setting it to `<fun>` power level

4.5 Generic UICC Logical Channel Access: +CGLA

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

4.5.1 Syntax

Command	Possible Response(s)
AT+CGLA=<*sessionid*>,<*length*>,<*command*>	`+CGLA:`<*length*>, <*response*> `+CME ERROR:` <*err*>
AT+CGLA=?	`+CME ERROR:` <*err*>

4.5.2 Description

Set command transmits to the MT the `<command>` it then shall send as it is to the selected UICC. In the same manner the UICC `<response>` shall be sent back by the MT to the TA as it is.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

This command allows a direct control of the currently selected UICC by a distant application on the TE. The TE shall then take care of processing UICC information within the frame specified by GSM/UMTS.

Although Generic UICC Logical Channel Access command +CGLA allows TE to take control over the UICC-MT interface, there are some functions of the UICC-MT interface that logically do not need to be accessed from outside the TA/MT. Moreover, for security reason the GSM network authentication should not be handled outside the TA/MT. Therefore it shall not be allowed to execute a Run GSM Algorithm command or an Authenticate command in GSM ETSI 3GPP TS 27.007 version 12.10.0 Release 12 139 ETSI TS 127 007 V12.10.0 (2015-10) context from the TE using +CGLA at all time whether the +CGLA is locked or unlocked. This shall not forbid the TE to send Authenticate commands in other security contexts (e.g. EAP security context).

For example, the TA/MT shall forbid the transfer of the Authenticate command to a USIM application when parameters P2 = 0 (GSM security context). See 3GPP TS 31.102 [59] for USIM authenticate command definition.

Note:	Compared to Restricted UICC Access command +CRLA, the definition of +CGLA allows TE to take more control over the UICC-MT interface. The locking and unlocking of the interface may be done by a special <command> value or automatically by TA/MT (by interpreting <command> parameter). In case that TE application does not use the unlock command (or does not send a <command> causing automatic unlock) in a certain timeout value, MT may release the locking.

4.5.3 Defined Values

sessionid

integer type; this is the identifier of the session to be used in order to send the APDU commands to the UICC. It is manadatory in order to send commands to the UICC when targeting applications on the smart card using a logical channel other than the default channel (channel "0").

length

integer type; length of the characters that are sent to TE in `<command>` or `<response>` (two times the actual length of the command or response)

command

command passed on by the MT to the UICC in the format as described in 3GPP TS 31.101 [65] (hexadecimal character format; refer Select TE Character Set: +CSCS)

response

response to the command passed on by the UICC to the MT in the format as described in 3GPP TS 31.101 [65] (hexadecimal character format; refer Select TE Character Set: +CSCS)

4.6 Printing IP Address Format: +CGPIAF

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

4.6.1 Syntax

Command	Possible Response(s)
AT+CGPIAF=[<*IPv6_AddressFormat*>[,<*IPv6_SubnetNotation*>[,<*IPv6_LeadingZeros*>[,<*IPv6_CompressZeros*>]]]]	
AT+CGPIAF?	`+CGPIAF:`<*IPv6_AddressFormat*>,<*IPv6_SubnetNotation*>,<*IPv6_LeadingZeros*>,<*IPv6_CompressZeros*>
AT+CGPIAF=?	`+CGPIAF:`*(list of supported <IPv6_AddressFormat>s), (list of supported <IPv6_SubnetNotation>s), (list of supported <IPv6_LeadingZeros>s),(list of supported <IPv6_CompressZeros>s)*

4.6.2 Description

Set command decides what format to print IPV6 address parameters of other AT commands. See RFC 4291 [88] for details of the IPv6 address format.

The +CGPIAF parameters `<IPv6_AddressFormat>`, `<IPv6_SubnetNotation>`, `<IPv6_LeadingZeros>` and `<IPv6_CompressedZeros>` affect the following commands and parameters:

1. in +CGTFT and +CGTFTRDP, the `<remote address and subnet mask>`;
2. in +CGDCONT, the `<PDP_addr>`;
3. in +CGPADDR, the `<PDP_addr_1>` and `<PDP_addr_2>`;
4. in +CGCONTRDP, the `<local address and subnet mask>`, `<DNS_prim_addr>`, `<DNS_sec_addr>`, `<P_CSCF_prim_addr>` and `<P_CSCF_sec_addr>`; and
5. in +CRC, the `<PDP_addr>` of unsolicited result code GPRS `<PDP_type>, <PDP_addr>[, [<L2P>][,<APN>]]`.

Read command returns the current command parameter settings.

Test command returns values supported as compound values.

4.6.3 Defined Values

IPv6_AddressFormat

Integer type, decides the IPv6 address format. Relevant for all AT command parameters that can hold an IPv6 address.

Table 4-3: *IPv6_AddressFormat*

Value	Description
0	Use IPv4-like dot-notation. IP address, and subnetwork mask if appliccable, are dot-separated. Example:For <remote address and subnet mask>:`"32.1.13.184.0.0.205.48.0.0.0.0.0.0.0.0.255.255.255.255.255.255.255.240.0.0.0.0.0.0.0.0"` For other IP address parameters:`"32.1.13.184.0.0.205.48.0.0.0.0.0.0.0.0"`
1	Use IPv6-like colon-notation. IP address, and subnetwork mask if applicable and when given explicitly, are separated by a space.Example:For `<remote address and subnet mask>:"2001:0DB8:0000:CD30:0000:0000:0000:0000 FFFF:FFFF:FFFF:FFF0:0000:0000:0000:0000"`For other IP address parameters:`"2001:0DB8:0000:CD30:0000:0000:0000:0000"`

IPv6_SubnetNotation

Integer type, decides the subnet-notation for `<remote address and subnet mask>`. Setting does not apply if `<IPv6_AddressFormat>` = 0.

Table 4-4: *IPv6_SubnetNotation*

Value	Description
0	Both IP Address and subnet mask are stated explicitly, separated by a space. Example:`"2001:0DB8:0000:CD30:0000:0000:0000:0000 FFFF:FFFF:FFFF:FFF0:0000:0000:0000:0000"`
1	The printout format is applying / (forward slash) subnet-prefix Classless Inter-Domain Routing (CIDR) notation. Example:`"2001:0DB8:0000:CD30:0000:0000:0000:0000/60"`

IPv6_LeadingZeros

Integer type, decides whether leading zeros are omitted or not. Setting does not apply if <IPv6_AddressFormat> = 0.

Table 4-5: *IPv6_LeadingZeros*

Value	Description
0	Leading zeros are omitted.Example: `"2001:DB8:0:CD30:0:0:0:0"`
1	Leading zeros are included.Example: `"2001:0DB8:0000:CD30:0000:0000:0000:0000"`

IPv6_CompressZeros

Integer type, decides whether 1-n instances of 16-bit zero-values are replaced by only '::'. This applies only once. Setting does not apply if <IPv6_AddressFormat> = 0.

Table 4-6: *IPv6_CompressZeros*

Value	Description
0	No zero compression.Example:`"2001:DB8:0:CD30:0:0:0:0"`
1	Use zero compression.Example:`"2001:DB8:0:CD30::"`

4.7 List All Available AT Commands: +CLAC

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

4.7.1 Syntax

Command	Possible Response(s)
AT+CLAC	*<AT Command1>*[<CR><LF>*<AT Command2>[...]]*
AT+CLAC=?	`+CME ERROR:` *<err>*

4.7.2 Description

Execution command causes the MT to return one or more lines of AT Commands.

Note: This command only returns the AT commands that are available for the user.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

4.7.3 Defined Values

AT Command

String. Defines the AT command including the prefix AT. Text shall not contain the sequence 0<CR> or OK<CR>

4.8 Mobile Termination Error Result Code: +CME ERROR

Note: This command is described in *3GPP TS 27.007*. the error codes reported here are from *3GPP TS 27.007* and *3GPP TS 27.005*. See Section *References*.

4.8.1 Syntax

Command	Possible Response(s)
	`+CME ERROR:` *<err>*

4.8.2 Description

The operation of `+CME ERROR: <err>` final result code is similar to the regular ERROR result code: if `+CME ERROR: <err>` is the result code for any of the commands in a command line, none of the following commands in the same command line is executed (neither ERROR nor OK result code shall be returned as a result of a completed command line execution). The format of `<err>` can be either numeric or verbose. This is set with command +CMEE, see Section 4.9 Report Mobile Termination Error: +CMEE on page 142.

4.8.3 CME/CMS Error Defined Values

err

Integer. Error code.

Table 4-7: General "CME ERROR" Codes (3GPP TS 27.007)

Code	Description
0	phone failure
1	no connection to phone
2	phone adaptor link reserved

Table 4-7: General "CME ERROR" Codes (3GPP TS 27.007) (Continued)

Code	Description
3	operation not allowed
4	operation not supported
5	PH SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	SIM not inserted (seet note1)
11	SIM PIN required
12	SIM PUK required
13	SIM failure (See NOTE 1)
14	SIM busy (See NOTE 1)
15	SIM wrong (See NOTE 1)
16	incorrect password
17	SIM PIN2 required
18	SIM PUK2 required
20	memory full
21	invalid index
22	not found
23	memory failure
24	text string too long
25	invalid characters in text string
26	dial string too long
27	invalid characters in dial string
30	no network service
31	network timeout
32	network not allowed - emergency calls only

Table 4-7: General "CME ERROR" Codes (3GPP TS 27.007) (Continued)

Code	Description
40	network personalization PIN required
41	network personalization PUK required
42	network subset personalization PIN required
43	network subset personalization PUK required
44	service provider personalization PIN required
45	service provider personalization PUK required
46	corporate personalization PIN required
47	corporate personalization PUK required
48	hidden key required (See NOTE 2)
49	EAP method not supported
50	Incorrect parameters
100	unknown
528	Upgrade failed: General error
529	Upgrade failed: Corrupted image.
530	Upgrade failed: Invalid signature
531	Upgrade failed: Network error
532	Upgrade failed: Upgrade already in progress
533	Upgrade cancel failed: No upgrade in progress

Note 1:This error code is also applicable to UICC.

Note 2:This key is required when accessing hidden phonebook entries.

Table 4-8: GPRS related "CME ERROR" Codes (3GPP TS 27.007)

Code	Decsription
103	Illegal MS (#3)
106	Illegal ME (#6)

Table 4-8: GPRS related "CME ERROR" Codes (3GPP TS 27.007) (Continued)

Code	Decsription
107	GPRS services not allowed (#7)
111	PLMN not allowed (#11)
112	Location area not allowed (#12)
113	Roaming not allowed in this location area (#13)
132	service option not supported (#32)
133	requested service option not subscribed (#33)
134	service option temporarily out of order (#34)
149	PDP authentication failure
151	Last PDN disconnection not allowed (#49) Note that this error is returned when the MT detects an attempt to disconnect the last PDN or the network returns a response message with cause value #49.
148	unspecified GPRS error
150	invalid mobile class

Note:Values in parentheses are 3GPP TS 24.008 [8] cause codes.

Table 4-9: SMS related "CMS ERROR" Codes (3GPP TS 27.005)

Code	Description
0...127	3GPP TS 24.011 [6] clause E.2 values
128...255	3GPP TS 23.040 [3] clause 9.2.3.22 values.
300	ME failure
301	SMS service of ME reserved
302	operation not allowed
303	operation not supported
304	invalid PDU mode parameter
305	invalid text mode parameter
310	(U)SIM not inserted

Table 4-9: SMS related "CMS ERROR" Codes (3GPP TS 27.005) (Continued)

Code	Description
311	(U)SIM PIN required
312	PH-(U)SIM PIN required
313	(U)SIM failure
314	(U)SIM busy
315	(U)SIM wrong
316	(U)SIM PUK required
317	(U)SIM PIN2 required
318	(U)SIM PUK2 required
320	memory failure
321	invalid memory index
322	memory full
330	SMSC address unknown
331	no network service
332	network timeout
340	no +CNMA acknowledgement expected
500	unknown error
...511	other values in range 256...511 are reserved
512...	manufacturer specific

4.9 Report Mobile Termination Error: +CMEE

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

4.9.1 Syntax

Command	Possible Response(s)
AT+CMEE=<*n*>	`+CME ERROR:` <*err*>
AT+CMEE?	`+CMEE:` <*n*>
AT+CMEE=?	`+CMEE:` *(list of supported <n>s)*

4.9.2 Description

Set command disables or enables the use of final result code `+CME ERROR: <err>` as an indication of an error relating to the functionality of the MT. When enabled, MT related errors cause `+CME ERROR: <err>` final result code instead of the regular ERROR final result code. ERROR is returned normally when error is related to syntax, invalid parameters, or TA functionality.

Test command returns values supported as a compound value.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for `<err>` values.

4.9.3 Defined Values

n

Integer. Defines the use of final result code.

Table 4-10: *n*

Value	Description
0	disable `+CME ERROR: <err>` result code and use ERROR instead
1	enable`+CME ERROR: <err>` result code and use numeric `<err>` values
2	enable `+CME ERROR: <err>` result code and use verbose`<err>` values

4.10 Mobile Termination Control Mode: +CMEC

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

See the current implementation limitation in the parameters description.

4.10.1 Syntax

Command	Possible Response(s)
AT+CMEC=[*<keyp>*,[,*<disp>*,[,*<ind>*[,*<tscrn>*]]]	`+CME ERROR:` *<err>*
AT+CMEC?	`+CMEC:` *<keyp>,<disp>,<ind>,<tscrn>*
AT+CMEC=?	`+CMEC:` *(list of supported <keyp>s),(list of supported <disp>s),(list of supported <ind>s),(list of supported <tscrn>s)*

4.10.2 Description

Set command selects the equipment, which operates MT keypad, writes to MT display and sets MT indicators. If operation mode is not allowed by the MT, `+CME ERROR: <err>` is returned.

Test command returns the modes supported as compound values.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

4.10.3 Defined Values

Caution: **Restriction: only the following parameters are currently supported:**

- **<keypd>**: '0'
- **<disp>**: '0'
- **<ind>**: '0'
- **<tscrn>**: '0'

keyp

Integer.

Table 4-11: *keyp*

Value	Description
0	MT can be operated only through its keypad (execute command of +CKPD cannot be used)
1	MT can be operated only from TE (with command +CKPD)
2	MT can be operated from both MT keypad and TE

disp

Integer.

Table 4-12: *disp*

Value	Description
0	only MT can write to its display (command +CDIS can only be used to read the display)
1	only TE can write to MT display (with command +CDIS)
2	MT display can be written by both MT and TE

ind

Integer.

Table 4-13: *ind*

Value	Description
0	only MT can set the status of its indicators (command +CIND can only be used to read the indicators)
1	only TE can set the status of MT indicators (with command +CIND)
2	MT indicators can be set by both MT and TE

tscrn

Integer.

Table 4-14: *tscrn*

Value	Description
0	only MT can set the status of its indicators (execute command of +CTSA cannot be used)
1	only TE can set the status of MT indicators (with command +CTSA)
2	MT indicators can be set by both MT and TE

4.11 Mobile Termination Event Reporting: +CMER

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

See the current implementation limitation in the parameters description.

4.11.1 Syntax

Command	Possible Response(s)
AT+CMER=*[<mode>[,<keyp>[,<disp>[,<ind>[,<bfr>[,<tscrn>][,<orientation>]]]]]]*	`+CME ERROR:` *<err>*
AT+CMER?	`+CMER:`*<mode>,<keyp>,<disp>,<ind>,<bfr>,<tscrn>,<orientation>*
AT+CMER=?	`+CMER:` *(list of supported <mode>s),(list of supported <keyp>s),(list of supported <disp>s),(list of supported <ind>s),(list of supported <bfr>s),(list of supported <tscrn>s),(list of supported <orientation>s)*

4.11.2 Description

Set command enables or disables sending of unsolicited result codes from TA to TE in the case of key pressings, display changes, and indicator state changes. `<mode>` controls the processing of unsolicited result codes specified within this command. `<bfr>`controls the effect on buffered codes when `<mode>` 1, 2 or 3 is entered. If setting is not supported by the MT, `+CME ERROR: <err>` is returned.

Test command returns the modes supported as compound values.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

4.11.3 Defined Values

Caution: Restriction: only the following parameters are supported:

- **<mode>: '3'**
- **<keyp>: '0'**
- **<disp>: '0'**
- **<ind>: '0' or '1' or '2'**

When `<ind>` is set to '1' or '2', the notification +CIEV is used (when supported). Only the notifications 'SERVICE', 'SMS FULL' and 'ROAMING' are supported. 'SMS FULL' is a proprietary notification.

- **<bfr>: '0'**
- **<tscrn>: '0'**

mode

Integer.

Table 4-15: *mode*

Value	Description
0	buffer unsolicited result codes in the TA; if TA result code buffer is full, codes can be buffered in some other place or the oldest ones can be discarded
1	discard unsolicited result codes when TA TE link is reserved (e.g. in on line data mode); otherwise forward them directly to the TE
2	buffer unsolicited result codes in the TA when TA TE link is reserved (e.g. in on line data mode) and flush them to the TE after reservation; otherwise forward them directly to the TE
3	forward unsolicited result codes directly to the TE; TA TE link specific inband technique used to embed result codes and data when TA is in on line data mode

keyp

Integer.

Table 4-16: *keyp*

Value	Description
0	no keypad event reporting
1	keypad event reporting using unsolicited result code +CKEV: <key>,<press>. <key> indicates the key (refer IRA values defined in table 67 in subclause "Keypad control +CKPD") and <press> if the key is pressed or released (1 for pressing and 0 for releasing). Only those key pressings, which are not caused by +CKPD shall be indicated by the TA to the TE.NOTE 1:When this mode is enabled, corresponding result codes of all keys currently pressed are flushed to the TA regardless of <bfr> setting.
2	keypad event reporting using unsolicited result code +CKEV: <key>,<press>. All key pressings shall be directed from TA to TE.NOTE 2:When this mode is enabled, corresponding result codes of all keys currently pressed are flushed to the TA regardless of <bfr> setting.

disp

Integer.

Table 4-17: *disp*

Value	Description
0	no display event reporting
1	display event reporting using unsolicited result code +CDEV: <elem>,<text>. <elem> indicates the element order number (as specified for +CDIS) and <text> is the new value of text element. Only those display events, which are not caused by +CDIS shall be indicated by the TA to the TE. Character set used in <text> is as specified by command Select TE Character Set +CSCS
2	display event reporting using unsolicited result code +CDEV: <elem>,<text>. All display events shall be directed from TA to TE. Character set used in <text> is as specified by command Select TE Character Set +CSCS

ind

Integer. Event indicator.

Table 4-18: *ind*

Value	Description
0	no indicator event reporting
1	indicator event reporting using unsolicited result code +CIEV: <ind>,<value>. <ind> (when supported) indicates the indicator order number (as specified for +CIND) and <value> is the new value of indicator. Only those indicator events, which are not caused by +CIND shall be indicated by the TA to the TE
2	indicator event reporting using unsolicited result code +CIEV: <ind>,<value> (when supported). All indicator events shall be directed from TA to TE

bfr

Integer.

Table 4-19: *bfr*

Value	Description
0	TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered
1	TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...3 is entered (OK response shall be given before flushing the codes)

tscrn

Integer. Touch screen event.

