Thuraya Satellite Telecommunications Company

THURAYA GEN2 - AT Command Set

PE-UT0010r5

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Contents

FIGURES

TABLES

1 INTRODUCTION

1.1 Scope

The present document specifies a profile of AT commands and recommends that this profile be used for controlling Mobile Equipment (ME) functions and GMR-1 network services from a Terminal Equipment (TE) through Terminal Adaptor (TA). The command prefix +C is reserved for Digital Cellular in ITU-T Recommendation V.25ter [14]. Commands from ITU-T Recommendation V.25ter [14] and existing digital cellular standards (TIAA IS-99 [15] and TIA IS-135 [16]) are used whenever applicable. ITU-T T.31 [11] and T.32 [12] fax AT commands may be used for GMR-1 fax transmission from TE. GMR-1 Short Message Service AT commands are defined in GMR-1 07.05 [24]. GMPRS AT commands are defined in clause 10 of the present document. The present document assumes an abstract architecture comprising a TE (e.g. a computer) and a ME interfaced by a TIA (see Figure 1.1). The span of control of the defined commands should allow to handle any physical implementation the this abstract architecture may lead to:

- TA, ME and TE as three separate entities;
- TA integrated under the ME cover, and the TE implemented as a separate entity;
- TA integrated under the TE cover, and the ME implemented as a separate entity;
- TA and ME integrated under the TE cover as a single entity.

The commands described in the present document may be observed on the link between the TE and the TA. However, most of the commands retrieve information about the ME, not about the TA.

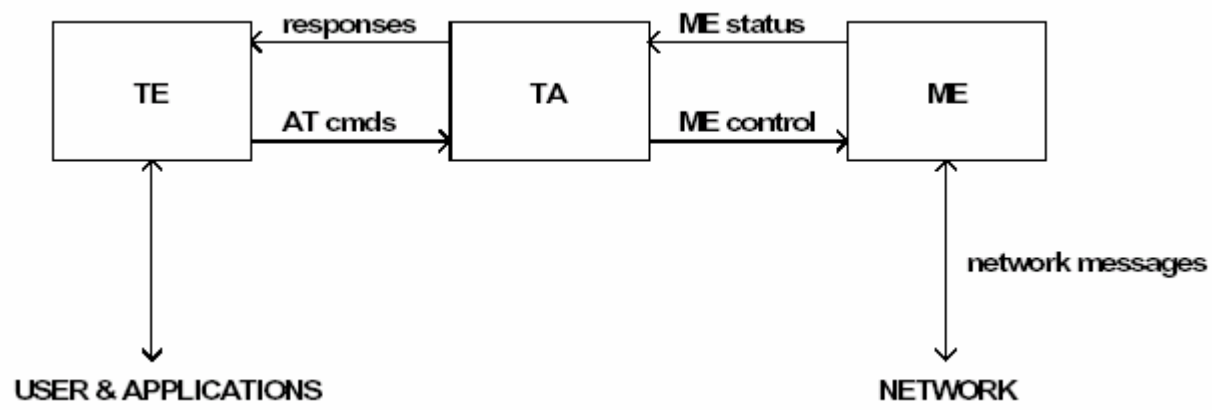

Figure 1 Setup

Interface between TE and TA is intended to operate over existing serial (ITU-T Recommendation V.24) cables, infrared link, and all link types with similar behavior. For correct

operation many of the defined commands require eight bit data and therefore it is recommended that TE-TA link is set to eight bits/byte mode. Interface between TA and ME is dependent on interface in the ME.

1.2 References

- THURAYA Second-Generation User Terminal AT Command Interface Control Document Revision 1.2 ; Document 6118036 (HSS 400816)

- Digital cellular telecommunications system (Phase 2+); AT Command set for GSM Mobile Equipment (ME) ; 3GPP TS 07.07 version 7.8.0

2 General Commands

2.1 +CGMI

Request manufacture identification

Command	Possible Response
+CGMI	<manufacturer> *+CME ERROR: <err>*
+CGMI=?	

Description

This command is used to obtain the manufacturer identification information.

Parameter

<manufacturer> the total number of characters, including line terminators, in the information text shall not exceed 2048 characters.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.2 +CGMM

Request model identification

Command	Possible Response
+CGMM	<model> *+CME ERROR: <err>*
+CGMM=?	

Description

This command is used to obtain the manufacturer model identification information.

Parameter

<model> the total number of characters, including line terminators, in the information text shall not exceed 2048 characters.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.3 +CGMR

Request revision identification

Command	Possible Response
+CGMR	<revision>

	+CME ERROR: <err>
+CGMR=?	

Description

This command is used to obtain the manufacturer embedded firmware information.

Parameter

<revision> the total numbers of characters, including line terminations, in the information text shall not exceed 2048 characters.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.4 +CGSN

Request product serial number identification

Command	Possible Response
+CGSN	<sn> *+CME ERROR: <err>*
+CGSN=?	