Table 4-20: *tscrn*

Value	Description
0	no touch screen event reporting
1	touch screen event reporting using unsolicited result code `+CTEV: <action>,<x>,<y>`. The `<x>,<y>` parameters indicate the x, y coordinates on the touch screen device (as specified for +CTSA), and `<action>`indicates the action performed on the screen (0 for screen released, 1 for screen depressed, 2 for single tap, and 3 for double tap). Only those touch screen events, which are not caused by +CTSA shall be indicated by the TA to the TE.NOTE 3:When this mode is enabled, corresponding result codes of all touch screen actions are flushed to the TA regardless of `<bfr>` setting.

Table 4-20: *tscrn* (Continued)

Value	Description
2	touch screen event reporting using unsolicited result code `+CTEV: <action>,<x>,<y>`. All touch screen events shall be directed from the TA to the TE.NOTE 4:When this mode is enabled, corresponding result codes of all touch screen actions are flushed to the TA regardless of `<bfr>` setting.
3	Verbose mode. Touch screen event reporting using unsolicited result code `+CTEV: <action>,<x>,<y>`. This is a special mode where intermediate depressed result codes (`+CTEV: 1,<x>,<y>`) are generated for each new `<x>,<y>` coordinate detected while a user is dragging a touch to a new location. All other touch screen actions shall be directed from the TA to the TE normally. Only those touch screen events which are not caused by `+CTSA` shall be indicated by the TA to the TE.NOTE 5:When this mode is enabled, corresponding result codes of all touch screen actions are flushed to the TA regardless of `<bfr>` setting.
4	enchanced touch screen event reporting using unsolicited result code `+CTEV: <action>,<x>,<y>,<id>[,<duration>]`. The `<x>,<y>` parameters indicate the x, y coordinates on the touch screen device (as specified for +CTSA), the <duration> parameter indicates the duration of the touch (as specified for +CTSA) and, the <id> identifies any simultaneous touch (as specified for +CTSA). Only those touch screen events, which are not caused by +CTSA shall be indicated by the TA to the TE. The <action> parameter indicates the action performed on the screen, if the <duration> parameter is:- 0, it is valid for the <action> parameter to indicate 0 for screen released, 1 for screen depressed, 2 for single tap, and 3 for double tap;-a positive, non-zero integer, it is valid for the <action> parameter to indicate 0 for screen released.NOTE 6: When this mode is enabled, corresponding result codes of all touch screen actions are flushed to the TA regardless of <bfr> setting.
5	enchanced touch screen event reporting using unsolicited result code +CTEV: <action>,<x>,<y>,<id>[,<duration>]. See description of <tscrn> set to 4 for the valid for the <action> parameter. All touch screen events shall be directed from the TA to the TE.NOTE 7:When this mode is enabled, corresponding result codes of all touch screen actions are flushed to the TA regardless of `<bfr>` setting.
6	Verbose mode. enchanced touch screen event reporting using unsolicited result code +CTEV: <action>,<x>,<y>,<id>[,<duration>]. This is a special mode where intermediate depressed result codes (+CTEV: 1,<x>,<y>,<id>[,<duration>]) are generated for each new <x>,<y> coordinate detected while a user is dragging a touch to a new location. All other touch screen actions shall be directed from the TA to the TE normally. See description of <tscrn> set to 4 for the valid for the <action> parameter. Only those touch screen events which are not caused by +CTSA shall be indicated by the TA to the TE.NOTE 8:When this mode is enabled, corresponding result codes of all touch screen actions are flushed to the TA regardless of `<bfr>` setting.

orientation

Integer. Parameter to enable display orientation event reporting from the TA to the TE, using unsolicited result code +COEV: <CurrentTopSide>. The <CurrentTopSide> parameter indicates the top of the ME's screen (as specified for +CSO).

Table 4-21: *orientation*

Value	Description
0	No display orientation event reporting.
1	Only those display orientation events, which are not caused by +CSO shall be indicated.
2	All display orientation events shall be indicated.

4.12 Phone Activity Status: +CPAS

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

4.12.1 Syntax

Command	Possible Response(s)
AT+CPAS	+CPAS: *<pas>* +CME ERROR: *<err>*
AT+CPAS=?	+CPAS: *list of supported <pas>s* +CME ERROR: *<err>*

4.12.2 Description

Execution command returns the activity status <pas> of the MT. It can be used to interrogate the MT before requesting action from the phone.

Test command returns values supported by the MT as a compound value.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

4.12.3 Defined Values

pas

Integer

Table 4-22: *pas*

Value	Description
0	ready (MT allows commands from TA/TE)
1	unavailable (MT does not allow commands from TA/TE)
2	unknown (MT is not guaranteed to respond to instructions)
3	ringing (MT is ready for commands from TA/TE, but the ringer is active)
4	call in progress (MT is ready for commands from TA/TE, but a call is in progress)
5	asleep (MT is unable to process commands from TA/TE because it is in a low functionality state)
6..128	Reserved

4.13 Power Saving Mode Setting: +CPSMS

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

4.13.1 Syntax

Command	Possible Response(s)
+CPSMS=[<*mode*>[,<*Requested_Periodic-RAU*>[,<*Requested_GPRSREADYtimer*>[,<*Requested_Periodic-TAU*>[,<*Requested_Active-Time*>]]]]]	`OK` `+CME ERROR:` <*err*>
+CPSMS?	`+CPSMS:`<*mode*>,[<*Requested_Periodic-RAU*>],[<*Requested_GPRS-READYtimer*>],[<*Requested_Periodic-TAU*>],[<*Requested_Active-Time*>]
+CPSMS=?	`+CPSMS:`*(list of supported* <*mode*>*s),(list of supported* <*Requested_Periodic-RAU*>*s),(list of supported* <*Requested_GPRS-READY-timer*>*s),(list of supported* <*Requested_Periodic-TAU*>*s),(list of supported* <*Requested_Active-Time*>*s)*

4.13.2 Description

The set command controls the setting of the UEs power saving mode (PSM) parameters. The command controls whether the UE wants to apply PSM or not, as well as the requested extended periodic RAU value and the requested GPRS READY timer value in GERAN/UTRAN, the requested extended periodic TAU value in E-UTRAN and the requested Active Time value. See the unsolicited result codes provided by commands +CGREG for the Active Time value, the extended periodic RAU value and the GPRS READY timer value that are allocated to the UE by the network in GERAN/UTRAN and `+CEREG` for the Active Time value and the extended periodic TAU value that are allocated to the UE by the network in E-UTRAN.

A special form of the command can be given as `+CPSMS=` (with all parameters omitted). In this form, the parameter `<mode>` will be set to 0, the use of PSM will be disabled and data for all parameters in command `+CPSMS` will be removed or, if available, set to the manufacturer specific default values.

The read command returns the current parameter values.

The test command returns the supported `<mode>`s and the value ranges for the requested extended periodic RAU value and the requested GPRS READY timer value in GERAN/UTRAN, the requested extended periodic TAU value in EUTRAN and the requested Active Time value as compound values.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

4.13.3 Defined Values

mode

Integer type. Indication to disable or enable the use of PSM in the UE.

Table 4-23: *mode*

Value	Description
0	Disable the use of PSM
1	Enable the use of PSM

Requested_Periodic-RAU

string type; one byte in an 8 bit format. Requested extended periodic RAU value (T3312) to be allocated to the UE in GERAN/UTRAN. The requested extended periodic RAU value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. "01000111" equals 70 hours). For the coding and the value range, see the GPRS Timer 3 IE in 3GPP TS 24.008 [8] Table 10.5.163a/3GPP TS 24.008. See also 3GPP TS 23.682 [149] and 3GPP TS 23.060 [47]. The default value, if available, is manufacturer specific.

Requested_GPRS-READY-timer

string type; one byte in an 8 bit format. Requested GPRS READY timer value (T3314) to be allocated to the UE in GERAN/UTRAN. The requested GPRS READY timer value is coded as one byte (octet 2) of the GPRS Timer information element coded as bit format (e.g. "01000011" equals 3 decihours or 18 minutes). For the coding and the value range, see the GPRS Timer IE in 3GPP TS 24.008 [8] Table 10.5.172/3GPP TS 24.008. See also 3GPP TS 23.060 [47]. The default value, if available, is manufacturer specific.

Requested_Periodic-TAU

string type; one byte in an 8 bit format. Requested extended periodic TAU value (T3412) to be allocated to the UE in E-UTRAN. The requested extended periodic TAU value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. "01000111" equals 70 hours). For the coding and the value range, see the GPRS Timer 3 IE in 3GPP TS 24.008 [8] Table 10.5.163a/3GPP TS 24.008. See also 3GPP TS 23.682 [149] and 3GPP TS 23.401 [82]. The default value, if available, is manufacturer specific.

Requested_Active-Time

string type; one byte in an 8 bit format. Requested Active Time value (T3324) to be allocated to the UE. The requested Active Time value is coded as one byte (octet 3) of the GPRS Timer 2 information element coded as bit format (e.g. "00100100" equals 4 minutes). For the coding and the value range, see the GPRS Timer 2 IE in 3GPP TS 24.008 [8] Table 10.5.163/3GPP TS 24.008. See also 3GPP TS 23.682 [149], 3GPP TS 23.060 [47] and 3GPP TS 23.401 [82]. The default value, if available, is manufacturer specific.

4.14 Call Control Hang-Up a Call: ATH

4.14.1 Syntax

Command	Possible Response(s)
ATH	OK

4.14.2 Description

This command releases all active and held calls.

4.14.3 Example

```
ATH
OK
```

4.15 Return to Online Data State: ATO

4.15.1 Syntax

Command	Possible Response(s)
ATO*[<value>]*	*<result_code>* `OK`

4.15.2 Description

Causes the DCE to return to online data state and issue a `CONNECT` or `CONNECT <text>` result code. This command may not be aborted.

This command is used to resume the data mode that might be suspended by the `+++` escape sequence.

4.15.3 Defined Values

value

Integer. 0 represents Return to online data state from online command state. Also used to retrain after a modem-on-hold transaction or to reconnect to a modem that has been placed in anon-hold state per V.92.

Other values are reserved.

result_code

String. Result of the command.

Table 4-24: *result_code*

Value	Description
CONNECT	If connection is successfully resumed and X0 is selected
CONNECT <*text*>	If connection is successfully resumed and Xn is selected where "n" is any value other than 0
NO CARRIER	If connection is not successfully resumed
ERROR	If <*value*> is not recognized or supported

4.15.4 Example

```
ATH
OK
```

5 3GPP SMS Related Commands

5.1 Send Command: +CMGC

Note:	This command is described in *3GPP TS 27.005*. See Section *References*.

5.1.1 Syntax

Command	Possible Response(s)

if text mode (+CMGF=1):
+CMGC=*<fo>,<ct>[,<pid>[,<mn>[,<da>[,<toda>]]]]*`<CR>text is entered<ctrl-Z/ESC>`
	if text mode (+CMGF=1) and sending successful:
	`+CMGC:`*<mr>[,<scts>]*
	if sending fails::
	`+CMS ERROR:` *<err>*

AT+CMGC=?	

5.1.2 Description

Execution command sends a command message from a TE to the network (SMS-COMMAND). The entering of text (3GPP TS 23.040 [3] TP-Command-Data) is done similarly as specified in command Send Message `+CMGS`, but the format is fixed to be a sequence of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octets (refer +CMGS). Message reference value `<mr>` is returned to the TE on successful message delivery. Optionally (when `+CSMS <service>` value is 1 and network supports) `<scts>` is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code `+CMS ERROR: <err>` is returned. This command should be abortable.

See also 5.8 Message Service Failure Result Code: +CMS ERROR on page 174 for `<err>` values.

5.2 Delete Message: +CMGD

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

See the current implementation limitation in `delflag` parameter description.

5.2.1 Syntax

Command	Possible Response(s)
AT+CMGD=<*index*>[,<*delflag*>]	`+CMS ERROR:` <*err*>
AT+CMGD=?	`+CMGD:`*(list of supported <index>s)[,(list of supported <delflag>s)]*

5.2.2 Description

Execution command deletes message from preferred message storage <mem1> location `<index>`. If `<delflag>` is present and not set to 0 then the ME shall ignore `<index>` and follow the rules for `<delflag>` shown below. If deleting fails, final result code `+CMS ERROR: <err>` is returned.

Test command shows the valid memory locations and optionally the supported values of `<delflag>`.

See also 5.8 Message Service Failure Result Code: +CMS ERROR on page 174 for `<err>` values.

5.2.3 Defined Values

index

Integer.

delflag

Integer. Indicates multiple message deletion request as follows:

Caution: Only the <delflag> 0 and 4 are currently implemented.

Table 5-1: *delflag*

Value	Description
0 (or omitted)	Default value if not specified. Delete the message specified in <index>.
1	Delete all read messages from preferred message storage, leaving unread messages and stored mobile originated messages (whether sent or not) untouched
2	Delete all read messages from preferred message storage and sent mobile originated messages, leaving unread messages and unsent mobile originated messages untouched
3	Delete all read messages from preferred message storage, sent and unsent mobile originated messages leaving unread messages untouched.
4	Delete all messages from preferred message storage including unread messages.

5.3 Message Format: +CMGF

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

5.3.1 Syntax

Command	Possible Response(s)
AT+CMGF=*[<mode>]*	
AT+CMGF?	`+CMGF:`*<mode>*
AT+CMGF=?	`+CMGF:`*(list of supported <index>s)[,(list of supported <mode>s)]*

5.3.2 Description

Set command tells the TA, which input and output format of messages to use. `<mode>` indicates the format of messages used with send, list, read and write commands and unsolicited result codes resulting from received messages. Mode can be either PDU mode (entire TP data units used) or text mode (headers and body of the messages given as separate parameters). Text mode uses the value of parameter `<chset>` specified by command Select TE Character Set `+CSCS` to inform the character set to be used in the message body in the TA-TE interface.

Test command returns supported modes as a compound value.

See also 5.8 Message Service Failure Result Code: +CMS ERROR on page 174 for `<err>` values.

5.3.3 Defined Values

mode

Integer. Indicates multiple message deletion request as follows:

Table 5-2: *mode*

Value	Description
0	PDU mode (default when implemented)
1	text mode

5.4 List Messages: +CMGL

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

5.4.1 Syntax

Command	Possible Response(s)
AT+CMGL=<*stat*>	• if text mode (+CMGF=1), command successful and SMS-SUBMITs and/or SMS-DELIVERs: `+CMGL:`<*index*>,<*stat*>,<*oa/da*>,[<*alpha*>],[<*scts*>][,<*tooa/toda*>,<*length*>]<*CR*><*LF*><*data*> `[<CR><LF>+CMGL:`<*index*>,<*stat*>,<*da/oa*>,[<*alpha*>],[<*scts*>][,<*tooa/toda*>, <*length*>] `<CR><LF>`<*data*>*[...]]* • if text mode (+CMGF=1), command successful and SMS-STATUS-REPORTs: `+CMGL:`<*index*>,<*stat*>,<*fo*>,<*mr*>,[<*ra*>],[<*tora*>],<*scts*>,<*dt*>,<*st*> `[<CR><LF>+CMGL:`<*index*>,<*stat*>,<*fo*>,<*mr*>,[<*ra*>],[<*tora*>],<*scts*>,<*dt*>,<*st*>*[...]]* • if text mode (+CMGF=1), command successful and SMS-COMMANDs: `+CMGL:`<*index*>,<*stat*>,<*fo*>,<*ct*> `[<CR><LF>+CMGL:`<*index*>,<*stat*>,<*fo*>,<*ct*>*[...]]* • if text mode (+CMGF=1), command successful and CBM storage: `+CMGL:` <*index*>,<*stat*>,<*sn*>,<*mid*>,<*page*>,<*pages*> <*CR*><*LF*><*data*> `[<CR><LF>+CMGL:`<*index*>,<*stat*>,<*sn*>,<*mid*>,<*page*>,<*pages*>`<CR><LF>`<*data*>*[...]]* • otherwise: `+CMS ERROR:`<*err*>
AT+CMGL=?	`+CMGL:`*(list of supported* <*stat*>*s)*

5.4.2 Description

Execution command returns messages with status value `<stat>` from message storage `<mem1>` to the TE. About text mode parameters in italics, refer command `Show Text Mode Parameters +CSDH`. If status of the message is 'received unread', status in the storage changes to 'received read'. If listing fails, final result code `+CMS ERROR: <err>` is returned.

Note: If the selected `<mem1>` can contain different types of SMs (e.g. SMS-DELIVERs, SMS-SUBMITs, SMS-STATUS-REPORTs and SMS-COMMANDs), the response may be a mix of the responses of different SM types. TE application can recognize the response format by examining the third response parameter.

Test command shall give a list of all status values supported by the TA.

See also 5.8 Message Service Failure Result Code: +CMS ERROR on page 174 for <err> values.

5.4.3 Defined Values

stat

Integer.

Table 5-3: *stat*

Value	Description
0	"REC UNREAD": received unread message (i.e. new message)
1	"REC READ": received read message
2	"STO UNSENT": stored unsent message (only applicable to SMs)
3	"STO SENT": stored sent message (only applicable to SMs)
4	"ALL": all messages (only applicable to +CMGL command)

5.5 Read Message: +CMGR

Note:	This command is described in *3GPP TS 27.005*. See Section *References*.

5.5.1 Syntax

Command	Possible Response(s)

AT+CMGR=*<index>*	• if text mode (`+CMGF=1`), command successful and SMS-DELIVER:
	`+CMGR:` *<stat>,<oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>, <sca>,<tosca>,<length>]*`<CR><LF><data>`
	• if text mode (+CMGF=1), command successful and SMS-SUBMIT:
	`+CMGR:`*<stat>,<da>,[<alpha>][,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]<CR><LF><data>*
	• if text mode (`+CMGF=1`), command successful and SMS-STATUS-REPORT:
	`+CMGR:`*<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st>*
	• if text mode (`+CMGF=1`), command successful and SMS-COMMAND:
	`+CMGR:`*<stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length>*`<CR><LF><cdata>]`
	• if text mode (`+CMGF=1`), command successful and CBM storage:
	`+CMGR:`*<stat>,<sn>,<mid>,<dcs>,<page>,<pages>*`<CR><LF>`*<data>*
	• otherwise:`+CMS ERROR:`*<err>*

AT+CMGR=?	

5.5.2 Description

Execution command returns message with location value `<index>` from message storage `<mem1>` to the TE. About text mode parameters in italics, refer command Show Text Mode Parameters +CSDH. If status of the message is 'received unread', status in the storage changes to 'received read'. If reading fails, final result code `+CMS ERROR: <err>` is returned.

See also 5.8 Message Service Failure Result Code: +CMS ERROR on page 174 for `<err>` values.

5.5.3 Defined Values

index

Integer.

5.6 Send Message: +CMGS

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

5.6.1 Syntax

Command	Possible Response(s)
if text mode (`+CMGF=1`): **AT+CMGS=**<*da*>*[,*<*toda*>*]***<CR>***text is entered***<ctrl-Z/ESC>**	• if text mode (`+CMGF=1`) and sending successful: `+CMGS:` <*mr*>*[,*<*scts*>*]* • If sending fails:`+CMS ERROR:`<*err*>
AT+CMGS=?	

5.6.2 Description

Execution command sends message from a TE to the network (SMS-SUBMIT). Message reference value `<mr>` is returned to the TE on successful message delivery. Optionally (when `+CSMS <service>` value is 1 and network supports) `<scts>` is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code `+CMS ERROR: <err>` is returned. This command should be abortable.

See also 5.8 Message Service Failure Result Code: +CMS ERROR on page 174 for `<err>` values.

- entered text (3GPP TS 23.040 [3] TP-Data-Unit) is sent to address `<da>` and all current settings (refer Set Text Mode Parameters +CSMP and Service Centre Address +CSCA) are used to construct the actual PDU in ME/TA.
- the TA shall send a four character sequence <CR><LF><greater_than><space> (IRA 13, 10, 62, 32) after command line is terminated with <CR>; after that text can be entered from TE to ME/TA.
- the DCD signal shall be in ON state while text is entered.
- the echoing of entered characters back from the TA is controlled by V.25ter echo command E.
- the entered text should be formatted as follows:
  - if <dcs> (set with +CSMP) indicates that 3GPP TS 23.038 [2] GSM 7 bit default alphabet is used and <fo> indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is not set:

– if TE character set other than "HEX" (refer command Select TE Character Set +CSCS in 3GPP TS 27.007 [9]): ME/TA converts the entered text into the GSM 7 bit default alphabet according to rules of Annex A; backspace can be used to delete last character and carriage returns can be used (previously mentioned four character sequence shall be sent to the TE after every carriage return entered by the user);
– -if TE character set is "HEX": the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into the GSM 7 bit default alphabet characters. (e.g. 17 (IRA 49 and 55) will be converted to character (GSM 7 bit default alphabet 23)).

- if <dcs> indicates that 8-bit or UCS2 data coding scheme is used or <fo> indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is set: the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. two characters 2A (IRA 50 and 65) will be converted to an octet with integer value 42).
- sending can be cancelled by giving <ESC> character (IRA 27).
- <ctrl-Z> (IRA 26) must be used to indicate the ending of the message body.

5.7 Write Message to Memory: +CMGW

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

5.7.1 Syntax

Command	Possible Response(s)
If text mode (+CMGF=1) **AT+CMGW=***[<oa/da>[,<tooa/toda>[,<stat>]]]*`<CR>`**text is entered**`<ctrl-Z/ESC>`	`+CMGW:`*<index>* `+CMS ERROR:`*<err>*
AT+CMGW=?	

5.7.2 Description

Execution command stores message (either SMS-DELIVER or SMS-SUBMIT) to memory storage `<mem2>`. Memory location `<index>` of the stored message is returned. By default message status will be set to `'stored unsent'`, but parameter `<stat>` allows also other status values to be given. The entering of text is done similarly as specified in command Send Message: +CMGS. If writing fails, final result code `+CMS ERROR: <err>` is returned.

See also 5.8 Message Service Failure Result Code: +CMS ERROR on page 174 for `<err>` values.

Note: SMS-COMMANDs and SMS-STATUS-REPORTs can not be stored in text mode.

5.7.3 Defined Values

mode

Integer. Indicates multiple message deletion request as follows:

Table 5-4: *mode*

Value	Description
0	PDU mode (default when implemented)
1	text mode

5.8 Message Service Failure Result Code: +CMS ERROR

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

5.8.1 Syntax

Command	Possible Response(s)
	`+CMS ERROR:` *<err>*

5.8.2 Description

Final result code `+CMS ERROR: <err>` indicates an error related to mobile equipment or network. The operation is similar to ERROR result code. None of the following commands in the same command line is executed. Neither ERROR nor OK result code shall be returned. ERROR is returned normally when error is related to syntax or invalid parameters.

5.8.3 Defined Values

err

Integer. The values used by common messaging commands are as follows:

Table 5-5: *err*

Value	Description
0...127	3GPP TS 24.011 [6] clause E.2 values
128...255	3GPP TS 23.040 [3] clause 9.2.3.22 values.
300	ME failure
301	SMS service of ME reserved
302	operation not allowed

Table 5-5: *err* (Continued)

Value	Description
303	operation not supported
304	invalid PDU mode parameter
305	invalid text mode parameter
310	(U)SIM not inserted
311	(U)SIM PIN required
312	PH-(U)SIM PIN required
313	(U)SIM failure
314	(U)SIM busy
315	(U)SIM wrong
316	(U)SIM PUK required
317	(U)SIM PIN2 required
318	(U)SIM PUK2 required
320	memory failure
321	invalid memory index
322	memory full
330	SMSC address unknown
331	no network service
332	network timeout
340	no +CNMA acknowledgement expected
500	unknown error
...511	other values in range 256...511 are reserved
512	manufacturer specific

5.9 Send Message from Storage: +CMSS

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

5.9.1 Syntax

Command	Possible Response(s)
AT+CMSS=<*index*>[,<*da*>[,<*toda*>]]	• if text mode (`+CMGF=1`) and sending successful: `+CMSS:` <*mr*>[,<*scts*>] • If sending fails:`+CMS ERROR:`<*err*>
AT+CMSS=?	

5.9.2 Description

Execution command sends message with location value `<index>` from preferred message storage `<mem2>` to the network (SMS-SUBMIT or SMS-COMMAND). If new recipient address `<da>` is given for SMS-SUBMIT, it shall be used instead of the one stored with the message. Reference value `<mr>` is returned to the TE on successful message delivery. Optionally (when `+CSMS <service>` value is 1 and network supports) `<scts>` is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code `+CMS ERROR: <err>` is returned. This command should be abortable.

See also 5.8 Message Service Failure Result Code: +CMS ERROR on page 174 for `<err>` values.

5.9.3 Defined Values

index

Integer.

5.10 Unsolicited Result Code: +CMTI

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

5.10.1 Syntax

Command	Possible Response(s)
	`+CMTI:`*<mem>*,*<index>*

5.11 New Message Acknowledgement to ME/TA: +CNMA

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

See the current implementation limitation in command description.

5.11.1 Syntax

Command	Possible Response(s)
if PDU mode (`+CMGF=0`): **AT+CNMA***[=<n>[,<length>*<**CR>***PDU is given***<ctrl-Z/ESC>**	`+CMS ERROR:`*<err>*
AT+CNMA=?	if PDU mode (`+CMGF=0`): `+CNMA:`*(list of supported <n>s)*

5.11.2 Description

Caution: Only parameter `<n>` is currently supported.

Execution command confirms reception of a new message (SMS-DELIVER or SMS-STATUS-REPORT) which is routed directly to the TE (refer command `+CNMI` tables 2 and 4). This acknowledgement command shall be used when `+CSMS` parameter `<service>` equals 1. In PDU mode, it is possible to send either positive (RP-ACK) or negative (RP-ERROR) acknowledgement to the network. Parameter `<n>` defines which one will be sent. Optionally (when `<length>` is greater than zero) an acknowledgement TPDU (SMS-DELIVER-REPORT for RP-ACK or RP-ERROR) may be sent to the network. The entering of PDU is done similarly as specified in command Send Message `+CMGS`, except that the format of `<ackpdu>` is used instead of `<pdu>` (i.e. SMSC address field is not present). PDU shall not be bounded by double quotes. TA shall not send another +CMT or +CDS result code to TE before previous one is acknowledged.

If ME does not get acknowledgement within required time (network timeout), ME should respond as specified in 3GPP TS 24.011 [6] to the network. ME/TA shall automatically disable routing to TE by setting both `<mt>` and `<ds>` values of `+CNMI` to zero.

If command is executed, but no acknowledgement is expected, or some other ME related error occurs, final result code `+CMS ERROR: <err>` is returned.

See also 5.8 Message Service Failure Result Code: +CMS ERROR on page 174 for `<err>` values.

5.12 New Message Indications to TE: +CNMI

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

See the current implementation limitation in `mode` and `mt` parameters description.

5.12.1 Syntax

Command	Possible Response(s)
AT+CNMI	`+CMS ERROR:`*<err>*
AT+CNMI?	`+CNMI:` *<mode>,<mt>,<bm>,<ds>,<bfr>*
AT+CNMI=?	`+CNMI:`*(list of supported <mode>s),(list of supported <mt>s),(list of supported <bm>s),(list of supported <ds>s),(list of supported <bfr>s)*

5.12.2 Description

Set command selects the procedure, how receiving of new messages from the network is indicated to the TE when TE is active, e.g. DTR signal is ON. If TE is inactive (e.g. DTR signal is OFF), message receiving should be done as specified in 3GPP TS 23.038 [2].

Note: When DTR signal is not available or the state of the signal is ignored (V.25ter command &D0), reliable message transfer can be assured by using +CNMA acknowledgement procedure.

`<mode>` controls the processing of unsolicited result codes specified within this command, `<mt>` sets the result code indication routing for SMS-DELIVERs, `<bm>` for CBMs and `<ds>` for SMS-STATUS-REPORTs. `<bfr>` defines the handling method for buffered result codes when `<mode>` 1, 2 or 3 is enabled. If ME does not support requested item (although TA does), final result code `+CMS ERROR: <err>` is returned.

See also 5.8 Message Service Failure Result Code: +CMS ERROR on page 174 for `<err>` values.

Test command gives the settings supported by the TA as compound values.

Note: Command Select Message Service +CSMS should be used to detect ME support of mobile terminated SMs and CBMs, and to define whether a message routed directly to TE should be acknowledged or not (refer command +CNMA).

5.12.3 Defined Values

Caution: Only the following parameters are supported:

- **<mode>: ‘0’ or ‘1’ or ‘2’**
- **<mt>: ‘0’ or ‘1’ or ‘2’ or ‘3’**
- <bm>: '0' (broadcast is not supported)
- <ds>: ‘0’ or ‘1’ or ‘2’
- <bfr>: ‘0’ or ‘1’

mode

The buffering mechanism may as well be located in the ME; the setting affects only to unsolicited result codes specified within this command):

Table 5-6: *mode*

Value	Description
0	Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.
1	Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode). Otherwise forward them directly to the TE.
2	Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.
3	Forward unsolicited result codes directly to the TE. TA-TE link specific inband technique used to embed result codes and data when TA is in on-line data mode.

Note: It is possible that ME/TA result code buffer is in volatile memory. In this case messages may get lost if the power of ME/TA is switched off before codes are sent to TE. Thus, it is not recommended to use direct message routing (`<mt>`=2 or 3, `<bm>`=2 or 3, or `<ds>`=1) with <mode> value 0 or 2.

mt

The rules for storing received SMs depend on its data coding scheme (refer 3GPP TS 23.038 [2]), preferred memory storage (+CPMS) setting and this value; refer table 1

Note: If AT command interface is acting as the only display device, the ME must support storing of class 0 messages and messages in the message waiting indication group (discard message); refer table 2):

Table 5-7: *mt*

Value	Description
0	No SMS-DELIVER indications are routed to the TE.
1	If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: `+CMTI:` *<mem>,<index>*
2	SMS-DELIVERs (except class 2 messages and messages in the message waiting indication group (store message)) are routed directly to the TE using unsolicited result code: `+CMT:` *[<alpha>],<length>*`<CR><LF>`*<pdu>* (PDU mode enabled); or`+CMT:` *<oa>, [<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>, <length>]*`<CR><LF>`*<data>* (text mode enabled; about parameters in italics, refer command Show Text Mode Parameters +CSDH) If ME has its own display device then class 0 messages and messages in the message waiting indication group (discard message) may be copied to both ME display and to TE. In this case, ME shall send the acknowledgement to the network (refer table 2). Class 2 messages and messages in the message waiting indication group (store message) result in indication as defined in `<mt>=1`.
3	Class 3 SMS-DELIVERs are routed directly to TE using unsolicited result codes defined in `<mt>=2`. Messages of other data coding schemes result in indication as defined in `<mt>=1`.

5.13 Preferred Message Storage: +CPMS

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

5.13.1 Syntax

Command	Possible Response(s)
AT+CPMS=*<mem1>[,<mem2>[,<mem3>]]*	`+CPMS:`*<used1>,<total1>,<used2>,<total2>,<used3>,<total3>* `+CMS ERROR:`*<err>*
AT+CPMS?	`+CPMS:`*<mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3>* `+CMS ERROR:`*<err>*
AT+CPMS=?	`+CPMS:`*(list of supported <mem1>s),(list of supported <mem2>s),(list of supported <mem3>s)*

5.13.2 Description

Set command selects memory storages `<mem1>`, `<mem2>` and `<mem3>` to be used for reading, writing, etc. If chosen storage is not appropriate for the ME (but is supported by the TA), final result code `+CMS ERROR: <err>` shall be returned.

Test command returns lists of memory storages supported by the TA.

See also 5.8 Message Service Failure Result Code: +CMS ERROR on page 174 for `<err>` values.

5.14 Restore Settings: +CRES

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

See the current implementation limitation in the parameters description.

5.14.1 Syntax

Command	Possible Response(s)
AT+CRES*[=<profile>]*	`+CMS ERROR:` *<err>*
AT+CRES=?	`+CRES:` *(list of supported <profile>s)*

5.14.2 Description

Execution command restores message service settings from non-volatile memory to active memory. A TA can contain several profiles of settings. Settings specified in commands Service Centre Address `+CSCA`, Set Message Parameters `+CSMP` and Select Cell Broadcast Message Types `+CSCB` (if implemented) are restored. Certain settings may not be supported by the storage (e.g. (U)SIM SMS parameters) and therefore can not be restored.

See also 5.8 Message Service Failure Result Code: +CMS ERROR on page 174 for `<err>` values.

5.14.3 Defined Values

profile

Integer. Value in range 0...255. Manufacturer specific profile number from where settings are to be restored.

5.15 Save Settings: +CSAS

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

See the current implementation limitation in the parameters description.

5.15.1 Syntax

Command	Possible Response(s)
AT+CSAS[=<*profile*>]	`+CMS ERROR:` <*err*>
AT+CSAS=?	`+CSAS:` *(list of supported <profile>s)*

5.15.2 Description

Execution command saves active message service settings to a non-volatile memory. A TA can contain several profiles of settings. Settings specified in commands Service Centre Address `+CSCA`, Set Message Parameters `+CSMP` and Select Cell Broadcast Message Types `+CSCB` (if implemented) are saved. Certain settings may not be supported by the storage (e.g. (U)SIM SMS parameters) and therefore can not be saved.

See also 5.8 Message Service Failure Result Code: +CMS ERROR on page 174 for `<err>` values.

Test command shall display the supported profile numbers for reading and writing of settings.

5.15.3 Defined Values

profile

Integer. Value in range 0...255. Manufacturer specific profile number where settings are to be stored.

5.16 Service Centre Address: +CSCA

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

5.16.1 Syntax

Command	Possible Response(s)
AT+CSCA=<*sca*>[, <*tosca*>]	
AT+CSCA?	`+CSCA:`<*sca*>,<*tosca*>
AT+CSCA=?	

5.16.2 Description

Set command updates the SMSC address, through which mobile originated SMs are transmitted. In text mode, setting is used by send and write commands. In PDU mode, setting is used by the same commands, but only when the length of the SMSC address coded into `<pdu>` parameter equals zero.

5.17 Show Text Mode Parameters: +CSDH

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

5.17.1 Syntax

Command	Possible Response(s)
AT+CSDH*[=<show>]*	
AT+CSDH?	`+CSDH:`*<show>*
AT+CSDH=?	`+CSDH:` *(list of supported <show>s)*

5.17.2 Description

Set command controls whether detailed header information is shown in text mode result codes.

Test command returns supported values as a compound value.

5.17.3 Defined Values

show

Integer.

Table 5-8: *show*

Value	Description
0	do not show header values defined in commands `+CSCA` and `+CSMP` (<sca>, <tosca>, <fo>, <vp>, <pid> and <dcs>) nor <length>, <toda> or <tooa> in `+CMT`, `+CMGL`, `+CMGR` result codes for SMSDELIVERs and SMS-SUBMITs in text mode; for SMS-COMMANDs in `+CMGR` result code, do not show <pid>, <mn>, <da>, <toda>, <length> or <cdata>.
1	show the values in result codes

5.18 Set Text Mode Parameters: +CSMP

Note:	This command is described in *3GPP TS 27.005*. See Section *References*.

5.18.1 Syntax

Command	Possible Response(s)
AT+CSMP=*[<fo>[,<vp>[,<pid>[,<dcs>]]]]*	
AT+CSMP?	`+CSMP:` *<fo>,<vp>,<pid>,<dcs>*
AT+CSMP=?	

5.18.2 Description

Set command is used to select values for additional parameters needed when SM is sent to the network or placed in a storage when text format message mode is selected. It is possible to set the validity period starting from when the SM is received by the SMSC (`<vp>` is in range 0... 255) or define the absolute time of the validity period termination (`<vp>` is a string). The format of `<vp>` is given by `<fo>`. If TA supports the EVPF, see 3GPP TS 23.040 [3], it shall be given as a hexadecimal coded string (refer e.g. `<pdu>`) with double quotes.

Note:	When storing a SMS-DELIVER from the TE to the preferred memory storage in text mode (refer command Write Message to Memory +CMGW), `<vp>` field can be used for `<scts>`.

5.19 Select Message Service: +CSMS

Note: This command is described in *3GPP TS 27.005*. See Section *References*.

See the current implementation limitation in the parameters description.

5.19.1 Syntax

Command	Possible Response(s)
AT+CSMS=<*service*>	`+CSMS:` <*mt*>,<*mo*>,<*bm*> `+CMS ERROR:` <*err*>
AT+CSMS?	`+CSMS:`<*service*>,<*mt*>,<*mo*>,<*bm*>
AT+CSMS=?	`+CSMS:` *(list of supported <service>s)*

5.19.2 Description

Set command selects messaging service `<service>`. It returns the types of messages supported by the ME: `<mt>` for mobile terminated messages, `<mo>` for mobile originated messages and `<bm>` for broadcast type messages. If chosen service is not supported by the ME (but is supported by the TA), final result code `+CMS ERROR: <err>` shall be returned.

See also 5.8 Message Service Failure Result Code: +CMS ERROR on page 174 for `<err>` values.

Also read command returns supported message types along the current service setting.

Test command returns a list of all services supported by the TA.

5.19.3 Defined Values

Caution: **Restriction: cannot disable `<mt>`, `<mo>` and `<bm>` services.**

service

Integer.

Table 5-9: *service*

Value	Description
0	3GPP TS 23.040 [3] and 3GPP TS 23.041 [4]
1	3GPP TS 23.040 [3] and 3GPP TS 23.041 [4]the requirement of <service> setting 1 is mentioned under corresponding command descriptions)
2...127	reserved
128	manufacturer specific

mt, mo, bm

Integer.

Table 5-10: *mt, mo, bm*

Value	Description
0	type not supported
1	type supported

6 USIM Commands

6.1 Restricted SIM Access: +CRSM

Note:	This command is described in *3GPP TS 27.007*. See Section *References*.

6.1.1 Syntax

Command	Possible Response(s)
AT+CRSM= <*command*>[,<*fileid*>[,<*P1*>,<*P2*>,<*P3*>[,<*data*>[,<*pathid*>]]]]	`+CRSM:` <*sw1*>,<*sw2*>[,<*response*>] +CME ERROR: <err> `OK`
AT+CRSM=?	

6.1.2 Description

By using this command instead of Generic SIM Access `+CSIM` TE application has easier but more limited access to the SIM database. Set command transmits to the MT the SIM `<command>` and its required parameters. If a SIM installed in the currently selected card slot, the MT handles internally all SIM MT interface locking and file selection routines. As response to the command, MT sends the actual SIM information parameters and response data. MT error result code `+CME ERROR` may be returned when the command cannot be passed to the SIM, but failure in the execution of the command in the SIM is reported in `<sw1>` and `<sw2>` parameters. Refer to Section 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for details on `<err>`.