Description

This command is used to obtain the manufacturer international Mobile Equipment Identity (IMEI).

Parameter

<sn> the total number of characters, including line terminators, in the information text shall not exceed 2048 characters.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.5 +CSCS

Select TE Character Set

Command	Possible Response
+CSCS=<□ rece>	OK ERROR
+CSCS?	+CSCS: <□ rece>
+CSCS=?	+CSCS: (list of supported <□ rece>s)

Description

This command is used to select the terminal equipment character set.

Parameter

<□ rece>	Description
“GSM”	GSM default alphabet; this setting causes easily software flow control (XON/XOFF) problems.
“UCS2”	16-bit universal multi-octet coded character set; 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, $(AT R97)$

Table 1 Character Set

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.6 +CIMI

Request international mobile Subscriber identity

Command	Possible Response
+CIMI	<IMSI> *+CME ERROR: <err>*
+CIMI=?	

Description

This command is used to obtain the International Mobile subscriber Identity (IMSI) value assigned to the SIM.

Parameter

<IMSI> International Mobile Subscriber Identity (string without double quotes)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.7 +GCAP

Request complete TA capabilities list

Command	Possible Response
+GCAP	+GCAP: <name>
+GCAP=?	

Description

TA returns a list of additional capabilities.

Parameter

<name> “+CGSM +FCLASS”

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.8 ITU-T V.25ter generic TA control commands

Command	Impl.	Use in GSM
Z[<value>]	mand.	TA sets all parameters to their defaults as specified by a user memory profile or by the manufacturer, and resets TA
&F[<value>]	mand.	TA sets all parameters to their defaults as specified by the manufacturer
I[<value>]	opt.	request manufacturer specific information about the TA (software cannot use this command to determine the capabilities of a TA)
+GMI	mand.	Request TA manufacturer identification (may equal to +CGMI)
+GMM	mand.	Request TA model identification (may equal to +CGMM)
+GMR	mand.	Request TA revision identification (may equal to +CGMR)
+GCAP	mand.	Request overall capabilities of TA; the response code for TA building on the present document shall be +CGSM

Table 2 ITU-T V.25ter generic TA control commands

2.9 Z

Reset to default configuration

Command	Possible Response
Z[<profile>]	*+CME ERROR: <err>*

Description

Set all DCE parameters to their defaults stored in a non-volatile profile.

Parameter

<profile> (0-1);ID of a profile stored in non-volatile storage (default 0)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.10 &F

Set to factory-defined configuration

Command	Possible Response
&F[<set>]	*+CME ERROR: <err>*

Description

Set all DCE parameters to default values defined by the manufacturer.

Parameter

<set> ID of default values

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.11 I

Request identification information

Command	Possible Response
I[<elem>]	*+CME ERROR: <err>*

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.

Parameter

<elem> (0-1); ID of an information element (default 0)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.12 S

Set register

Command	Possible Response
S<reg id>=<reg value> Or S<reg id>	<reg value> *+CME ERROR: <err>*

Description

Sets a register which controls the operation of the DCE.

Parameter

<reg id> ID of a register
0,2,3,4,5,6,7,8,10,11

<reg value>

Register	Description
S0	(0-255); Automatic answer 0 disabled (default) 1-255 Number of RINGs until automatic answer
S2	(0-255); AT Escape Character 43 character '+' (default)
S3	(0-127); Command line termination character 13 CR (default)
S4	(0-127); Response formatting character 10 LF (default)
S5	(0-127); Command line editing character

	8 BS (default)
S6	(2-10); Pause before blind dialing, in seconds 2 (default)
S7	(1-255); Connection completion timeout, in seconds 60 (default)
S8	(0-255); Comma dial modifier time, in seconds 2 (default)
S10	(1-254); Automatic disconnect delay, in tenths of seconds 20 (default)
S11	(50-150); Length of DTMF tone duration, in milliseconds 95 (default)

Table 3 S-register Description

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.13 E

Command echo

Command	Possible Response
E[<value>]	*+CME ERROR: <err>*

Description

This command determines whether the MT will echo characters received from TE during command state and on-line command state.

Parameter

<value> Echo ON/OFF
0 off
1 on (default)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.14 Q

Result code suppression

Command	Possible Response
Q[<value>]	*+CME ERROR: <err>*

Description

This command determines whether the MT need to transmit result codes to TE.

Parameter

<value>
0 off (default)
1 on

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.15 V

DCE response format

Command	Possible Response
V[<value>]	*+CME ERROR: <err>*

Description

This command determines the content of header and trailer transmitted with result code and information responses. In other words, it selects either verbose or numeric from.

Parameter

<value>
0 numeric
1 alphabetic (default)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.16 X

Result code selection and call progress monitoring control

Command	Possible Response
X[<value>]	*+CME ERROR: <err>*

Description

This command determines whether or not the MT transmits particular result code to TE other than simply CONNECT result code.

Parameter

<value>
0 CONNECT, dial and busy disabled (default)
1 CONNECT <text>, dial and busy disabled
2 CONNECT <text>, dial enabled, busy disabled
3 CONNECT <text>, dial disabled, busy enabled
4 CONNECT <text>, dial enabled and busy enabled

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.17 &C

Circuit 109 behavior

Command	Possible Response
&C[<value>]	*+CME ERROR: <err>*

Description

This command determines the behavior of carrier detect. This command is ignored now by MT and is included for compatibility reason since DCD behavior should follow the specification that MT/TE runs.

Parameter

<value>

0 always ON

1 in accordance with underlying DCE (default)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.18 &D

Circuit 108 behavior

Command	Possible Response
&D[<value>]	*+CME ERROR: <err>*

Description

This command determines the behavior of MT in response to DTR state change in TE side. This command is ignored now by MT and is included for compatibility reason since DCD behavior should follow the specification that MT/TE runs.

Parameter

<value>

0 ignored (default)

1 enters online command state and issues an OK result code, a call remains connected

2 instructs the DCE to perform an orderly tear down of a call

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

2.19 Result Codes

Command	Command Description
OK	Acknowledges execution of a command
CONNECT	Connection is established and DCE is moving from Command state to Online Data state

RING	DCE has detected an incoming call signal from network
NO CARRIER	The connection is terminated or attempt to establish the connection failed
ERROR	Command not recognized, command line maximum length exceeded, parameter value invalid, or other problem with processing the command line
NO DIALTONE	No dial tone detected
BUSY	Engaged (busy) signal detected
NO ANSWER	"@" (Wait for Quiet Answer) dial modifier was used, but remote ringing followed by five seconds of silence was not detected before expiration of the connection timer (S7)
CONNECT <text>	Same as CONNECT, but includes manufacturer-specific text that may specify speed, line speed, error control, data compression, or other status
SIM READY	Inform the SIM enabled.
SIM NOT PRESENT	Inform the SIM not present.
SIM BLOCK	Inform the SIM Block Status.
GMPRS DISCONNECT	GMPRS indicate disconnect.

Table 4 Result Codes

3 Call Control Commands

3.1 +CSTA

Select type of address

Command	Possible Response
+CSTA=[<type>]	
+CSTA?	+CSTA: <type>
+CSTA=?	+CSTA: (list of supported <type>s)

Description

This command is used to select the type of number to be used for further dialing commands.

Parameter

<type> type of address octet in integer format (refer GSM 04.08 [8] subclause 10.5.4.7);

default 129

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.2 ITU-T V.25ter [14] dial command D

V.25ter [14] dial command D lists characters that may be used in a dialing string for making a call or controlling supplementary services in accordance with GSM 02.03 [19]. Their use in GSM is listed in this subclause, as well as new dial modifiers applicable only to GSM are introduced. For a ME supporting AT commands only, it is mandatory to support the control of supplementary services in accordance with GSM 02.03 through the dial command or through the specific supplementary service commands (+CCFC, +CLCK, etc.), where GSM 02.03 identifies the supplementary services as mandatory.

V.25ter recede digits

`1 2 3 4 5 6 7 8 9 0 * # + A B C` (implementation of these characters is mandatory for GSM)

`D` (implementation of this character is optional for GSM, and it is ignored)

V.25ter modifier characters

`,` (implementation of this character is mandatory for GSM, but it may be ignored)

`T P` (implementation of these characters is mandatory for GSM, but they are ignored)

`! W @` (implementation of these characters is optional for GSM, and they are ignored)

V.25ter semicolon character

In GSM, when semicolon character is given after recede digits (or modifiers), a voice call originated to the given address. TA returns to command state immediately (or after possible `+COLP` result code; refer subclause “Connected line identification presentation +COLP”). Refer Annex G for a detailed example.

GSM modifier characters

> (refer subclause “Direct recede from phonebooks”)
I or i (override the CLIR supplementary service subscription default value for this call; I = invocation (restrict CLI presentation) and i = suppression (allow CLI presentation); refer subclause “Calling line identification restriction +CLIR”)
G or g (control the CUG supplementary service information for this call; uses index and info values set with command +CCUG; refer subclause “Closed user group +CCUG”)

3.3 Direct dialing from phonebooks

GSM ME and SIM can contain phonebooks which have a phone number and an alphanumeric field for each phonebook entry location. Available memories may be queried with Select Phonebook Storage test command +CPBS=?, and location range for example with Read Phonebook Entries test command +CPBR=?.