Coordination of command requests to SIM and the ones issued by GSM/UMTS application inside the MT is implementation dependent.

However the TE should be aware of the precedence of the GSM/UMTS application commands to the TE commands.

6.1.3 Defined Values

command

command passed on by the MT to the SIM. refer 3GPP TS 51.011 [28].

Table 6-1: *command*

Value	Description
176	READ BINARY
178	READ RECORD
192	GET RESPONSE
214	UPDATE BINARY
220	UPDATE RECORD
242	STATUS
203	RETRIEVE DATA
219	SET DATA

Note: all other values are reserved.

NOTE 1:The MT internally executes all commands necessary for selecting the desired file, before performing the actual command.

fileid

Integer. Identifier of a elementary datafile on SIM. Mandatory for every command except STATUS

NOTE 2:The range of valid file identifiers depends on the actual SIM and is defined in 3GPP TS 51.011 [28]. Optional files may not be present at all.

P1, P2, P3

Integer. Parameters passed on by the MT to the SIM. These parameters are mandatory for every command, except `GET RESPONSE` and `STATUS`. The values are described in 3GPP TS 51.011.

data

Hexadecimal. Information which shall be written to the SIM. See also Section 2.18 Select TE Character Set: +CSCS on page 69.

pathid

String. Path of an elementary file on the SIM/UICC in hexadecimal format as defined in ETSI TS 102 221 [60] (e.g. "7F205F70" in SIM and UICC case). The `<pathid>` shall only be used in the mode "select by path from MF" as defined in ETSI TS 102 221 [60].

NOTE 3:Since valid elementary file identifiers may not be unique over all valid dedicated file identifiers the `<pathid>` indicates the targeted UICC/SIM directory path in case of ambiguous file identifiers. For earlier versions of this specification or if `<pathid>` is omitted, it could be implementation specific which one will be selected.

sw1, sw2

Integer. Information from the SIM about the execution of the actual command. These parameters are delivered to the TE in both cases, on successful or failed execution of the command

response

Hexadecimal. Response of a successful completion of the command previously issued. See also Section 2.18 Select TE Character Set: +CSCS on page 69. `STATUS` and `GET RESPONSE` return data, which gives information about the current elementary datafield. This information includes the type of file and its size (refer 3GPP TS 51.011 [28]). After `READ BINARY`, `READ RECORD` or `RETRIEVE DATA` command the requested data will be returned. `<response>` is not returned after a successful `UPDATE BINARY`, `UPDATE RECORD` or `SET DATA` command.

6.2 Generic SIM Access: +CSIM

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

6.2.1 Syntax

Command	Possible Response(s)
AT+CSIM= *<length>, <command>*	`+CSIM:` *<length>,<response>* `+CME ERROR:` *<err>* `OK`
AT+CSIM=?	

6.2.2 Description

The “Set” command transmits to the MT the `<command>` it then shall send as it is to the SIM. In the same manner the SIM `<response>` shall be sent back by the MT to the TA as it is. See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

This command allows a direct control of the SIM by an distant application on the TE. The TE shall then take care of processing SIM information within the frame specified by GSM/UMTS.

Note: Compared to Restricted SIM Access command +CRSM, the definition of +CSIM allows TE to take more control over the SIM MT interface. The locking and unlocking of the interface may be done by a special `<command>` value or automatically by TA/MT (by interpreting `<command>` parameter). In case that TE application does not use the unlock command (or does not send a `<command>` causing automatic unlock) in a certain timeout value, MT may release the locking.

6.2.3 Defined Values

length

Integer. Length of the characters that are sent to TE in `<command>` or `<response>` (two times the actual length of the command or response).

command

Hexadecimal. Command passed on by the MT to the SIM in the format as described in 3GPP TS 51.011 [28]. See also Section 2.18 Select TE Character Set: +CSCS on page 69.

response

Hexadecimal. response to the command passed on by the SIM to the MT in the format as described in 3GPP TS 51.011 [28]. See also Section 2.18 Select TE Character Set: +CSCS on page 69.

6.3 Activate USAT Profile: +CUSATA

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

6.3.1 Syntax

Command	Possible Response(s)
+CUSATA[=<*activation*>]	+CUSATA:<*UICC_state*>[,<*additional_profile_supp ort*>] +CME ERROR: <*err*>
AT+CUSATA=?	+CUSATA:*(list of supported <activation>s)*

6.3.2 Description

Execution command +CUSATA retrieves the current UICC state or downloads a profile to the UICC and/or activates handling of the TE profile facilities.

A positive result upon a +CUSATA=1 or +CUSATA=3 command (also) enables TE profile facility handling via unsolicited result codes

+CUSATP: <proactive_command>

and +CUSATEND. The MT uses the unsolicited result code +CUSATP: <proactive_command> to forward to the TE proactive commands issued by the UICC. The unsolicited result code +CUSATEND is issued by the MT when the UICC indicates that the proactive command session is terminated, i.e. in response to a USAT terminal response, the UICC indicates that no other USAT proactive command is pending. Lastly, terminal responses to the proactive commands can now be issued with +CUSATT=<terminal_response> and envelope commands can be issued with +CUSATE=<envelope_command>.

If the action requested by the +CUSATA command can not be performed, the information response +CUSATA: <UICC_state>,[<additional_profile_support>] is returned with appropriate values, followed by the final result code +CME ERROR: 4 (Operation not supported) in case the UICC does not support USAT at all, or the final result code +CME ERROR: 3 (Operation not allowed) in all other cases.

If the UICC is already in active state and the UICC does not support the "Additional TERMINAL PROFILE after UICC activation" feature (see 3GPP TS 31.111 [92]), the TE has the option to perform a reset of the UICC or use

+CFUN to get back to an initial non-active UICC state. The +CUSATD command can be used to set profile handling upon the next restart.

All USAT proactive commands that the MT does not process itself and all terminal responses from the TE are transparently forwarded by the MT. The routing mechanism for USAT commands supported by both entities is specified in 3GPP TS 31.111 [92].

Test command returns values supported as a compound value.

Refer to Section 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for details on <err>.

6.3.3 Defined Values

activation

Integer type.

Table 6-2: *activation*

Value	Description
0	Return status information only, in information response:+CUSATA:*<UICC_state>[,<additional_profile_support>]*.
1	Enable TE profile facility handling only, no profile download. This action can only be used if the combined TE and MT profile was downloaded during start-up (setting +CUSATD=1).
2	Download MT default profile.
3	Download the combined TE and MT profile (merger of the profiles written by +CUSATW) an enable TE profile facility handling. The rules for merging profiles are defined in 3GPP TS 31.111 [92].

UICC_state

Integer type. Parameter reports that the UICC entered a new state during start-up or that the UICC ended startup and entered active state.

Table 6-3: *UICC_state*

Value	Description
0	UICC start-up in progress, before profile download.
1	UICC start-up halted and ready for profile download. This state is reached if +CUSATD=2 was issued before restart. UICC start-up will continue upon +CUSATA=2 or +CUSATA=3.

Table 6-3: *UICC_state* (Continued)

Value	Description
2	Profile download completed, UICC startup continuing.
3	UICC awaiting PIN verification.
4	UICC active.

additional_profile_support

Integer type. Indicates whether the UICC supports the "Additional TERMINAL PROFILE after UICC activation" feature (see 3GPP TS 31.111 [92]). The value may not be available during early phases of start-up.

Table 6-4: *additional_profile_support*

Value	Description
0	No support.
1	Supported.

proactive_command

String type in hexadecimal character format. Proactive command as defined in 3GPP TS 31.111 [92], consisting of the full BER-TLV data object.

6.4 Profile Download upon Start-Up: +CUSATD

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

6.4.1 Syntax

Command	Possible Response(s)
+CUSATD=[*<download>*[,*<reporting>*]]	+CME ERROR: *<err>* OK
AT+CUSATD?	+CUSATD:*<download>,<reporting>*
AT+CUSATD=?	+CUSATD:*(list of supported <download>s), (list of supported <reporting>s)*

6.4.2 Description

This command determines if, and optionally which profile should be downloaded to the UICC automatically upon startup. If, prior to a restart/start-up, the +CUSATD settings have not been altered, then the default settings determine the behaviour upon start-up. However, if the parameters of +CUSATD has been set to other than default and then a restart is performed (e.g. by +CFUN), these values determine the behaviour. This is true for one restart only after altering +CUSATD parameters as they are always reset to default at the end of the next UICC start-up (i.e. when the USIM initialisation as specified in 3GPP TS 31.102 [98] has been completed).

The command without parameters resets the parameters to their default values.

The command can only be used if the UICC is already in active state (<UICC_state> 4, e.g. upon +CUSATA) or in download completed state (<UICC_state> 2) and the UICC does not support the "Additional TERMINAL PROFILE after UICC activation" feature (see 3GPP TS 31.111 [92]). In all other cases the command responds with +CME ERROR: 14 (SIM busy).

+CUSATD=<download>,1 also enables the unsolicited result code +CUSATS: <UICC_state>. The MT uses this unsolicited result code to indicate that a profile download is performed (setting +CUSATD=0,1 or +CUSATD=1,1) or that it is ready for profile download (setting +CUSATD=2,1). In both cases, the

MT also indicates the end of UICC start-up by the unsolicited result code `+CUSATS: 4`. If the UICC is awaiting PIN verification during start-up, this is also reported.

When using `+CUSATD=1`, the `+CUSATA=1` command has to be used to enable TE profile facility handling after restart. In the time between profile download and issuance of `+CUSATA=1`, the UICC may already attempt to issue proactive commands. The MT will not send these to the TE, but rather give the UICC the response "terminal currently unable to process command" autonomously. The UICC may implement only a limited number of retries, which can potentially leave USAT in an unwanted state if the `+CUSATA=1` command arrives late.

Note: Care has to be taken when using `+CUSATD=2`. If no `+CUSATA=2` or `+CUSATA=3` is sent during startup, USAT is also blocked for the MT.

Test command returns supported values as compound values.

Refer to Section 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for details on `<err>`.

6.4.3 Defined Values

download

Integer type. Parameter decides when/if to perform a profile download to UICC and which profile to ownload. The default value is implementation specific.

Table 6-5: *download*

Value	Description
0	Download MT default profile automatically during next start-up.
1	Download the combined TE and MT profile (merger of the profiles written by `+CUSATW`) automatically during next start-up. The rules for merging profiles are defined in 3GPP TS 31.111 [92].
5	Halt next UICC start-up when ready for profile download. Profile to download will be selected and download will be triggered by `+CUSATA`.

reporting

Integer type. Parameter enables unsolicited result code `+CUSATS: <UICC_state>` to notify the TE about a new state during start-up.

Table 6-6: *reporting*

Value	Description
0	Disable `+CUSATS`, i.e. no notification.
1	Enable `+CUSATS`, i.e. notify TE.

UICC_state

Integer type. Parameter reports that the UICC entered a new state during start-up or that the UICC ended startup and entered active state.

Table 6-7: *UICC_state*

Value	Description
0	UICC start-up in progress, before profile download.
1	UICC start-up halted and ready for profile download. This state is reached if `+CUSATD=2` was issued before restart. UICC start-up will continue upon `+CUSATA=2` or `+CUSATA=3`.
2	Profile download completed, UICC startup continuing.
3	UICC awaiting PIN verification.
4	UICC active.

6.5 Send USAT Envelope Command: +CUSATE

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

6.5.1 Syntax

Command	Possible Response(s)
+CUSATE=< *envelope_command >*	+CME ERROR: *<err>*
AT+CUSATT=?	

6.5.2 Description

Execution command sends a USAT terminal response to the MT as an answer to a preceding USAT proactive command sent from the UICC with unsolicited result code `+CUSATP: <proactive_command>` (see `+CUSATA` command description).

Refer to Section 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for details on `<err>`.

6.5.3 Defined Values

envelope_command

String type in hexadecimal character format. Envelope command as defined in 3GPP TS 31.111 [92], consisting of the full BER-TLV data object.

envelope_response

String type in hexadecimal character format. Response to the envelope command as defined in 3GPP TS 31.111 [92], consisting of the full BER-TLV data object. An empty string is provided if the UICC does not have any response data to provide.

busy

Integer type.

Table 6-8: *busy*

Value	Description
0	UICC indicated normal ending of the command.
1	UICC responded with USAT is busy, no retry by the MT.
2	UICC responded with USAT is busy even after one or more retries by the MT.

sw1

Integer type. Status word information from the envelope response returned by the UICC as defined in ETSI TS 102 221 [60], subclause 10.2. The parameter can be delivered to the TE both in the case of successful and failed execution of the envelope command.

sw2

Integer type. For description, see `<sw1>`.

6.6 Read USAT Profile: +CUSATR

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

6.6.1 Syntax

Command	Possible Response(s)
AT+CUSATR [=*<profile_storage>*]	[+CUSATR: *<profile_storage>*,*<profile>*][<CR><LF>+CUSATR:*<profile_storage>*,*<profile>*[...]] +CME ERROR: *<err>* OK
AT+CUSATR=?	+CUSATR:*(list of supported <profile_storage>s)*

6.6.2 Description

Execution command `+CUSATR=<profile_storage>` returns the profile specified by `<profile_storage>`.

Execution command issued without parameter `+CUSATR` returns all profiles.

Test command returns values supported as a compound value.

Refer to Section 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for details on `<err>`.

6.6.3 Defined Values

profile_storage

Integer type.

Table 6-9: *profile_storage*

Value	Description
0	TE profile that can be set with `+CUSATW`.
1	MT profile that can be set with `+CUSATW`.
2	MT default profile that reflects the inherent, default supported facilities of the MT.
3	UICC profile that reflects the currently active UICC profile that was sent to the UICC in the last TERMINAL?PROFILE command.
4	UICC EF_{UST}. The elementary file that indicates services available in the USIM.
5	List of MT only facilities (facilities that are not allowed to be assigned to the TE, see 3GPP TS 31.111 [92]).

profile

string type in hexadecimal character format. The profile describing the supported facilities of the referenced `<profile_storage>` as specified for the Terminal Profile in 3GPP TS 31.111 [92] or for the related EF in 3GPP TS 31.102 [59].S

6.7 Send USAT Terminal Response: +CUSATT

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

6.7.1 Syntax

Command	Possible Response(s)
+CUSATT=<*terminal_response*>	+CUSATE:<*envelope_response*>*[,*<*busy*>*] [*<*CR*><*LF*>*+CUSATE2:* <*sw1*>*,*<*sw2*>*]* +CME ERROR: <*err*>
AT+CUSATE=?	

6.7.2 Description

Execution command allows the TE to send a USAT envelope command to the MT. If the UICC provides response data to the command or indicates that USAT is busy, the information response `+CUSATE: <envelope_response>[,<busy>]` is returned. A second line of information response `+CUSATE2: <sw1>,<sw2>` may be provided if the MT presents the status words provided by the UICC.

Refer to Section 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for details on `<err>`.

6.7.3 Defined Values

terminal_response

String type in hexadecimal character format. Terminal response to a proactive command as defined in 3GPP TS 31.111 [92], consisting of the full BER-TLV data object.

6.8 Write USAT Profile: +CUSATW

Note: This command is described in *3GPP TS 27.007*. See Section *References*.

6.8.1 Syntax

Command	Possible Response(s)
AT+CUSATW [=*<profile_storage>*[,*<pr?ofile>*]]	`+CUSATW:` *<profile_storage>,< <conflict_profile>* `+CME ERROR:` *<err>* `OK`
AT+CUSATW=?	`+CUSATW:`*(list of supported <profile_storage>s)*

6.8.2 Description

Execution command `+CUSATR=<profile_storage>` returns the profile specified by `<profile_storage>`.

Execution command issued without parameter `+CUSATR` returns all profiles.

Test command returns values supported as a compound value.

Refer to Section 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for details on `<err>`.

6.8.3 Defined Values

profile_storage

Integer type.

Table 6-10: *profile_storage*

Value	Description
0	TE. Refers profile storage for the facilities supported by the TE. Default value is a blank profile with all bits set to zero. This value is applicable both in the execution command and in the information response.
1	MT. Refers profile storage for the facilities to be supported by MT, which can be a subset of the default MT facilities. The TE can choose to register a subset of the MT default profile, typically omitting facilities also?supported by the TE profile. Default value is the MT default profile. This value is applicable both in the?execution command and in the information response.
5	Refers to a conflict between the TE profile and the list of MT only facilities. This value is not applicable in?the execution command.

profile

String type in hexadecimal character format. The profile describing the supported USAT facilities of the referenced <profile_storage> as specified for the Terminal Profile in 3GPP TS 31.111 [92].

conflict_profile

String type in hexadecimal character format. A bitwise AND of two profiles, showing the conflicts, that is, USAT facilities supported by both profiles. See description of Terminal Profile in 3GPP TS 31.111 [92].

7 SMS Proprietary Commands

7.1 SMS Configuration: +SQNSMSCFG

7.1.1 Syntax

Command	Possible Response(s)
AT+SQNSMSCFG=*[<mo-type>, [,<mo-char-set>[,<mo-ack-req>]]]*	`+SQNSMSCFG: <mo-type>,<mo-char-set>,<mo-ack-req>`
AT+SQNSMSCFG?	`+SQNSMSCFG: <mo-type>,<mo-char-set>,<mo-ack-req>`
AT+SQNSMSCFG=?	`+SQNSMSCFG: (list of supported <mo-type>s), (list of supported<mo-char-set>s),(list of supported <mo-ack-req>s)`

7.1.2 Description

This command configures the parameters of SMS.

Note: `<mo-char-set>` parameter is allowed only when `<mo-type> = "3GPP2"`. If `<mo-type> = "3GPP"`, then `<mo-char-set>` parameter is not accepted.

7.1.3 Defined Values

mo-type

String. MO message format.

Table 7-1: *mo-type*

Value	Description
"3GPP"	GSM format
"3GPP2"	CDMA format
“TEXT”	SIP text messaging

mo-char-set

String. Force the text encoding of MO SMS.

Table 7-2: *mo-char-set*

Value	Description
"AUTO"	Encoding is auto-selected (depends on used symbols)
"7BIT-ASCII"	
"7BIT-GSM"	
"7BIT-IA5"	
"8BIT-LATIN"	
"16BIT-UCS2"	

mo-ack-req

Integer. Send TP-SRR(3GPP) or BearerReplyOption(3GPP2).

Table 7-3: *mo-ack-req*

Value	Description
0	do not request
1	do request

7.1.4 Examples

```
AT+SQNSMSCFG=?
+SQNSMSCFG:
("3GPP","3GPP2","TEXT"),("AUTO","7BIT_ASCII","7BIT_GSM","7BIT_IA5","8B
IT_LATIN","16BIT_UCS2"),(0,1)
OK
```

```
AT+SQNSMSCFG="3GPP"
+SQNSMSCFG: "3GPP","AUTO",0
OK
```

```
AT+SQNSMSCFG=,"7BIT_IA5",1
+SQNSMSCFG: "3GPP","7BIT_IA5",1
OK
```

```
AT+SQNSMSCFG?
+SQNSMSCFG: "3GPP","7BIT_IA5",1
OK
```

7.2 Stored SMS Statistics: +SQNSMSCOUNT

7.2.1 Syntax

Command	Possible Response(s)
AT+SQNSMSCOUNT=[=*<mem>*[,*<stat>*]]	+SQNSMSCOUNT:*<count>,<mem>,<stat>* OK
AT+SQNSMSCOUNT=?	+SQNSMSCOUNT:*(list of possible <mem>s),(list of possible <stat>s)* OK

7.2.2 Description

Execution command returns the number of SMS of status `<stat>` stored in given `<mem>`.