Execute commands

1. D>*mem*<n>	originate call to phone number in memory *mem* entry location <n> (available memories may be queried with Select Phonebook Storage test command +CPBS=?; *mem* could be e.g. ME)
2. D><n>	originate call to phone number in entry location <n> (it is manufacturer specific which memory storage of ME, SIM and TA is used; command Select Phonebook Memory Storage +CPBS setting is recommended to be used)

Responses

Possible error responses include +CME ERROR: <err> when error is related to ME functionality. Refer subclause 9.2 for possible error values. Otherwise TA responses can have values defined by V.25ter [14] and commands Service Reporting Control +CR and Connected Line Identification Presentation +COLP. Detailed error report of an unsuccessful originated call failed in a GSM network error can be obtained with command Extended Error Report +CEER (if implemented).

<n> integer type memory location should be in the range of locations available in the memory used

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.4 T

Select tone dialing

Command	Possible Response
T	OK ERROR

Description

Causes subsequent D commands to assume that DTMF dialing is to be used unless otherwise specified. Command has no effect in SAT.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.5 P

Select pulse dialing

Command	Possible Response
P	OK ERROR

Description

Causes subsequent D commands to assume that pulse dialing is to be used unless otherwise specified. Command has no effect in SAT.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.6 A

Answer

Command	Possible Response
A	CONNECT CONNECT <text> NO CARRIER OK *+CME ERROR: <err>*

Description

This command instructs the DCE to immediately connect to the line and start the answer sequence as specified for the underlying DCE. Any additional commands that appear after A on the same command line are ignored.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.7 H

Hook control

Command	Possible Response
H[<value>]	

Description

This command instructs the DCE to disconnect from the line, terminating any call in progress. All of the functions of the command shall be completed before the DCE issues any result code.

Parameter

<value>
0 Disconnect and terminate call

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.8 O

Return to online data state

Command	Possible Response
O[<value>]	CONNECT CONNECT <text> NO CARRIER OK *+CME ERROR: <err>*

Description

This command switches from on-line command mode to in-line data during an active call.

Parameter

<value>
0 Return to online data state from online command

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.9 L

Monitor speaker loudness

Command	Possible Response
L[<value>]	*+CME ERROR: <err>*

Description

Control the volume of the monitor speaker. This command has no effect.

Parameter

<value> Speaker volume
0 low (default)
1 low
2 medium
3 high

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.10 M

Monitor speaker mode

Command	Possible Response
M[<value>]	*+CME ERROR: <err>*

Description

Controls when the monitor speakers is on. This command has no effect.

Parameter

<value> Speaker is
0 always off (default)
1 on until DCE informs DCE that carrier has been detected
2 always on when DCE is off-hook

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.11 +CMOD

Call mode

Command	Possible Response
+CMOD=[<mode>]	
+CMOD?	+CMOD: <mode>
+CMOD=?	+CMOD: (list of supported <mode>s)

Description

Set command selects the call mode of further dialing commands (D) or for next answering command (A). Mode can be either single or alternating.

Parameter

<mode>
0 single mode
1 alternating voice/fax (teleservice 61)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.12 +CHUP

Hangup call

Command	Possible Response
+CHUP	
+CHUP=?	

Description

Execution command causes the TA to hang up the current SAT call of the ME.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.13 +CBST

Select bearer service type

Command	Possible Response
+CBST=[<speed>[,<name>[,<ce>]]]	
+CBST?	+CBST: <speed>,<name>,<ce>
+CBST=?	+CBST: (list of supported <speed>s), (list of supported <name>s), (list of supported <ce>s)

Description

Set command selects the bearer service <name> with data rate <speed>, and the connection element <ce> to be used when data calls are originated. Values may also be used during mobile terminated data call setup, especially in case of single numbering scheme calls.

Parameter

<speed>

0	autobauding (automatic selection of the speed; this setting is possible in case of 3.1 kHz modem and non-transparent service)
1	300 bps (V.21)
2	1200 bps (V.22)
3	1200/75 bps (V.23)
4	2400 bps (V.22bis)
5	2400 bps (V.26ter)
6	4800 bps (V.32)
7	9600 bps (V.32)
12	9600 bps (V.34)
14	14400 bps (V.34)
15	19200 bps (V.34)
16	28800 bps (V.34)
34	1200 bps (V.120)
36	2400 bps (V.120)
38	4800 bps (V.120)
39	9600 bps (V.120)
43	14400 bps (V.120)
47	19200 bps (V.120)
48	28800 bps (V.120)
49	38400 bps (V.120)
50	48000 bps (V.120)
51	56000 bps (V.120)
65	300 bps (V.110)

66 1200 bps (V.110)
68 2400 bps (V.110 or X.31 flag stuffing)
70 4800 bps (V.110 or X.31 flag stuffing)
71 9600 bps (V.110 or X.31 flag stuffing)
75 14400 bps (V.110 or X.31 flag stuffing)
79 19200 bps (V.110 or X.31 flag stuffing)
80 28800 bps (V.110 or X.31 flag stuffing)
81 38400 bps (V.110 or X.31 flag stuffing)
82 48000 bps (V.110 or X.31 flag stuffing)
83 56000 bps (V.110 or X.31 flag stuffing)
115 56000 bps (bit transparent)
116 64000 bps (bit transparent)
supported <speed> is 6,7.