If `<mem>` is omitted, then current `mem1` is used. If `<stat>` is omitted, then results is returned for all possible `<stat>`.

The command has no impact on the status of messages (`UNREAD` or `READ`).

7.2.3 Defined Values

mem

String type. Memory from which the messages are read.

Table 7-4: *mem*

Value	Description
"ME"	ME message storage
"SM"	(U)SIM message storage
"SR"	Status report storage

stat

String type, indicates the status of message in memory

Table 7-5: *stat*

Value	Description
"REC UNREAD"	received unread message
"REC READ"	received read message
"STO UNSENT"	stored unsent message
"STO SENT"	stored sent message
"ALL"	all messages

count

Integer type. Number of SMS in storage `<mem>` with status `<stat>`.

7.2.4 Example

-

```
AT+SQNSMSCOUNT="ME","REC READ"
+SQNSMSCOUNT: 1,ME,REC READ
OK
```

-

```
AT+SQNSMSCOUNT
+SQNSMSCOUNT: 0,ME,REC UNREAD
+SQNSMSCOUNT: 1,ME,REC READ
+SQNSMSCOUNT: 0,ME,STO UNSENT
+SQNSMSCOUNT: 1,ME,STO SENT
+SQNSMSCOUNT: 2,ME,ALL
OK
```

7.3 Delete long SMS: +SQNSMSDELETE

7.3.1 Syntax

Command	Possible Response(s)
AT+SQNSMSDELETE=<*index*>	`+CMS ERROR:` <*err*> `OK`

7.3.2 Description

This command deletes the message <*index*> from the message storage. If the message is segmented, all its segments are deleted.

7.3.3 Example

The first command deletes the SMS of index 0. The second command on the same index returns an error.

```
AT+SQNSMSDELETE=0
OK

AT+SQNSMSDELETE=0
+CMS ERROR: 321
```

7.4 Get List of Indexes of Received SMS: +SQNSMSLIST

7.4.1 Syntax

Command	Possible Response(s)
AT+SQNSMSLIST	`+SQNSMSLIST: <index> [,<index>[, ... ] ]` `+CMS ERROR: <err>`

7.4.2 Description

This command returns the indexes of all stored messages. For segmented messages, it returns only one index (of one of its segment).

7.4.3 Example

In the following example, 7 SMS fragments (#0 to #6) are in memory, and the last 3 belong to the same SMS (fragments #4, #5 and #6).

```
AT+SQNSMSLIST
+SQNSMSLIST: 0,1,2,3,4
OK
```

7.5 Send Multiline SMS: +SQNSMSMLSEND

7.5.1 Syntax

Command	Possible Response(s)
AT+SQNSMSMLSEND=<*to*>*[,*<*save*> *[,*<*priority*> *[,*<*cbkNumber*>*]]]*<CR>Text is entered <CTRL+Z/ESC>	`+SQNSMSMLSEND:`*ID,*<*internalId*> `+SQNSMSMLSEND:` STORED,<*mem*>,<*storageId*>
AT+SQNSMSMLSEND=?	`+SQNSMSMLSEND:`<*to*>*[,*<*save*> *[,*<*priority*> *[,*<*cbkNumber*>*]]]*<CR>Text is entered <CTRL+Z/ESC>

7.5.2 Description

Execution command (optionaly stores, and) sends message from a TE to the network.

Message reference value `<mr>` is returned to the TE via URC on successful message delivery. Command behaves as `AT+SQNSMSSEND` except that text is entered at separate lines after prompt `<CR><LF><greater_than><space>` (IRA 13, 10, 62, 32).

Final result OK or ERROR is returned immediately, not waiting for Network response.

Command has auto-segmentation feature. If necessary, the entered text is split to chunks and sent in several concatenated SMS.

The sending can be cancelled by entering `<ESC>` character (IRA 27). The `<ctrl-Z>` (IRA 26) must be used to indicate the ending of the message body.

7.5.3 Defined Values

to

String type, destination address.

save

Integer type

Table 7-6: *save*

Value	Description
0	don't store SMS before sending.
1	store SMS before sending.

priority

Integer type, 3GPP2 only

Table 7-7: *priority*

Value	Description
0	NORMAL
1	INTERACTIVE
2	URGENT
3	EMERGENCY

cbkNumber

String type, 3GPP2 only, number to call back.

internalId

Integer type, internal identifier used to bind intermediate response with subsequent URC.

7.5.4 Defined URCs

For each SMS segment, two URC are notified.

The first URC is the status of sending attempt and the second is the status of network response.

`+SQNSMSSENDRES: SENT OK | SENT ERROR,<internalId>,<mr>|<errorCause>`

`+SQNSMSSENDRES: ACK OK | ACK ERROR,<internalId>[,<errorCause>]`

with

- `<mr>`: integer type, TPDU message reference.
- `<errorCause>`: integer type, error cause

7.5.5 Example

- Send message:

```
AT+SQNSMSMLSEND="+11325476980"
> This the first line.
> This is the last line.
+SQNSMSMLSEND: ID,4
OK
+SQNSMSMLSENDRES: SENT OK,4,44
+SQNSMSMLSENDRES: ACK OK,4
```

- Store and send message:

```
AT+SQNSMSMLSEND="+11325476980",1
> test quotes "abc"
+SQNSMSMLSEND: STORED,ME,1
+SQNSMSMLSEND: 14
OK
+SQNSMSMLSENDRES: SENT OK,14,49
+SQNSMSMLSENDRES: ACK OK,14
```

7.6 Read Long SMS: +SQNSMSREAD

7.6.1 Syntax

Command	Possible Response(s)
AT+SQNSMSREAD=<*index*>	**+SQNSMSREAD:** <*stat*>, <*send-status*>, <*oa*>, <*scts*>,<*local-ts*>, <*priority*>, <*cbk-xnumber*><CR><LF><*data*> `+CMS ERROR: <err>`

7.6.2 Description

This command reads the message <*index*> from the message storage location.

If the message is segmented, then it performs an automatic reconstruction of the full message from available segments in the storage.

7.6.3 Defined Values

priority

Integer. Message priority.

Table 7-8: *priority*

Value	Description
0	Normal
1	Interactive
2	Urgent
3	Emergency

7.6.4 Example

```
AT+SQNSMSREAD=2
+SQNSMSREAD: "REC READ","SEND UNSET","5714550728",
"12/12/04,03:48:20+00", "14/09/17,18:16:21+00",2, "222222222"
Test msg to check Priority and Call-Back
OK
```

7.7 Send SMS: +SQNSMSSEND

7.7.1 Syntax

Command	Possible Response(s)
AT+SQNSMSSEND=<*to*>, <*text*>[, <*save*>[, <*priority*>[, <*cbk number*>]]]	`OK`

Note: Quotes are not supported.

7.7.2 Description

Execution command (optionaly store and) sends message from a TE to the network.

Message reference value `<mr>` is returned to the TE via `+SQNSMSSENDRES` URC on successful message delivery.

Final result `OK` or `ERROR` return immediately not waiting for Network response.

Command has auto-segmentation feature - if necessary, entered text is split to chunks and sent in several concatenated SMS.

7.7.3 Defined Values

to

String. Destination number for the SMS message.

text

String. Text of the SMS message.

save

Integer. Optional parameter.

Table 7-9: *save*

Value	Description
0	(default value) Do not save the SMS message.
1	Save the SMS message.

priority

Integer.

Table 7-10: *priority*

Value	Description
0	Normal
1	Interactive
2	Urgent
3	Emergency

cbk number

String. Callback number.

7.7.4 Examples

- Send message

```
AT+SQNSMSSEND="123456789","This is the SMS content"
```

- Send message and save

```
AT+SQNSMSSEND="123456789","This is the SMS content",1
```

- Send message without saving and with callback number 11111

```
AT+SQNSMSSEND="123456789","This is the SMS content",0,,"11111"
```

- Full example with Error

```
AT+SQNSMSSEND="1234","0123456789012345678901234567890123456789012
34567890123456789012345678901234567890123456789012345678901234567
89012345678901234567890123456789012345678901234567890123456789i"
+SQNSMSSEND: ID,6
+SQNSMSSEND: ID,7
OK
+SQNSMSSENDRES: SENT ERROR,6,500
+SQNSMSSENDRES: SENT ERROR,7,500
```

- Full example with OK+ACK

```
AT+SQNSMSSEND="1234","0123456789012345678901234567890123456789012
34567890123456789012345678901234567890123456789012345678901234567
89012345678901234567890123456789012345678901234567890123456789i"
+SQNSMSSEND: ID,6
+SQNSMSSEND: ID,7
OK
+SQNSMSSENDRES: SENT OK,6,1
+SQNSMSSENDRES: SENT OK,7,2
+SQNSMSSENDRES: ACK OK,6 or +SQNSMSSENDRES: ACK ERROR,6,1
+SQNSMSSENDRES: ACK OK,7 or +SQNSMSSENDRES: ACK ERROR,7,1
```

8 System Control Related Commands

8.1 Clock: +CCLK

Note:	This command is described in *3GPP TS 27.007*. See Section *References*.

8.1.1 Syntax

Command	Possible Response(s)
AT+CCLK= *<time>*	`+CME ERROR:` *<err>*
AT+CCLK=?	`+CCLK:` *<time>* `+CME ERROR:` *<err>*
AT+CCLK=?	

8.1.2 Description

Set command sets the real time clock of the MT. If setting fails in an MT error, `+CME ERROR: <err>` is returned. See Section 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137.

Read command returns the current setting of the clock.

8.1.3 Defined Values

time

String. Format is `"yy/MM/dd,hh:mm:ss zz"`, where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -96...+96). E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08"

NOTE:If MT does not support time zone information then the three last characters of `<time>` are not returned by `+CCLK?`. The format of `<time>` is specified by use of the +CSDF command.

8.2 Change PIN with <aid>: +SCPWD

8.2.1 Syntax

Command	Possible Response(s)
AT+SCPWD=, <pin>,<newPin>[,<aid>]*<fac>, <pin>,<newPin>[,<aid>]*	+CME ERROR:*err*

8.2.2 Description

This command allows changing PIN with *aid*.

8.2.3 Defined Values

fac

Facility type. Only the facility "SC" is supported.

pin

value of PIN code

newpin

value of new PIN code

aid

Application ID, if omitted USIM application is used

8.2.4 Example

```
AT+SCPWD="SC", 1234,5678,A0000000871004010203040506070809
OK
```

8.3 RF Thermistor Measurement +SMDTH

8.3.1 Syntax

Command	Possible response(s)
+SMDTH=[*crnti*][,*txPsd*,*txMode*]	`+SMDTH:`*temperature* `+SMT ERROR:` *err*
+SMDTH=?	

8.3.2 Description

The command provides thermistor measurement block which gives an absolute value of the temperature.

8.3.3 Defined Values

The following values are defined:

temperature

Measured temperature in degrees Celsius. -1 error code otherwise.

err

Error list:

- `NA`: Temperature service is not available for this RFIC chip.
- `ONGOING`: Measurement is on-going.

8.4 Device Shutdown: +SQNSSHDN

8.4.1 Syntax

Command	Possible Response(s)
AT+SQNSSHDN	`+CME ERROR:`*<err>*
AT+SQNSSHDN=?	`OK`

8.4.2 Description

Set command causes device detach from the network and shutdown. Before definitive shutdown an `OK` response is returned. After the issuing of this command, any previous activity is terminated and the device will not respond to any further command.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

8.5 Hard Reset: ^RESET

8.5.1 Syntax

Command	Possible Response(s)
AT^RESET	Device is reset

8.5.2 Description

This command performs an hardware reset.

8.6 Read RSRP Values: +VZWRSRP

8.6.1 Syntax

Note: This command is implemented according to the definitions in *Device Requirements LTE AT Commands For Test Automation* from Verizon Wireless™.

Command	Possible Response(s)
AT+VZWRSRP	`+VZWRSRP:` *<cellID>1, <EARFCN>1, <RSRP>1, <cellID>2, <EARFCN>2, <RSRP>2, ..., <cellID>n, <EARFCN>n, <RSRP>n* `+CME ERROR:`*err*

8.6.2 Description

Execution command returns the RSRP values for all cells which the UE is measuring. The device shall be capable of returning the RSRP values of up to 8 cells. The device shall support this command in both RRC_IDLE and RRC_CONNECTED modes.

If command fails, `+CME ERROR: <err>` is returned.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

8.7 Read RSRQ Values: +VZWRSRQ

8.7.1 Syntax

Note: This command is implemented according to the definitions in *Device Requirements LTE AT Commands For Test Automation* from Verizon Wireless™.

Command	Possible Response(s)
AT+VZWRSRQ	`+VZWRSRQ:` *<cellID>1, <EARFCN>1, <RSRQ>1, <cellID>2, <EARFCN>2, <RSRQ>2, ..., <cellID>n, <EARFCN>n, <RSRQ>n* `+CME ERROR:` *err*

8.7.2 Description

Execution command returns the RSRQ values for all cells which the UE is measuring. The device shall be capable of returning the RSRQ values of up to 8 cells. The device shall support this command in both RRC_IDLE and RRC_CONNECTED modes.

If command fails, `+CME ERROR: <err>` is returned.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

9 Modem Configuration Commands

9.1 Auto-Connect: +SQNAUTOCONNECT

9.1.1 Syntax

Command	Possible Response(s)
AT+SQNAUTOCONNECT =<*autoconnect*>[,*forceautoconnect*]	`OK`
AT+SQNAUTOCONNECT?	`+SQNAUTOCONNECT:`<*autoconnect*> `OK`
AT+SQNAUTOCONNECT=?	`+SQNAUTOCONNECT: (0,1),(0,1)` `OK`

9.1.2 Description

The set command changes the autoconnect mode of the device. When enabled, the device will automatically set the UE to its maximal functionality (equivalent to `AT+CFUN=1`) after each reboot. This setting is persistent across reboot.

The read command returns the current autoconnect mode.

The test command returns the possible autoconnect values.

9.1.3 Defined Values

autoconnect

String. Autoconnect Mode.

Table 9-1: *autoconnect*

Value	Description
0	Autoconnect is disabled.
1	Autoconnect is enabled.

forceautoconnect

String. Force autoconnect Mode.

Table 9-2: *forceautoconnect*

Value	Description
0	ForceAutoconnect if disabled, the Autoconnect is overriden to 0 in case of `"3gpp-conformance", "verizon-conformance"`
1	ForceAutoconnect is enabled.

9.1.4 Example

Enable autoconnect:

```
AT+SQNAUTOCONNECT=1
OK
```

Read the current autoconnect setting:

```
AT+SQNAUTOCONNECT?
+SQNAUTOCONNECT: 1
OK
```

9.2 Internet Auto-Connect: +SQNAUTO-INTERNET

9.2.1 Syntax

Command	Possible Response(s)
AT+SQNAUTOINTERNET=<*autointernet*>	`+CME ERROR:`<*err*>
AT+SQNAUTOINTERNET?	`+SQNAUTOINTERNET:` <*autointernet*> `OK`
AT+SQNAUTOINTERNET=?	`+SQNAUTOINTERNET:`*(0,1)* `OK`

9.2.2 Description

The set command changes the `autointernet` mode of the device. When enabled, the device will automatically try to connect internet PDN provisioned into `/etc/config/sqnmm` after each attach to the network.

This setting is persistent across reboot.

The read command returns the current `autointernet` mode.

The test command returns the possible `autointernet` values.

9.2.3 Defined Values

autointernet

Auto connect to Internet, integer [0-1].

Table 9-3: *autointernet*

Value	Description
0	Autointernet is disabled
1	Autointernet is enabled

9.3 ICCID Read: +SQNCCID

9.3.1 Syntax

Command	Possible Response(s)
AT+SQNCCID	`+CME ERROR:`<*err*>
AT+SQNCCID?	`+SQNCCID:`<*iccid*>[,<*euiccid*>] `OK` `+CME ERROR:`<*err*>
AT+SQNCCID=?	`+CME ERROR:`<*err*>

9.3.2 Description

The execution command reads the ICCID (card identification number) on the SIM card.

The test command returns OK result code.

9.3.3 Defined Values

iccid

String. USIM integrated circuit card ID.

euiccid

String. eUICCID of the SIM card.

9.4 Conformance Test Mode: +SQNCTM

9.4.1 Syntax

Command	Possible Response(s)
AT+SQNCTM=<*ctm*>	`OK`
AT+SQNCTM?	`+SQNCTM:`<*ctm*> `OK`
AT+SQNCTM=?	`+SQNCTM:("standard", "3gpp-conformance", "verizon", "verizon-conformance", "lgu", "att")` `OK`

9.4.2 Description

The set command changes the conformance test mode of the device.

Caution: The change will be effective after the device's reboot.

The read command returns the current conformance test mode.

The test command returns the supported conformance test modes.

Note: The values not listed in Table 9-4 are reserved for Sequans use and should not be used.

9.4.3 Defined Values

ctm

String. Conformance Test Mode.

Table 9-4: *ctm*

Value	Description
"standard"	Standard 3GPP mode
"3gpp-conformance"	Standard 3GPP mode to pass GCF tests
"verizon"	Verizon mode. Enables Verizon Wireless specific requirements and AT commands
"verizon-conformance"	Verizon conformance mode. On top of "verizon" mode, it provides specific AT commands that should not be available in the final product.
"att"	AT&T mode. Enables AT&T specific requirements.
Other values	Reserved

9.4.4 Example

Change the conformance test mode to `"3gpp-conformance"` to run PS tests:

```
AT+SQNCTM="3gpp-conformance"
OK
AT^RESET
```

Read the current conformance test mode:

```
AT+SQNCTM?
+SQNCTM: "3gpp-conformance"
OK
```

9.5 Read the Home PLMN: +SQNHPLMN

9.5.1 Syntax

Command	Possible Response(s)
AT+SQNHPLMN?	`+SQNHPLMN:`*<num_oper>,<short_oper>, <long_oper>,* `OK`

9.5.2 Description

This command reads the HPLMN.

9.5.3 Defined Values

num_oper

Numeric format: the GSM Location Area Identification number (refer to 3GPP TS 24.008 [8] subclause 10.5.1.3). Country code with three BCD digits coded as in ITU-T Recommendation E.212 [10] Annex A, plus a two BCD digit network code, which is administration specific.

The returned `<num_oper>` value is not in BCD format, but in IRA characters converted from BCD, so the number has the following format:

```
(country digit3)(country digit2)(country
digit1)(network digit3)(network digit2)(network digit1)
```

short_oper

String. Short alphanumeric format of the operator name: up to 8 characters (refer to GSM MoU SE.13 [9]).

long_oper

String. Long alphanumeric format of the operator name, up to 16 characters.