<name>
0 data circuit asynchronous (UDI or 3.1 kHz modem)
1 data circuit synchronous (UDI or 3.1 kHz modem)
2 PAD Access (asynchronous) (UDI)
3 Packet Access asynchronous (UDI)
4 data circuit asynchronous (RDI)
5 data circuit synchronous (RDI)
6 PAD Access (asynchronous) (RDI)
7 packet Access (synchronous) (RDI)
supported <name> is 0

<ce>
0 transparent
1 non-transparent
2 both, transparent preferred
3 both, non-transparent preferred
supported <ce> is 1

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.14 +CRLP

Radio link protocol

Command	Possible Response
+CRLP=[<iws>[,<mws>[,<T1>[,<N2>[,<ver>[,<T4>]]]]]]	
+CRLP?	+CRLP: <iws>,<mws>,<T1>,<N2>[,<ver1>,[,<T4>]] [<CR><LF>+CRLP: <iws>,<mws>,<T1>,<N2>[,<ver2>[,<T4>]] […]]
+CRLP=?	+CRLP: (list of supported <iws>s), (list of supported <mws>s), (list of supported <T1>s), (list of supported <N2>s)[,<ver1>[,(list of supported <T4>s)]] [<CR><LF>+CRLP: (list of supported <iws>s), (list of supported

	<mws>s), (list of supported <T1>s), (list of supported <N2>s) [,<ver1>[,(list of supported <T4>s)]] […]]

Description

Radio link protocol (RLP) parameters used when non-transparent data calls are originated may be altered with set command. Available command sub-parameters depend on the RLP versions implemented by the device.

Parameter

<ver>, <verx> RLP version number in integer format; when version indication is not present it shall equal 0

<iws>, <mws>, <T1>, <N2>, <T4> IWF to MS window size, MS to IWF windows size, acknowledgement timer T1, retransmission attempts N2, re-sequencing period T4 in integer format (default values and value ranges depend on RLP version; refer GSM 04.22 [18]): T1 and T4 are in units of 10 ms

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.15 +CR

Service reporting control

Command	Possible Response
+CR=[<mode>]	
+CR?	+CR: <mode>
+CR=?	+CR: (list of supported <mode>s)

Description

Set command controls whether or not intermediate result code +CR: <serv> is returned from the TA to the TE. If enable, the intermediate result code is transmitted at the point during connect negotiation at which the TA has determined which speed and quality of service will be used, before any error control or data compression reports are transmitted, and before the intermediate result code CONNECT is transmitted.

Parameter

<mode>
- 0 disables reporting
- 1 enables reporting

<serv>
- ASYNC asynchronous transparent
- SYNC synchronous transparent
- REL ASYNC asynchronous non-transparent
- REL SYNC synchronous non-transparent

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.16 +CEER

Extended error report

Command	Possible Response
+CEER	+CEER: <report>
+CEER=?	

Description

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

- the failure in the last unsuccessful call setup or in-ca;; modification;
- the last call releases;

Parameter

<report> the total number of characters, including line terminators, in the information text shall not exceed 2041 characters

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.17 +CRC

Set Cellular Result Codes for incoming call indication

Command	Possible Response
+CRC=[<mode>]	
+CRC?	+CRC: <mode>
+CRC=?	+CRC: (list of supported <mode>s)

Description

Set command controls whether or not the extended format of incoming call indication or GMPRS networks request for PDP context activation is used. When enabled, an incoming call is indicated to the TE with unsolicited result code +CRING: <type> instead of the normal RING.

Parameter

<mode>

0 disables extended format
1 enables extended format

<type>

ASYNC	asynchronous transparent
SYNC	synchronous transparent
REL ASYNC	asynchronous non-transparent

REL SYNC	synchronous non-transparent
FAX	facsimile (TS 62)
VOICE	normal voice (TS 11)
VOICE/*XXX*	voice followed by data (BS 81) (*XXX* is ASYNC, SYNC, REL ASYNC or REL SYNC)
ALT VOICE/*XXX*	alternating voice/data, voice first (BS 61)
ALT *XXX*/VOICE	alternating voice/data, data first (BS 61)
ALT VOICE/FAX	alternating voice/fax, voice first (BS 61)
ALT FAX/VOICE	alternating voice/fax, fax first (BS 61)

GMPRS <PDP_type>, <PDP_addr>[,<L2P>] GMPRS networks request for PDP context activation

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.18 +CSNS

Single numbering scheme

Command	Possible Response
+CSNS=[<mode>]	
+CSNS?	+CSNS: <mode>
+CSNS=?	+CSNS: (list of supported <mode>s)

Description

Set command selects the bearer or teleservice to be used when mobile terminated single numbering scheme call is established. Parameter values set with +CBST command shall be used when <mode> equals to a data service.