9.5.4 Example

```
AT+SQNHPLMN?
+SQNHPLMN: "00101","TEST","Aeroflex"
OK
```

9.6 Change STK APN Configuration: +SQNSTKAPNE

9.6.1 Syntax

Command	Possible Response(s)
AT+SQNSTKAPNE= *<apnname>*, *<iptype>*, *<enabled>*	`OK`
AT+SQNSTKAPNE?	`+SQNSTKAPNE:`*<apnname>*, *<iptype>*, *<enabled>* `OK`
AT+SQNSTKAPNE=?	`+SQNSTKAPNE:`*<apnname>*, (ip, ipv6, ipv4v6), (0,1) `OK`

9.6.2 Description

The set command changes the STK APN configuration. If the UICC STK application does not provide the APN in the open channel, this configuration will be used instead.

This setting is not persistent across reboot.

The read command returns the current configuration.

The test command returns the possible values.

9.6.3 Defined Values

iptype

String. IP type description.

Table 9-5: *iptype*

Value	Description
ip	IPv4 only
ipv6	IPv6 only
ipv4v6	IPv4 and IPv6

enabled

Integer. Status.

Table 9-6: *enabled*

Value	Description
0	APN is disabled
1	APN is enabled

9.6.4 Example

Set STK APN:

```
AT+SQNSTKAPNE="stktest","ipv4v6",1
OK
```

Read the current autoconnect setting:

```
AT+SQNSTKAPNE?
+SQNSTKAPNE: stktest,ipv4v6,1
OK
```

10 Sequans IP Data Basic Commands

10.1 Socket Accept: +SQNSA

10.1.1 Syntax

Command	Possible Response(s)

AT+SQNSA=*<connId>[,<connMode>]*	Possible intermediate response: `CONNECT`
	`OK`
	`ERROR`
	`NO CARRIER`
	`+CME ERROR:`*<err>*

AT+SQNSA=?	`+SQNSA: (1-6)[,(0-1)]`

10.1.2 Description

Execution command accepts an incoming socket connection after an unsolicited result code `+SQNSRING: <connId>`. Note that this `+SQNSRING` URC is the consequence of the creation of a socket listen (`+SQNSL`).

Setting the command before having received a `+SQNSRING` URC will result in an `ERROR` indication, with information that a connection request has not yet been received.

Use `+SQNSH` command to reject the connection.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for `<err>` values.

Test command returns the range of supported values for all the subparameters.

10.1.3 Defined Values

connId

Socket connection identifier, integer [1-6].

connMode

Connection mode, optional, integer [0-1].

Table 10-1: *connMode*

Value	Description
0	Default. Online data mode
1	Command mode

10.1.4 Example

- General syntax:

```
at+sqnsa=?
+SQNSA: (1-6)[,(0-1)]
OK

at+sqnsa=1
CONNECT

at+sqnsa=2,1
OK
```

- Opening listening TCP socket on port 1234.

```
AT+SQNSL=1,1,1234
OK
```

- `+SQNSRING` URC indicates here that there is incoming connection on socket #1.

```
+SQNSRING: 1
```

- Accept connection in command mode.

```
AT+SQNSA=1,1
OK
```

- Check socket status. There is a connection with remote host on `192.168.15.135:41829`.

```
AT+SQNSS
+SQNSS: 1,2,192.168.15.1,1234,192.168.15.135,41829
+SQNSS: 2,0
+SQNSS: 3,0
+SQNSS: 4,0
+SQNSS: 5,0
+SQNSS: 6,0
OK
```

- `+SQNSRING` URC indicates that some data is received on socket #1.

```
+SQNSRING: 1
```

- Receive up to 10 bytes from 1st socket. 6 bytes are actually received.

```
AT+SQNSRECV=1,10
+SQNSRECV: 1,6
Test!
OK
```

- Send some text to socket. Note the final <Ctrl+Z> before <CR>.

```
AT+SQNSSEND=1
> Some text <Ctrl+Z>
OK
```

- Shutdown connection.

```
AT+SQNSH=1
OK
```

10.2 Socket Configuration: +SQNSCFG

10.2.1 Syntax

Command	Possible Response(s)

AT+SQNSCFG=<*connId*>,<*cid*>,<*pktSz*>,<*maxTo*>,<*connTo*>,<*txTo*>	`OK`
	`ERROR`
	`+CME ERROR:`<*err*>

AT+SQNSCFG?	`+SQNSCFG:`<*connId1*>, <*cid1*>, <*pktSz1*>, <*maxTo1*>, <*connTo1*>, <*txTo1*><CR><LF> ... `+SQNSCFG:`<*connId6*>, <*cid6*>, <*pktSz6*>, <*maxTo6*>, <*connTo1*>, <*txTo6*> `OK`
AT+SQNSCFG=?	`+SQNSCFG:(1-6),(0-6),(0-1500),(0-65535),(0,10-1200),(0-255)` `OK`

10.2.2 Description

This command sets the socket configuration parameters.

Note: These values are automatically saved in the device's NVRAM.

10.2.3 Defined Values

connId

Integer in range [1-6]. Socket connection identifier.

cid

Integer in range [0-6]. PDP context identifier.

pktSz

Integer in range [0-1500]. Packet size to be used by the TCP/UDP/IP stack for data sending. Used for online data mode only.

Table 10-2: *pktSz*

Value	Description
0	Automatically chosen by the device (default 300)

Table 10-2: *pktSz* (Continued)

Value	Description
[1-1500]	Packet size in bytes.

maxTo

Integer in range [0-65535]. Exchange timeout. if there is no data exchange within this timeout period, then the connection is closed.

Table 10-3: *maxTo*

Value	Description
0	No timeout.
[1-65535]	Timeout value in seconds (default 90 s.).

connTo

Integer in range [0,10-1200]. Connection timeout. If a connection to the remote can't be established within this timeout period, then an error is raised.

Table 10-4: *connTo*

Value	Description
0	No timeout.
[10-1200]	Timeout value in hundreds of milliseconds (default 600)

txTo

Integer in range [0-255]. Data sending timeout. Data is sent even if less than max packet size, after this period. Used for online data mode only.

Table 10-5: *txTo*

Value	Description
0	No timeout.
[1-255]	Timeout value in hundreds of milliseconds (default 50).

10.2.4 Example

```
at+sqnscfg=?
+SQNSCFG: (1-6),(0-5),(0-1500),(0-65535),(0,10-1200),(0-255)
OK

at+sqnscfg?
+SQNSCFG: 1,1,300,90,600,50
+SQNSCFG: 2,1,300,90,600,50
+SQNSCFG: 3,1,300,90,600,50
+SQNSCFG: 4,1,300,90,600,50
+SQNSCFG: 5,1,300,90,600,50
+SQNSCFG: 6,1,300,90,600,50
OK

at+sqnscfg=1,3,0,90,600,50
OK
```

10.3 Socket Configuration Extended: +SQNSCFGEXT

10.3.1 Syntax

Command	Possible Response(s)

AT+SQNSCFGEXT=<*connId*>,<*srMode*>, <*recvDataMode*>, <*keepalive*>, [<*listenAutoRsp*>], [<*sendDataMode*>[,<*unused_A*> [,<*unused_B*>]]]]	`OK`
	`ERROR`
	`+CME ERROR:`<*err*>

AT+SQNSCFGEXT?	`+SQNSCFGEXT:`<*connId1*>, <*srMode1*>, <*recvDataMode1*>, <*keepalive1*>, <*listenAutoRsp1*>, <*sendDataMode1*>, <*unused_A1*>, <*unused_B1*><CR><LF> ... `+SQNSCFGEXT:` <*connId6*>, <*srMode6*>, <*recvDataMode6*>, <*keepalive6*>, <*listenAutoRsp6*>, <*sendDataMode6*>, <*unused_A6*>, <*unused_B6*> `OK`
AT+SQNSCFGEXT=?	`+SQNSCFGEXT:(1-6),(0-2),(0-1),(0-240)[,(0-1)[,(0-1)[,(0)[,(0)]]]]` `OK`

10.3.2 Description

This command sets the socket configuration extended parameters.

Note: These values are automatically saved in the device's NVRAM.

10.3.3 Defined Values

connId

Integer in range [1-6]. Socket connection identifier.

srMode

Integer in range [0-2]. SQNSRING URC mode.

Table 10-6: *srMode*

Value	Description
0	Normal mode (default), SQNSRING : <connId>
1	Data amount mode, SQNSRING : <connId>,<recData>
2	Data view mode, SQNSRING: <connId>,<recData>,<data>

recvDataMode

Integer in range [0-1]. “Received data view mode” presentation format.

Table 10-7: *recvDataMode*

Value	Description
0	Data represented as text (default)
1	Data represented as sequence of hexadecimal numbers (from 00 to FF). Note that this parameter changes the presentation of SQNSRING URC but not SQNSSEND. No conversion is done on the data before sending on the network.

keepalive

Integer type [0-240]. Currently unused.

listenAutoRsp

Integer in range [0-1]. “Listen auto-response mode”, that affects `AT+SQNSL` command.

Table 10-8: *listenAutoRsp*

Value	Description
0	Deactivated (default). Call AT+SQNSA to accept incoming TCP connection.
1	Activated. Incoming TCP connection is automatically accepted. Modem remains in command mode.

sendDataMode

Integer in range [0-1]. “Sent data view mode” presentation format.

Table 10-9: *sendDataMode*

Value	Description
0	Data represented as text (default)
1	Data represented as sequence of hexadecimal numbers (from 00 to FF).

10.3.4 Example

```
at+sqnscfgext=?
+SQNSCFGEXT: (1-6),(0-2),(0-1),(0-240),(0-1),(0-1),(0),(0)
OK

at+sqnscfgext?
+SQNSCFGEXT: 1,0,0,0,0,0,0,0
+SQNSCFGEXT: 2,0,0,0,0,0,0,0
+SQNSCFGEXT: 3,0,0,0,0,0,0,0
+SQNSCFGEXT: 4,0,0,0,0,0,0,0
+SQNSCFGEXT: 5,0,0,0,0,0,0,0
+SQNSCFGEXT: 6,0,0,0,0,0,0,0
OK

at+sqnscfgext=1,0,0,0
OK
```

10.4 Socket Dial: +SQNSD

10.4.1 Syntax

Command	Possible Response(s)

AT+SQNSD=<*connId*>,<*txProt*>,<*rPort*>,<*IPaddr*>[,<*closureType*>[,<*lPort*>[,<*connMode*>]]]	Possible intermediate response: `CONNECT`
	`OK`
	`ERROR`
	`NO CARRIER`
	`+CME ERROR:`<*err*>

AT+SQNSD=?	`+SQNSD: (1-6),(0-1),(0-65535),<IPaddr>[,(0,255)[,(0-65535)[,(0-1)]]]` `OK`

10.4.2 Description

This commands opens a remote connection via socket.

Notes:

1. If <*connMode*> is set to online mode connection and the command is successful, then we enter the '*online data mode*' and we see the intermediate result code `CONNECT`. After the `CONNECT`, we can suspend the direct interface to the socket connection (the socket remains open) using the escape sequence (+++). The module moves back to '*command mode*' and we receive the final result code `OK` after the suspension. After such a suspension, it is possible to resume at any moment (unless the socket inactivity timer timeouts, see Socket Configuration: +SQNSCFG) by using the Socket Restore: +SQNSO command with the corresponding <*connId*>.

2. If we set <*connMode*> to command mode connection and the command is successful, the socket is opened and we remain in '`command mode`' and we see the result code `OK`.

3. If some data comes in through a connected socket and is not read because the module entered '`command mode`' before reading it (after an escape sequence or after `+SQNSD` has been issued with <*connMode*> set to '`command mode`' connection), this data is buffered and we receive the `SQNSRING URC` (SQNSRING presentation format depends on the last `+SQNSCFGEXT` setting). It is possible to read this data later with `+SQNSRECV`. Under the same hypothesis, it is possible to send data while in '`command mode`' by issuing `+SQNSSEND`.

10.4.3 Defined Values

connId

Integer in range [1-6]. Socket connection identifier.

txProt

Integer type [0-1]. Transmission protocol

Table 10-10: *txProt*

Value	Description
0	TCP
1	UDP

rPort

Integer type [0-65535]. Remote host port to contact.

IPaddr

String type. Address of the remote host.

Any valid IP address in the format `"xxx.xxx.xxx.xxx"` or any host name solved with a DNS query.

closureType

Integer type. Socket closure behaviour for TCP, has no effect for UDP connections.

Table 10-11: *closureType*

Value	Description
0	Local host closes immediately when remote host has closed (default)
255	Local host closes after an escape sequence (+++)

lPort

Integer type in range [0-65535]. UDP connection local port, has no effect for TCP connections.

connMode

Integer type [0-1]. Connection mode.

Table 10-12: *connMode*

Value	Description
0	Online mode connection (default)
1	Command mode connection

10.4.4 Example

```
at+sqnsd=?
+SQNSD: (1-6),(0-1),(0-65535),,(0,255),(0-65535),(0-1)
OK

at+sqnsd=1,0,7,"10.10.10.4",0,0,0
CONNECT

at+sqnsd=1,0,80,"www.example.com",0,0,1
OK
```

10.5 Socket Shutdown: +SQNSH

10.5.1 Syntax

Command	Possible Response(s)
AT+SQNSH=<*connId*>	OK ERROR +CME ERROR:<*err*>
AT+SQNSH=?	+SQNSH: (1-6) OK
	(Unsollicited response) +SQNSH:<*connId*>

10.5.2 Description

This command closes a socket connection.

Note: A socket connection can be closed only when it is in suspended mode (even if data is pending). Trying to close an active socket connection will produce an error.

10.5.3 Defined Values

connId

Integer in range [1-6]. Socket connection identifier.

10.5.4 Example

```
at+sqnsh=?
+SQNSH: (1-6)
OK

at+sqnsh=1
OK
```

10.6 Socket Information: +SQNSI

10.6.1 Syntax

Command	Possible Response(s)
AT+SQNSI=<*connId*>	+SQNSI:<*connId*>,<*sent*>,<*received*>,<*buff_in*>,<*ack_waiting*> OK ERROR NO CARRIER +CME ERROR<*err*>
AT+SQNSI	+SQNSI:<*connId1*>,<*sent1*>,<*received1*>,<*buff_in1*>,<*ack_waiting1*><CR><LF> ... +SQNSI:<*connId6*>,<*sent6*>,<*received6*>,<*buff_in6*>,<*ack_waiting6*> OK
AT+SQNSI=?	+SQNSI:(1-6)

10.6.2 Description

Execution command is used to get information about socket data traffic.

Test command reports the range for parameter `<connId>`.

10.6.3 Defined Values

connId

Integer in range [1-6]. Socket connection identifier.

sent

Total amount (in bytes) of sent data since the last time the socket connection identified by `<connId>` has been opened.

received

Total amount (in bytes) of received data since the last time the socket connection identified by `<connId>` has been opened.

buff_in

Total amount (in bytes) of data just arrived through the socket connection identified by `<connId>` and currently buffered, not yet read.

ack_waiting

Total amount (in bytes) of sent and not yet acknowledged data since the last time the socket connection identified by `<connId>` has been opened.

Note: Data not yet acknowledged is available only for TCP connections. The value `<ack_waiting>` is always 0 for UDP connections.

10.6.4 Examples

- Read Command

```
AT+SQNSI=?
+SQNSI: (1-6)
OK
```

- Read Command

```
AT+SQNSI
+SQNSI: 1,32,75,8,0
+SQNSI: 2,0,0,0,0
+SQNSI: 3,0,0,0,0
+SQNSI: 4,0,0,0,0
+SQNSI: 5,0,0,0,0
+SQNSI: 6,0,0,0,0
OK
```

- Set connection 1

```
AT+SQNSI=1
+SQNSI: 1,0,0,0,0
OK
```

10.7 Socket Listen : +SQNSL

10.7.1 Syntax

Command	Possible Response(s)

AT+SQNSL=<*connId*>,<*listenState*>,<*listenPort*>[,<*lingerT*>]	`OK`
	`ERROR`
	`+CME ERROR:`<*err*>

AT+SQNSL?	`+SQNSL:`<*connId1*><CR><LF> ... `[+SQNSL:`<*connIdN*>]
AT+SQNSL=?	`+SQNSL: (1-6),(0-1),(0-65535),(0,255)`

10.7.2 Description

This command opens/closes a socket listening for an incoming TCP connection on a specified port.

If successful, commands returns a final result code `OK`. Then, when there is an incoming connection on the local port, unsolicited result code `+SQNSRING: <connId>` is received.

Afterwards user can use Socket Accept: +SQNSA to accept the connection or Socket Shutdown: +SQNSH to reject that incoming connection. `<listenPort>` is optional when closing the socket.

If the `ListenAutoRsp` flag from `+SQNSCFGEXT` command has been set, then, when a TCP connection request comes on the input port, the connection is automatically accepted: the `CONNECT` indication is given and the modem goes into '`online data mode`'.

If the socket is closed by the network, then the following URC is received: `+SQNSH: <connId>`.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

Read command returns all the actual listening TCP sockets.

Test command returns the range of supported values for all the subparameters.

10.7.3 Defined Values

connId

Socket connection identifier, integer [1-6].

listenState

Open or close the listening socket, integer [0-1].

Table 10-13: *listenState*

Value	Description
0	Close listening socket
1	Open listening socket

listenPort

Local listening TCP port, Integer [0-65535].

lingerT

Closure type, optional, integer [0,255].

Table 10-14: *lingerT*

Value	Description
0	Default value. Immediate closure after remote closure
255	Socket is closed after an escape sequence (+++) or after remote closure

10.7.4 Example

```
at+sqnsl=?
+SQNSL: (1-6),(0-1),(0-65535)[,(0,255)]
OK

at+sqnsl?
OK

at+sqnsl=1,1,99
OK

at+sqnsl=2,1,555
OK

at+sqnsl?
+SQNSL: 1
+SQNSL: 2
OK
```

10.8 Socket Listen UDP: +SQNSLUDP

10.8.1 Syntax

Command	Possible Response(s)

AT+SQNSLUDP=<*connId*>, <*listenState*>[,<*listenPort*>]	`OK`
	`ERROR`
	`+CME ERROR:`<*err*>

AT+SQNSLUDP?	`+SQNSLUDP:`<*connId1*> ... `+SQNSLUDP:`<*connIdN*> `OK`
AT+SQNSLUDP=?	`+SQNSLUDP: (1-6),(0-1),(0-65535)`

10.8.2 Description

This command opens/closes a socket listening for an incoming UDP connection on a specified port.

If successful, commands returns a final result code `OK`. Then, when there is an incoming connection on the local port, unsolicited result code `+SQNSRING: <connId>` is received.

Afterwards user can use `+SQNSA` to accept the connection or `+SQNSH` to refuse it. `<listenPort>` is optional when closing the socket.

If the socket is closed by the network the following unsolicited result code is received `+SQNSLUDP: ABORTED`.

Read command returns all the actual listening sockets.

Test command returns values supported as a compound value.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for `<err>` values.

10.8.3 Defined Values

connId

Socket connection identifier, integer [1-6].

listenState

Open or close the listening socket, integer [0-1].

Table 10-15: *listenState*

Value	Description
0	Close listening socket
1	Open listening socket

listenPort

Listening UDP port, Integer [0-65535].

10.8.4 Example

```
at+sqnsludp=?
+SQNSLUDP: (1-6),(0-1),(0-65535)
OK

at+sqnsludp?
OK

at+sqnsludp=1,1,456
OK

at+sqnsludp?
+SQNSLUDP: 1
OK
```

10.9 Socket Restore: +SQNSO

10.9.1 Syntax

Command	Possible Response(s)

AT+SQNSO=<*connId*>	Possible intermediate response: `CONNECT`
	`OK`
	`ERROR`
	`NO CARRIER`
	`+CME ERROR:`<*err*>

AT+SQNSO=?	`+SQNSO: (1-6)` `OK`

10.9.2 Description

This command resumes the socket connection which has been suspended by the escape sequence.

Note: After the `CONNECT`, you can suspend the socket connection (the socket remaining open) using the escape sequence (+++). The device re-enters 'command mode' and you will receive the final result code `OK` after the suspension.

10.9.3 Defined Values

connId

Integer in range [1-6]. Socket connection identifier.

10.9.4 Example

```
at+sqnso=?
+SQNSO: (1-6)
OK

at+sqnso=1
CONNECT
```

10.10 Receive Data in Command Mode: +SQNSRECV

10.10.1 Syntax

Command	Possible Response(s)

AT+SQNSRECV=<*connId*>, <*maxByte*>	`+SQNSSRECV:`<*connId*>,<*maxByte*><CR><LF>
	<*data*>
	`OK`
	`ERROR`
	`+CME ERROR:`<*err*>

AT+SQNSRECV=?	`+SQNSRECV:(1-6), (1-1500)` `OK`

10.10.2 Description

This command reads data arrived through a connected socket, buffered and not yet read because the module entered '*command mode*' before reading them. The module is notified of these data by a `SQNSRING` URC, whose presentation format depends on the last `+SQNSCFGEXT` setting.

Note: Issuing `AT+SQNSRECV` when there's no buffered data raises an error.

10.10.3 Defined Values

connId

Integer in range [1-6]. Socket connection identifier.

cid

Integer in range [1-1500]. Maximum number of bytes to read.

10.10.4 Example

```
at+sqnsrecv=?
+SQNSRECV: (1-6),(1-1500)
OK

at+sqnsrecv=1,5
+SQNSRECV: 1,5
hello+OK
```

10.11 Socket Activity Notification: +SQNSRING

10.11.1 Syntax

	Unsollicited Response(s)
	• When `AT+SQNSCFGEXT` parameter `<srMode>` is set to 0 (default), or for an incoming TCP connection: `+SQNSRING:`*<connId>* • When `AT+SQNSCFGEXT` parameter `<srMode>` is set to 1: `+SQNSRING:`*<connId>,<recData>* • When `AT+SQNSCFGEXT` parameter `<srMode>` is set to 2: `+SQNSRING:`*<connId>,<recData>,<data>*

10.11.2 Description

Unsolicited response that can be received while being in 'command mode' only. It can notify of data arrival, more or less detailed (see syntax), and of an incoming TCP connection if a listening socket has been started before with `+SQNSL` command.

Note:

- After data arrival notification, received bytes are flushed only by explicit read through `+SQNSRECV` command.
- Internal buffering is limited and `+SQNSRING` notification will stop until host starts reading data through `+SQNSRECV` command. URC will be sent again if enough data has been read and if there are still new data arrival to notify.

10.11.3 Defined Values

connId

Integer in range [1-6]. Socket connection identifier.

recData

Integer in range [1-1500]. Maximum number of bytes to read.

data

Data to read.

10.11.4 Example

```
at+sqnscfgext=1,0, 0,0,0,0,0,0
OK
(...)
+SQNSRING: 1
+SQNSRING : 1
+SQNSRING: 1
+SQNSRING: 1
+SQNSRING: 1

at+sqnscfgext=2,1,0,0,0,0,0,0
 OK
(...)
+SQNSR I NG: 2,1500

at+sqn scf gext=3,2,0,0,0,0,0,0
OK(...)
+SQNSRING: 3,264,fdkkkkkkkkkkkkkkmoSDQFfdd...
+SQNSRING: 3,264,fgiojnerogijoijopfdsqpioiop...
+SQNSRING: 3,168,gGgGgGgGgGgGgGgGgGgGgGgGgU...
at+sqnsl?
+SQNSL: 4
OK
+SQNSRING: 4
```

10.12 Socket Status : +SQNSS

10.12.1 Syntax

Command	Possible Response(s)
AT+SQNSS	`+SQNSS:`*<connId1>,<state1>,<locIP1>,<locPort1>,<remIP1>,<remPort1>*<CR><LF> ... `+SQNSS:`*<connId6>,<state6>,<locIP6>,<locPort6>,<remIP6>,<remPort6>*<CR><LF> `OK`
AT+SQNSS?	`+SQNSS:`*<connId1>,<state1>,<locIP1>,<locPort1>,<remIP1>,<remPort1>*<CR><LF> ... `+SQNSS:`*<connId6>,<state6>,<locIP6>,<locPort6>,<remIP6>,<remPort6>*<CR><LF> `OK`
AT+SQNSS=?	`OK`

Note: If a channel is closed (*<state>* value 0), then *<locIP>*, *<locPort>*, *<remIP>* and *<remPort>* parameters are omitted.

10.12.2 Description

This command reports the current status of the sockets.

10.12.3 Defined Values

connId

Integer in range [1-6]. Socket connection identifier.

state

Integer in range [0-6]. Current state of the socket.

Table 10-16: *state*

Value	Description
0	Socket Closed.
1	Socket with an active data transfer connection.
2	Socket suspended.
3	Socket suspended with pending data.
4	Socket listening.
5	Socket with an incoming connection. Waiting for the user accept or shutdown command.
6	Socket in opening process. The socket is not in Closed state but still not in Active or Suspended or Suspended with pending data state.

locIP

IP address associated by the context activation to the socket.

locPort

One of the following:

- The listening port if the socket is in listen mode.
- The local port for the connection if the socket is connected to a remote machine.

remIP

Remote IP address when the device is connected to a remote machine.

remPort

Connected port on the remote machine.

10.12.4 Example

```
at+sqnss
+SQNSS: 1,2,192.168.6.8,36419,65.52.116.180,80
+SQNSS: 2,4,0.0.0.0,888,,0
+SQNSS: 3,0
+SQNSS: 4,5,192.168.9.2,999,10.10.10.6,45133
+SQNSS: 5,3,192.168.6.2,57037,10.10.10.4,7
+SQNSS: 6,0

at+sqnss?
+SQNSS: 1,0
+SQNSS: 2,0
+SQNSS: 3,0
+SQNSS: 4,0
+SQNSS: 5,0
+SQNSS: 6,0
OK

at+sqnss=?
OK
```

10.13 Send Data in Command Mode: +SQNSSEND

10.13.1 Syntax

Command	Possible Response(s)

AT+SQNSSEND=<*connId*>	Intermediate result code: `>`
	`OK`
	`ERROR`
	`NO CARRIER`
	`+CME ERROR:`<*err*>

AT+SQNSSEND=?	`+SQNSSEND:(1-6)` `OK`

10.13.2 Description

This command, while the module is in command mode, sends data through a connected socket.

To complete the operation, send `Ctrl-Z` char (0x1A in hexadecimal). To exit without sending the message, send `ESC` char (0x1B in hexadecimal).

If data is successfully sent, then the response is `OK`. If data sending fails for some reason, then an error code is reported.

Notes:

1. The maximum number of bytes to send is 1500.
2. It is possible to use `+SQNSSEND` only if the connection was opened by `+SQNSD`, else the UE will raise an error.
3. A byte corresponding to `BS` character (0x08) is processed with its corresponding meaning (back space). Therefore, the previous byte will be cancelled and the `BS` character itself will not be sent.

10.13.3 Defined Values

connId

Integer in range [1-6]. Socket connection identifier.

10.13.4 Example

```
at+sqnssend=?
+SQNSSEND: (1-6)
OK

at+sqnssend=1
>hello
OK
```

10.14 Extended Send Data In Command Mode: +SQNSSENDEXT

10.14.1 Syntax

Command	Possible Response(s)

AT+SQNSSEND=<*connId*>,
<*bytesToSend*>
	Intermediate result code: `>`
	`OK`
	`ERROR`
	`NO CARRIER`
	`+CME ERROR:`<*err*>

AT+SQNSSEND=?	`+SQNSSENDEXT: (1-6),(1-1500)` `OK`

10.14.2 Description

This command allows, while the module is in command mode, to send data through a connected socket including all possible octets (from 0x00 to 0xFF).

The device responds to the command with the prompt '`>`' (<greater_than> sign and <space> character) and waits for the data to send.

When `<bytestosend>` bytes have been sent, then the operation is automatically completed.

If data is successfully sent, then the response is `OK`. If data sending fails for some reason, then an error code is reported.

Note: Input data format is raw binary by default. It is configurable using `AT+SQNSCFGEXT` command.

Notes:

1. The maximum number of bytes to send is 1500.
2. It is possible to use `+SQNSSENDEXT` only if the connection was opened by `+SQNSD`, else the UE will raise an error.
3. All special characters are sent like generic bytes. A byte corresponding to `BS` character (0x08) is sent through the socket and doesn't behave like a back space. Therefore, the previous byte will not be deleted.

10.14.3 Defined Values

connId

Integer in range [1-6]. Socket connection identifier.

bytesToSend

Integer in range [1-1500]. Number of bytes to send.

10.14.4 Example

```
at+sqnssendext=?
+SQNSSENDEXT: (1-6),(1-1500)
OK

at+sqnssendext=1,11
>hello again
```

11 Sequans Specific HTTP Commands

11.1 HTTP Configure: +SQNHTTPCFG

11.1.1 Syntax

Command	Possible Response(s)
AT+SQNHTTPCFG=<prof_id>[,<server_address>[,<server_port>[,<auth_type>[,<username>[,<password>[,<ssl_enabled>[,<timeout>[,<cid>]]]]]]]]	+CME ERROR:<err>
AT+SQNHTTPCFG?	+SQNHTTPCFG: <prof_id1>,<server_address1>,<server_port1>,<auth_type1>,<username1>,<password1>,<ssl_enabled1>,<timeout1>,<cid1> ... +SQNHTTPCFG: <prof_idN>,<server_addressN>,<server_portN>,<auth_typeN>,<usernameN>,<passwordN>,<ssl_enabledN>,<timeoutN>,<cidN> OK
AT+SQNHTTPCFG=?	+SQNHTTPCFG:<prof_id>,<s_length>,<server_port>,<auth_type>,<u_length>,<p_length>,<ssl_enabled>,<timeout>,<cid> OK

11.1.2 Description

This command sets the parameters needed to the HTTP connection.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

Read command returns the current settings for each defined profile.

Test command returns the range of supported values/lengths for all the subparameters.

Note: A special form of the Set command, `+SQNHTTPCFG=<prof_id>`, causes the values for profile number `<prof_id>` to reset to default values.

Parameters of `+SQNHTTPCFG` are automatically saved to NVM.

11.1.3 Defined Values

prof_id

Integer in range [0-2]. Numeric parameter indicating the profile identifier.

server_address

String. IP address of the HTTP server.

This parameter can be either

- Any valid IP address in the format: "xxx.xxx.xxx.xxx"
- Any host name to be solved with a DNS query

Default is "".

server_port

Integer in range [1-65535]. Numeric parameter indicating the TCP remote port of the HTTP server to connect to.

Default values are 80 for the first, second and third profiles.

auth_type

Integer in range [0-1]. Numeric parameter indicating the HTTP authentication type.

Table 11-1: *auth_type*

Value	Description
0	(Default) No authentication
1	Basic authentication

username

String. Authentication user identification string for HTTP. This parameter is empty by default.

password

String. Authentication password for HTTP. This parameter is empty by default.

ssl_enabled

Integer in range [0-1]. Indicates if the SSL encryption is enabled.

Table 11-2: *ssl_enabled*

Value	Description
0	(Default) SSL encryption disabled
1	SSL encryption is enabled

timeout

Integer in range [1-120]. Time interval in seconds to wait for receiving data from HTTP server. Default: 120.

cid

Integer in range [1-8]. PDN Context Identifier. Default: 3.

s_length

Integer. Maximum length of of parameter `<server_address>`.

u_length

Integer. Maximum length of of parameter `<username>`.

p_length

Integer. Maximum length of of parameter `<password>`.

11.2 HTTP Query: +SQNHTTPQRY

11.2.1 Syntax

Command	Possible Response(s)
AT+SQNHTTPQRY=<*prof_id*>,<*command*>,<*resource*>[,<*extra_header_line*>]	`+CME ERROR:`<*err*>
AT+SQNHTTPQRY=?	`+SQNHTTPQRY:`<*prof_id*>,<*command*>,<*r_length*>,<*m_length*> `OK`

11.2.2 Description

This command performs HTTP GET, HEAD or DELETE request to server.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

Test command returns the range of supported values/lengths for all the subparameters.

When an answer from HTTP server is received, the `+SQNHTTPRING` URC is shown.

11.2.3 Defined Values

prof_id

Integer in range [0-2]. Numeric parameter indicating the profile identifier.

command

Integer in range [0-2]. Command requested to HTTP server.

Table 11-3: *command*

Value	Description
0	GET
1	HEAD
2	DELETE

resource

String. HTTP resource (uri), object of the request.

extra_header_line

String. Optional HTTP header line.

Note: If sending ends successfully, the response is OK; otherwise an error code is reported.
The HTTP request header sent with `+SQNHTTPQRY` always contains the `"Connection: close"` line which can't be removed.

content_type

String. "Content-Type" header line, as received from the server (see RFC 2616)

data_size

Integer. Amount of data (in byte) received from the server.

If the server doesn't report the "Content-Length:" header line, the parameter value is 0.

Note: Note: if there are no data from server or the server doesn't answer within the time interval specified in `<timeout>` parameter of `+SQNHTTPCFG`command, then the URC `+SQNHTTPRING` `<http_status_code>` parameter has value 0.

http_status_code

Integer. Status code, as received from the server (see RFC 2616).

r_length

This value is used only in test command `AT+SQNHTTPQRY=?`.

Maximum length of of parameter <resource>, integer.

m_length

This value is used only in test command `AT+SQNHTTPQRY=?`.

Maximum length of of parameter <extra_header_line>, integer.

11.3 HTTP Receive: +SQNHTTPRCV

11.3.1 Syntax

Command	Possible Response(s)
AT+SQNHTTPRCV=*<prof_id>[,<maxbytes>]*	`+CME ERROR:`*<err>*
AT+SQNHTTPRCV=?	`+SQNHTTPRCV:`*<prof_id>,<max_bytes>* `OK`

11.3.2 Description

This command is used to read the body of HTTP response. It can be used after receiving of HTTP Response URC: +SQNHTTPRING

Set command permits the user to read data from HTTP server in response to a previous HTTP module request. The module is notified of these data by the +SQNHTTPRING URC. The device shall prompt a three character sequence <<< (*<less_than><less_than><less_than>*) (IRA 60, 60, 60)) followed by the data. If reading ends successfully, the response is OK; otherwise an error code is reported.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

Test command returns values supported as a compound value.

11.3.3 Defined Values

prof_id

Integer in range [0-2]. Numeric parameter indicating the profile identifier.

max_bytes

Integer. Max number of bytes to read at a time, range is [0,64-1500]. Default: 0, which means infinite size.

Note: If `<max_byte>` is unspecified, server data will be transferred all in once. If the data are not present or if the +SQNHTTPRING <http_status_code> parameter has value 0, then an error code is reported.

http_status_code

Integer. Status code, as received from the server (see RFC 2616).

11.3.4 Examples

- Setting www.w3.org as remote server.

```
AT+SQNHTTPCFG=1,"www.w3.org"
OK
```

- Perform HTTP GET request to "/Summary.html" page.

```
AT+SQNHTTPQRY=1,0,"/Summary.html"
OK
```

- `+SQNHTTPRING` URC is shown. Status code is 200 (OK), content type has an extension and content-length is 5223 bytes.

```
+SQNHTTPRING: 1,200,"text/html; charset=iso-8859-1",5223
```

- Perform infinite reading of server's response.

```
AT+SQNHTTPRCV=1
<<<<HTML>
<HEAD>
... output omitted ...
</ADDRESS></BODY>
</HTML>

OK
```

11.4 HTTP Response URC: +SQNHTTPRING

11.4.1 Syntax

Command	Possible Response(s)
	`+SQNHTTPRING:`*<prof_id>,<http_status_code>,<content_type>,<data_size>*

11.4.2 Description

This URC is shown when an answer from HTTP server is received.

11.4.3 Defined Values

prof_id

HTTP profile identifier, integer [0-2].

http_status_code

HTTP status code, as received from the server, 3-digit integer.

content_type

"`Content-Type`" header line, as received from the server, string.

data_size

`"Content-Length:"` header line, as received from the server.

Note: If server doesn't answer within the time interval specified in <timeout> parameter of +SQNHTTPCFG command, then the <http_status_code> parameter has value 0, <content_type> parameter is empty and <data_size> parameter has value 0. If "Content-Length" header line is absent in the response from server, then <data_size> parameter has value 0.

11.5 HTTP Send: +SQNHTTPSND

11.5.1 Syntax

Command	Possible Response(s)
AT+SQNHTTPSND=<*prof_id*>,<*command*>,<*resource*>,<*data_len*>[,<*post_param*>[,<*extra_header_line*>]]	`+CME ERROR:`<*err*>
AT+SQNHTTPSND=?	`+SQNHTTPSND:`<*prof_id*>,<*command*>,<*r_length*>,<*data_len*>,<*p_length*>,<*m_length*> `OK`

11.5.2 Description

Set command performs a POST or PUT request to HTTP server and starts sending data to the server. The device shall prompt a three character sequence `>>>` (<*greater_than*><*greater_than*><*greater_than*> (IRA 62, 62, 62)) after command line is terminated with <CR>; after that the data can be entered from TE, sized <data_len> bytes. When the HTTP server answer is received, then the following URC (when supported) is put on the serial port: `+SQNHTTPRING: <prof_id>,<http_status_code>,<content_type>,<data_size>`.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

Test command returns values supported as a compound value.

11.5.3 Defined Values

prof_id

Integer in range [0-2]. Numeric parameter indicating the profile identifier.

command

Integer in range [0-1]. Command requested to HTTP server:

Table 11-4: *command*

Value	Description
0	POST
1	PUT

resource

String. HTTP resource (uri), object of the request

data_len

Integer. Length of input data in bytes.

post_param

String. HTTP Content-Type identifier.

Used only for POST command, optionally followed by colon character (:) and a string that extends with sub-types the identifier. Other content–free string corresponding to other content type and possible sub-types.

Table 11-5: *post_param*

Value	Description
0[:extension]	"application/x-www-form-urlencoded" with optional extension
1[:extension]	"text/plain" with optional extension
2[:extension]	"application/octet-stream" with optional extension
3[:extension]	"multipart/form-data" with optional extension

extra_header_line

String. Optional HTTP header line.

Note: If sending ends successfully, the response is OK; otherwise an error code is reported.
The HTTP request header sent with `+SQNHTTPQRY` always contains the "`Connection: close`" line which can't be removed.

content_type

String. “Content-Type” header line, as received from the server (see RFC 2616)

data_size

Integer. Amount of data (in byte) received from the server.

If the server doesn’t report the "Content-Length:" header line, the parameter value is 0.