Parameter

<mode>

0	voice
1	alternating voice/fax (TS 61)
2	fax (TS 62)
3	alternating voice/data, voice first (BS 61)
4	data
5	alternating voice/fax, fax first (TS 61)
6	alternating voice/data, data first (BS 61)
7	voice followed by data (BS 81)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.19 +CVHU

Voice Hang Up control

Command	Possible Response
+CVUH=[<mode>]	
+CVUH?	+CVUH: <mode>
+CVUH=?	+CVUH: (list of supported <mode>s)

Description

Set Command selects whether ATH or “drop DTR” shall cause a voice connection to be disconnected or not. By voice connection is also meant alternating mode calls that are currently in voice mode.

Parameter

<mode>

0 “Drop DTR” ignored but OK response given. ATH disconnects.
1 “Drop DTR” and ATH ignored but OK response given.
2 “Drop DTR” behaviour according to &D setting. ATH disconnects.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

3.20 ITU-T V.25ter [14] call control commands

Command	Impl.	Use in GSM
D[<dial_string>] [;]	mand.	Originates a call
T	mand.	Ignored (select tone dialing)
P	mand.	Ignored (select pulse dialing)
A	mand.	Answer a call
H[<vaule>]	mand.	Hang-up a single mode call; for alternate mode call refer subclause ”Hangup call +CHUP” (only value equal to zero needed)
O[<vaule>]	mand.	Returns TA to online data state from online command mode (only value equal to zero needed)
S0=[<vaule>]	mand.	Sets the number of call indications (rings) before automatically answer the call; value equaling zero disables automatic answering and is the default.
S6=[<vaule>]	mand.	Ignored (pause before blind dialing)
S7=[<vaule>]	mand.	Sets number of seconds to wait for completion of call answering or originating procedure before giving up and disconnecting
S8=[<vaule>]	mand.	Sets number of seconds to wait when comma dial modifier encountered in dial string of D command (default is 2 seconds)
S10=[<vaule>]	mand.	Sets number of tenths of seconds to wait before disconnecting after TA has indicated the absence of received line signal
L[<vaule>]	mand.	Ignored (monitor speaker loudness)
M[<vaule>]	mand.	Ignored (monitor speaker mode)

Table 5 ITU-T V.25ter call control commands

4 Network services Commands

4.1 +CNUM

Subscriber number

Command	Possible Response
+CNUM	+CNUM: [<alpha1>],<number1>,<type1> [<CR><LF>+CNUM: [<alpha2>],<number2>,<type2> […]] *+CME ERROR: <err>*
+CNUM=?	

Description

Set command returns the MSISDN related to the subscriber (this information can be stored in the SIM or in the ME). If subscriber has different MSISDN for different services, each MSISDN is returned in a separate line.

Parameter

<alphax> optional alphanumeric string associated with <numberx>; used character set should be the one selected with command Select TE Character Set +CSCS

<numberx> string type phone number of format specified by <type>

<typex> type of address octet in integer format

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.2 +CREG

Network registration

Command	Possible Response
+CREG=[<n>]	
+CREG?	+CREG : <n>,<stat>[,<lac>,<ci>] *+CME ERROR : <err>*
+CREG=?	+CREG: (list of supported <n>s)

Description

Set command controls the presentation of an unsolicited result code +CREG: <stat> when <n>=1 and there is a change in the ME network registration status, or code +CREG: <stat>[,<lac>,<ci>] when <n>=2 and there is a change of the network cell.

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 ME. Location

information elements <lac> and <ci> are returned only when <n>=2 and ME is registered in the network.

Parameter

<n>

0	disable network registration unsolicited result code
1	enable network registration unsolicited result code +CREG: <stat>
2	enable network registration and location information unsolicited result code +CREG: <stat>[,<lac>,<ci>]

<stat>

0	not registered, ME is not currently searching a new operator to register to
1	registered, home network
2	not registered, but ME is currently searching a new operator to register to
3	registration denied
4	unknown
5	registered, roaming
6	alerting status

<lac> string type; two byte location area code in hexadecimal format

<ci> string type; two byte cell ID in hexadecimal format

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.3 +COPS

Operator selection

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

Description

Set command forces an attempt to select and register the GSM network operator. <mode> is used to select whether the selection is done automatically by the ME or is forced by this command to operator <oper> (it shall be given in format <format>). If the selected operator is not available, no other operator shall be selected (except <mode>=4).
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. Refer subclause 9.2 for possible <err> values. This command should be abortable when registration/deregistration attempt is made.