Note:	Note: if there are no data from server or the server doesn’t answer within the time interval specified in `<timeout>` parameter of `+SQNHTTPCFG`command, then the URC `+SQNHTTPRING` `<http_status_code>` parameter has value 0.

r_length

Integer, Maximum length of of parameter `<resource>`.

p_length

Integer. Maximum length of of parameter `<post_param>`.

m_length

Integer. Maximum length of of parameter `<extra_header_line>`.

11.5.4 Example

- Post 100 byte without “Content-type” header

```
AT+SQNHTTPSND=0,0,"/",100
>>>
```

- Post 100 byte with “application/x-www-form-urlencoded”

```
AT+SQNHTTPSND=0,0,"/",100,0
>>>
```

- Post 100 byte with “multipart/form-data” and extension

```
AT+SQNHTTPSND=0,0,"/",100,"3:boundary=----FormBoundary"
>>>
```

12 Sequans Non-Volatile Memory Commands

12.1 Read Data in NVM: +SQNSNVR

12.1.1 Syntax

Command	Possible Response(s)
AT+SQNSNVR=<*type*>,...**AT+SQNSNVR="certificate"**,<*index*>,<*size*><CR><LF><data>	`+SQNSNVR:`<*type*>...<*type*>... [...]][<CR><LF>+SQNSNVR: <*type*>...[...]] `OK`
AT+SQNSNVR?	`OK`
AT+SQNSNVR=?	`+SQNSNVR: "certificate",`*(list of supported <index>)* `OK`

12.1.2 Description

Note: The commands `+SQNSNVR` and `+SQNSNVW` allow reading and writing data (Certificate, etc.) from/to the non-volatile (NV) memory or from/to the Flash File System. Data stores in Non-Volatile Memory will be persistent against device reboot and software upgrade.

This command allows to read data (Certificate, etc.) stored in the non-volatile (NV) memory or the Flash File System.

Read command usage and syntax vary depending on the type of stored data.

`AT+SQNSNVR="certificate"[,<index>]`

This command with "`certificate`" type should be used to dump all certificate stored in the system.

If `<index>` is provided, only certificate with given <index> is displayed. An ERROR is reported in case this entry is empty.

If <index> is not provided, then all available certificates are displayed, one per line.

12.1.3 Defined Values

type

Type of data, string. When `"certificate"`: Certificate data.

index

Certificate index, integer [0-19].

issuer

Certificate issuer (Entity that verified the information and issued the certificate), string.

serial-number

Certificate serial number (used to uniquely identify the certificate), string.

subject

Certificate subject (person or entity identified), string.

valid-from

Certificate validity period start, string.

valid-to

Certificate expiration date, string.

signature-algorithm

Certificate signature algorithm (Algorithm used to create the signature), string.

signature

Certificate signature (Actual signature to verify that it came from the issuer), string.

thumbprint-algorithm

Certificate thumbprint algorithm (algorithm used to hash the public key certificate), string.

thumbprint

Certificate thumbprint (The hash itself, used as an abbreviated form of the public key certificate), string.

12.1.4 Example

- Read certificate @ index 5

```
AT+SQNSNVR="certificate",5
+SQNSNVR:
"certificate",5,<issuer>,<serial-number>,<subject>,<valid-from>,<
valid-to>,<signature-algorithm>,<signature>,<thumbprint-algorithm
>,<thumbprint>
OK
```

- Read all certificates:

```
AT+SQNSNVR="certificate"
+SQNSNVR:
"certificate",<index>,<issuer>,<serial-number>,<subject>,<valid-f
rom>,<valid-to>,<signature-algorithm>,<signature>,<thumbprint-alg
orithm>,<thumbprint>
[...]
OK
```

12.2 Write Data in NVM: +SQNSNVW

12.2.1 Syntax

Command	Possible Response(s)
AT+SQNSNVW=<*type*>,...**AT+SQNSNVW="certificate"**,<*index*>,<*size*><CR><LF><data>	`OK`
AT+SQNSNVW?	`OK`
AT+SQNSNVW=?	`+SQNSNVW: "certificate",`*(list of supported <index>),(list of supported <size>)* `OK`

12.2.2 Description

Note: The commands `+SQNSNVR` and `+SQNSNVW` allow reading and writing data (Certificate, etc.) from/to the non-volatile (NV) memory or from/to the Flash File System. Data stores in Non-Volatile Memory will be persistent against device reboot and software upgrade.

This command allows to write/delete data (Certificate, etc.) to/from the non-volatile (NV) memory.

Write command usage & syntax may change depending on the type of data to store.

`AT+SQNSNVW="certificate",<index>,<size><CR><LF><data>`

This write command with `"certificate"` type should be used to write certificate in non volatile memory. After upload, public certificates are immediately available for all client secured IP connection (`+SQNSUPGRADE`, Secured socket). For secured socket in server mode, certificate `<index>` should be used to assign private certificate to secure server.

An `<index>` should be provided and will be used by the system to identify in a unique way the certificate for future operations (delete, etc.)

`<size>` parameter corresponds to the exact number of bytes of the certificate to upload: after `AT+SQNSNVW` write command issued, user should send certificate bytes in PEM (Privacy-enhanced Electronic Mail) format. As soon as `<size>` bytes have been received, operation is automatically completed. If certificate is successfully uploaded and verified, then the response is OK. If certification upload fails for some reason, then an error code is reported.

To delete a certificate, one should simply write a 0 byte certificate using certification ID as `<index>`.

Note:	Private RSA keys with password are not supported.

12.2.3 Defined Values

type

Type of data, string. "certificate": Certificate data.

index

Certificate index, integer [0-19].

size

Size in bytes of certificate file to upload or `0` to remove, integer.

12.2.4 Example

- Certificate upload @ index 5:

```
AT+SQNSNVW="certificate",5,1346
-----BEGIN CERTIFICATE-----
MIIDXTCCAkWgAwIBAgIJAJC1HiIAZAiIMA0GCSqGSIb3DfBAYTAkFVMRMwEQYDVQQ
IDApTb21lLVN0YXRlMSEwHwYDVx[…]C3Fayua4DRHyZOLmlvQ6tIChY0ClXXuefbm
VSDeUHwc8YuB7xxt8BVc69rLeHV15A0qyx77CLSj3tCx2IUXVqRs5mlSbvA==
-----END CERTIFICATE-----
OK
```

- Remove certificate @ index 5:

```
AT+SQNSNVW="certificate",5,0
OK
```

13 OMA LWM2M Related Commands

13.1 OMA LWM2M Battery Status: +SQNOMABATTST

13.1.1 Syntax

Command	Possible Response(s)
AT+SQNOMABATTST=<*status*>	`OK`
AT+SQNOMABATTST=?	`+SQNOMABATTST: (0..6)` `OK`

13.1.2 Description

This command writes baterry status to LWM2M client. These value is accessible via LWM2M Device object (3) with corresponding id (20). Stored data will be persistent against device reboot.

13.1.3 Defined Values

status

Integer. Battery status according to LWM2M specification.

Table 13-1: *status*

Value	Description
0	Normal. The battery is operating normally and not on power.
1	Charging. The battery is currently charging.
2	Charge Complete. The battery is fully charged and still on power.
3	Damaged. The battery has some problem.
4	Low Battery. The battery is low on charge.
5	Not Installed. The battery is not installed.
6	Unknown. The battery information is not available.

13.2 OMA LWM2M Host Device Identification Data: +SQNOMAHDEV

13.2.1 Syntax

Command	Possible Response(s)
AT+SQNOMAHDEV	`OK`
AT+SQNOMAHDEV?	List of `+SQNOMAHDEV:`*<instId>*, *<index>*, *<value>* `OK`
AT+SQNOMAHDEV=?	`+SQNOMAHDEV:(0..1), (0..3),`*value* `OK`

13.2.2 Description

This command reads and writes Host Device Identifivation values such as UID, Device model, Firmware version.

These values are accessible via LWM2M objects Host Device (10255) and Portfolio (16). Stored data will be persistent against device reboot.

13.2.3 Defined Values

instId

Integer. Instance index.

index

Integer. Value index.

Table 13-2: *state*

Value	Description
0	UID
1	Manufacturer
2	Model
3	FW Version

value

String. Arbitrary identification string.

13.2.4 Example

1. Review default values after the first boot

```
$ AT+SQNOMAHDEV?
+SQNOMAHDEV: 0, 0, HUID0
+SQNOMAHDEV: 0, 1, HMAN0
+SQNOMAHDEV: 0, 2, HMOD0
+SQNOMAHDEV: 0, 3, HFW0
+SQNOMAHDEV: 1, 0, HUID1
+SQNOMAHDEV: 1, 1, HMAN1
+SQNOMAHDEV: 1, 2, HMOD1
+SQNOMAHDEV: 1, 3, HFW1
OK
```

2. Modify default values

```
$ AT+SQNOMAHDEV=0,2,"Some module #1"
OK
$ AT+SQNOMAHDEV=1,3,"Some firmware #2"
OK
$ AT+SQNOMAHDEV?
+SQNOMAHDEV: 0, 0, HUID0
+SQNOMAHDEV: 0, 1, HMAN0
+SQNOMAHDEV: 0, 2, Some module #1
```

```
+SQNOMAHDEV: 0, 3, HFW0
+SQNOMAHDEV: 1, 0, HUID1
+SQNOMAHDEV: 1, 1, HMAN1
+SQNOMAHDEV: 1, 2, HMOD1
+SQNOMAHDEV: 1, 3, Some firmware #2
OK
```

3. Values seen by Verizon (Host Device Object) LWM2M nodes

```
$ AT+SQNOMAGET="/10255"
+SQNOMAGET: /10255/0/0 LWM2M_TYPE_STRING: HMAN0
+SQNOMAGET: /10255/0/1 LWM2M_TYPE_STRING: Some module
#1
+SQNOMAGET: /10255/0/2 LWM2M_TYPE_STRING: HUID0
OK
$ AT+SQNOMAGET="/10255/1"
+SQNOMAGET: /10255/1/0 LWM2M_TYPE_STRING: HMAN1
+SQNOMAGET: /10255/1/1 LWM2M_TYPE_STRING: HMOD1
+SQNOMAGET: /10255/1/2 LWM2M_TYPE_STRING: HUID1
OK
```

4. Values seen by AT&T (Portfolio Object) LWM2M nodes

```
$ AT+SQNOMAGET="/16"
+SQNOMAGET: /16/0/0 LWM2M_TYPE_STRING: HUID0
+SQNOMAGET: /16/0/1 LWM2M_TYPE_STRING: HMAN0
+SQNOMAGET: /16/0/2 LWM2M_TYPE_STRING: Some module #1
+SQNOMAGET: /16/0/3 LWM2M_TYPE_STRING: HFW0
OK
$ AT+SQNOMAGET="/16/1"
+SQNOMAGET: /16/1/0 LWM2M_TYPE_STRING: HUID1
+SQNOMAGET: /16/1/1 LWM2M_TYPE_STRING: HMAN1
+SQNOMAGET: /16/1/2 LWM2M_TYPE_STRING: HMOD1
+SQNOMAGET: /16/1/3 LWM2M_TYPE_STRING: Some firmware #2
OK
```

14 System Upgrade Related Commands

14.1 Device Reset to Factory State: +SQNSFACTORYRESET

14.1.1 Syntax

Command	Possible Response(s)
AT+SQNSFACTORYRESET	`+CME ERROR:`*<err>*
AT+SQNSFACTORYRESET=?	`OK`

14.1.2 Description

Set command causes device to reset to factory state. A device reboot is necessary to finalize the reset to factory state.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

14.2 Device Upgrade: +SQNSUPGRADE

14.2.1 Syntax

Command	Possible Response(s)
AT+SQNSUPGRADE=<*firmware_url*>,[<*reboot*>[,<*report_progress*>,[<*command*>]]]	`+CME ERROR:`<*err*>
AT+SQNSUPGRADE?	`SQNSUPGRADE:`<*upgrade_state*>*[,...]*
AT+SQNSUPGRADE=?	`SQNSUPGRADE:`*(max string length of* <*firmware_url*>*),(list of supported* <*reboot*>*s),(range of supported* <*report_progress*>*),(list of supported* <*command*>*s)*

14.2.2 Description

The write command used to trigger device upgrade with a firmware located either in the device filesystem or fetched from anexternal server.

The parameters `<reboot>`, `<report_progress>` and `<command>` are optional. A device reboot is necessary to finalize the system upgrade. Any kind of reboot is acceptable (`AT^RESET`, `AT+SQNSSHDN`, hardware reset). `<reboot>` parameter controls automatic reboot after download firmware has been validated and installed. Upgrade can be launched in foreground or background as specified by `<command>` value. User can cancel upgrade by sending `cancel <command>` any time before device reboot. An unsolicited result code `+SQNSUPGRADE: "installed"` is generated as soon as firmware download is complete and verified, stating device is ready for reboot. `<report_progress>` controls presentation of unsolicited result code `+SQNSUPGRADE: "downloading"`.

The write command is also used in case of manual network initiated firmware upgrade, to control firmware upgrade operation timings: the user calls this command to trigger the firmware upgrade and/or to cancel the operation.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

The read command returns the status of result code presentation corresponding to the current state of upgrade process.

Test command returns values supported as a compound value.

14.2.3 Defined Values

firmware_url

String. URL (compliant with RFC1738) of the firmware (protocol://user:password@host:port/path).

An example is *`https://sqn:pass@www.sequans.com/private/firmware.sfp`*.

reboot

Integer

Table 14-1: *reboot*

Value	Description
0	No reboot after the firmware is installed. The user must reboot explicitly the device to take into account the new firmware
1	Default value. Reboot automatically after the firmware is installed

report_progress

Integer

Table 14-2: *report_progress*

Value	Description
0	Don't report download progress
1..100	report download progress using `+SQNSUPGRADE: "downloading",`*<percent_downloaded>* URC.

command

integer

Table 14-3: *command*

Value	Description
0	Default value. Synchronous upgrade.
1	Start asynchronous upgrade. Launch an asynchronous upgrade. The command launches the upgrade and returns immediately -with OK if upgrade is started correctly or CME ERROR (see below for specific error codes). The command report upgrade progress with +SQNSUPGRADE URC.

Table 14-3: *command* (Continued)

Value	Description
2	Cancel upgrade. Cancel upgrade if any or do nothing, then returns OK. In case of Network Initiated firmware upgrade, then the network will be notified with upgrade cancel error code.

upgrade_state

String

Table 14-4: *upgrade_state*

Value	Description
"canceled"	The upgrade has been canceled
"downloading"	Report the downloading progress. This state is followed with <percent_downloaded>. This information is displayed only if <report_progress> has been set different than 0
"idle"	No upgrade is on going
"installed"	The upgraded is installed and will be effective after the next reboot
“available”	A new firmware is available for download (network initiated firmware upgrade use cases only)
“rebooting”	This notification is sent just before the device reboot that finalizes the system upgrade.

percent_downloaded

Integer. Percentage of image downloaded. Range is 0..100.

14.2.4 Example

```
AT+SQNSUPGRADE?
+SQNSUPGRADE: "idle"
OK
```

The following error codes may be returned through `+CME ERROR`. They are also listed in

Table 14-5: +SQNSUPGRADE Specific Error Codes

Code	Description
528	Upgrade failed: General error
529	Upgrade failed: Corrupted image.
530	Upgrade failed: Invalid signature
531	Upgrade failed: Network error
532	Upgrade failed: Upgrade already in progress
533	Upgrade cancel failed: No upgrade in progress

14.3 Device Upgrade Configuration +SQNSUPGRADECFG

14.3.1 Syntax

Command	Possible Response(s)
AT+SQNSUPGRADECFG =*<mode>*,*<report>*,*<report_progress>*	`+CME ERROR:`*<err>*
AT+SQNSUPGRADECFG ?	`SQNSUPGRADECFG:`*<mode>*,*<report>*,*<report_progress>*
AT+SQNSUPGRADECFG =?	`SQNSUPGRADECFG:`*(list of supported <mode>s),(list of supported <report>s),(range of supported <report_progress>)*

14.3.2 Description

The write command is used to configure the device behavior in case of network-initiated firmware upgrade configuration. This is typically the case for OTADM FOTA. The level of interaction with the user or the external host is configured by the `<mode>` parameter. Two modes are defined: automatic (default) and manual. The manual mode is currently not available.

In automatic mode, the network-initiated firmware upgrade operates in background of the regular module operation. After the completion of the new firmware download, the module will automatically apply the new firmware and then reboot.

After the reboot, the module will send a status to the upgrade server, with respect to the Over-The-Air firmware upgrade protocol. The user is notified of the upgrade progress (firmware downloading, firmware installed, upgrade canceled, rebooting) by `+SQNSUPGRADE` unsolicited result codes, as defined by the notification level configuration (`<report>` and `<report_progress>`) parameters.

Attention: A reboot of the device is necessary to take into account `<mode>` configuration change. Any kind of reboot (`AT^RESET`, `AT+SQNSSHDN`, hardware reset) is acceptable.

The read command returns the current configuration.

Test command returns values supported as a compound value.

See also 4.8 Mobile Termination Error Result Code: +CME ERROR on page 137 for <err> values.

14.3.3 Defined Values

mode

Integer

Table 14-6: *mode*

Value	Description
0	Default value. Automatic mode. Network initiated firmware upgrade is fully transparent for the user. Note that an unsolicited reboot can happen anytime to complete the upgrade procedure.
1	Manual mode. This mode is currently not supported.

report

Integer

Table 14-7: *report*

Value	Description
0	Default value. Do not report any upgrade status.
1	Activate upgrade status main step reporting (see <upgrade_state> values of +SQNSUPGRADE URC)

report_progress

Integer

Table 14-8: *report_progress*

Value	Description
0	Default value. Do not report download progress
1..100	report download progress using `+SQNSUPGRADE: "downloading",`<*percent_downloaded*> URC.

A Abbreviations

The following abbreviations appear in this document.

Acronym	Description
ACM	Abstract Control Model
AES	Advanced Encryption Standard
BCD	Binary-Coded Decimal
CDC	Communications Device Class
CMAC	Cipher-based MAC
CQI	Channel Quality Indicator
CSG	Closed Subscriber Group
DCE	Data Control Equipment
DCI	Downlink Control Information
DTE	Data Terminal Equipment
DUT	Device Under Test
EARFCN	E-UTRA Absolute Radio Frequency Channel Number
ICCID	Integrated Circuit Card Identifier. Identifies internationally a SIM card
IMPU	IP Multimedia Public Identity
IMS	IP Multimedia Subsystem
IRA	International Reference Alphabet
L1	Layer 1. In LTE, the Physical layer
LTE	Long Term Evolution
MAC	Media Access Control

Acronym	Description
MIB	Master Information Block
MII	Media Independent Interface
NIC	Network Interface Controller
OUI	Organizationally Unique Identifier
PCB	Printed Circuit Board
PLMN	Public Land Mobile Network
PSD	Power Spectral Density
PSS	Primary Synchronization Signal
RF	Radio Frequency
RFIC	Radio Frequency Integrated Circuit
RLF	Radio Link Failure
RSRP	Reference Signal Received Power
Rx	Receiver
SIB	Secondary Information Block
SIM	Subscriber Identity Module
SIP	Session Initiation Protocol
SoC	System-on-Chip
TDD	Time Division Duplexing
TE	Terminating Equipment
Tx	Transmitter
UART	Universal Asynchronous Receiver/Transmitter
UE	User Equipment
URC	Unsolicited Response Code
USB	Universal Serial Bus