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

Test command returns a list of quadruplets, each representing an operator present in the network. Quadruplet consists of an integer indicating the availability of the operator <stat>, long and short alphanumeric format of the name of the operator, and numeric format representation of the operator. 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, 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.

Parameter

<mode>
- 0 automatic (<oper> field is ignored)
- 1 manual (<oper> field shall be present)
- 2 deregister from network
- 3 set only <format> (for read command +COPS?), do not attempt registration/deregistration (<oper> field is 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
- 5 PLMN List request is stopped (This function is for SAT)
- 6 Sat registration
- 7 Sat Registration Stop

<format>
- 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 up to 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 GSM 04.08 [8] subclause 10.5.1.3) which consists of a three BSD digit country code coded as in ITU-T E.212 Annex A [10], 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 2) (network code digit 1)

<stat>
- 0 unknown
- 1 available
- 2 current
- 3 forbidden

	SG2520	SO2510	SM2500

Supported	✓	✓	✓

4.4 +CLCK

Facility lock

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

Description

Execute command is used to lock, unlock or interrogate a ME 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>. Refer subclause 9.2 for possible <err> values.
This command should be abortable when network facilities are set or interrogated.
Call barring facilities are based on GSM supplementary services (refer GSM 02.88 [6]). The interaction of these with other commands based on other GSM supplementary services is described in the GSM standard.

Parameter

<fac>

“SC”	SIM (lock SIM card) (SIM asks password in ME power-up and when this lock command and issued)
“AO”	BAOC (Barr All Outgoing Calls)
“OI”	BOIC (Barr Outgoing International Calls)
“OX”	BOIC-exHC (Barr Outgoing International Calls except to Hone Country)
“AI”	BAIC (Barr All Incoming Calls)
“IR”	IBC-Roam (Barr Incoming Calls when Roaming outside the home country)
“FD”	SIM fixed dialing memory feature (if PIN2 authentication has not been done during current session, PIN2 is required as <passwd>)
“AB”	All Barring services (applicable only for <mode>=0)
“AG”	All outGoing barring services (applicable only for <mode>=0)
“AC”	All inComing barring services (applicable only for <mode>=0)

<mode>

0	unlock
1	lock
2	query status

<status>

0	not active
1	active

<passwd> string type; shall be the same as password specified for facility from the ME user interface or with command Change Password +CPWD

<classx> is a sum of integers each representing a class of information (default 7):
1 voice (telephony)
2 data (refer to all bearer services; with <mode>=2 this may refer only to some bearer service if TA does not support value 16, 32, 64, 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

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.5 +CPWD

Change passwd

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

Description

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

Parameter

<fac>
"P2" SIM PIN2
refer Facility Lock +CLCK for other value
<oldpwd>,<newpwd> string type; <oldpwd> shall be the same as password specified for the facility from the ME 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 type maximum length of the password for the facility

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.6 +CLIP

Calling line identification presentation

Command	Possible Response
+CLIP=<n>	
+CLIP?	+CLIP: <n>,<m>
+CLIP=?	+CLIP: list of supported (<n>)s

Description

This command refers to the GSM supplementary service CLIP (Calling Line Identification Presentation) that enables a called subscriber to get the calling line identity (CLI) of the calling party when receiving a mobile terminated call. Set command enables or disables the presentation of the CLI at the TE. It has no effect on the execution of the supplementary service CLIP in the network.

When the presentation of the CLI at the TE is enabled (and calling subscriber allows), +CLIP: <number>,<type>[,<subaddr>,<satype>[,[<alpha>][,<CLI validity>]]] response is returned after every RING (or +CRING: <type>; refer subclause "Cellular result codes +CRC") result code sent from TA to TE. It is manufacturer specific if this response is used when normal voice call is answered.

Parameter

<n>
- 0 disable
- 1 enable

<m>
- 0 CLIP not provisioned
- 1 CLIP provisioned
- 2 unknown

<number> string type phone number of format specified by <type>

<type> type of address octet in integer format

<subaddr> string type sub-address of format specified by <sattype>

<sattype> type of sub-address octet in integer format

<alpha> optional string type alphanumeric representation of <number> corresponding to the entry found in phonebook; used character set should be the one selected with command Select TE Character Set +CSCS

<CLI validity>
- 0 CLI valid
- 1 CLI has been with held by the originator

2 CLI is not available due to interworking problems or limitations of originating network

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.7 +CLIR

Calling line identification restriction

Command	Possible Response
+CLIR=<n>	
+CLIR?	+CLIP: <n>,<m>
+CLIR=?	+CLIP: list of supported (<n>)s

Description

This command refers to CLIR-service according to GSM 02.81 [3] that allows a calling subscriber to enable or disable the presentation of the CLI to the called party when originating a call.

Set command overrides the CLIR subscription (default is restricted or allowed) when temporary mode is provisioned as a default adjustment for all following outgoing calls. This adjustment can be revoked by using the opposite command. If this command is used by a subscriber without provision of CLIR in permanent mode the network will act according
GSM 02.81 [3].

Parameter

<n>

0 presentation indicator is used according to the subscription of the CLIP service
1 CLIR invocation
2 CLIR suppression

<m>

0 CLIR not provisioned
1 CLIR provisioned in permanent mode
2 unknown
3 CLIR temporary mode presentation restricted
4 CLIR temporary mode presentation allowed

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.8 +COLP

Connected line identification presentation

Command	Possible Response
+COLP=<n>	

+COLP?	+COLP: <n>,<m>
+COLP =?	+COLP: list of supported (<n>)s

Description

This command refers to the GSM supplementary service COLP (Connected Line Identification Presentation) that enables a calling subscriber to get the connected line identity (COL) of the called party after setting up a mobile originated call. The command enables or disables the presentation of the COL at the TE. It has no effect on the execution of the supplementary service COLR in the network.

When enabled (and called subscriber allows), +COLP: <number>,<type>[,<subaddr>,<satype> [,<alpha>]] intermediate result code is returned from TA to TE before any +CR or V.25ter [14] responses. It is manufacturer specific if this response is used when normal voice call is established.

Parameter

<n>
- 0 disable
- 1 enable

<m>
- 0 COLP not provisioned
- 1 COLP provisioned
- 2 unknown

<number>,<type>,<subaddr>,<sattype>,<alpha>: refer +CLIP

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.9 +COLR

Connected line identification restriction

Command	Possible Response
+COLR=<n>	
+COLR?	+COLR: <n>,<m>
+COLR =?	+COLR: list of supported (<n>)s

Description

It has no effect on the execution of the supplementary service COLR in the network.

Parameter

<n>
- 0 presentation indicator is used according to the subscription of the COLP service
- 1 COLR invocation

2 COLR suppression

<m>
0 COLR not provisioned
1 COLR provisioned in permanent mode
2 unknown
3 COLR temporary mode presentation restricted
4 COLR temporary mode presentation allowed

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.10 +CCUG

Closed user group

Command	Possible Response
+CCUG=[<n>[,<index>[,<info>]]]	
+CCUG?	+CCUG: <n>,<index>,<info>
+CCUG =?	

Description

This command allows control of the Closed User Group supplementary service (refer GSM 02.85 [21]). Set command enables the served subscriber to select a CUG index, to suppress the Outgoing Access (OA), and to suppress the preferential CUG.

Set command with <n>=1 enables to control the CUG information on the air interface as a default adjustment for all following outgoing calls. The interaction of this command with other commands based on other GSM supplementary services is described in the GSM standard.

Parameter

<n>
0 disable CUG temporary mode
1 enable CUG temporary mode

<index>
0…9 CUG index
10 no index

<info>
0 no information
1 suppress OA
2 suppress preferential CUG
3 suppress OA and preferential CUG

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.11 +CCFC

Call forwarding number and conditions

Command	Possible Response
+CCFC=<reason>,<mode>[,<number>[,<type>[,<class>[,<subaddr>[,<satype>[,<time>]]]]]]	*+CME ERROR: <err>* **when <mode>=2 and command successful:** +CCFC: <status>,<class1>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]] [<CR><LF>+CCFC: <status>,<class2>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]][…]]
+CCFC?	+CCFC: (list of supported <reason>s)

Description

This command allows control of the call forwarding supplementary service according to GSM 02.82 [4]. Registration, erasure, activation, deactivation, and status query are supported. 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>.

Parameter

<reason>

0	unconditional
1	mobile busy
2	no reply
3	not reachable
4	all call forwarding
5	all conditional call forwarding

<mode>

0	disable
1	enable
2	query status
3	registration
4	erasure

<number> string type phone number of forwarding address in format specified by <type>

<type> type of address octet in integer format; default 145 when dialing string includes international access code character “+”, otherwise 129

<subaddr> string type sub-address of format specified by <satype>

<satype> type of sub-address octet in integer format

<classx> is a sum of integers each representing a class of information (default 7)

1	voice (telephony)

2 data (refer 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

<time>

1…30 when “no reply” is enabled or queried, this gives the time in seconds to wait before call is forwarded, default value 20

<status>
0 not active
1 active

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.12 +CCWA

Call waiting

Command	Possible Response
+CCWA=[[<n>][, <mode>][, <class>]]	*+CME ERROR: <err>* **when <mode>=2 and command successful:** +CCWA: <status>,<class1> [<CR><LF>+CCWA: <status>,<class2> […]]
+CCWA?	+CCWA: <n>
+CCWA=?	+CCWA: (list of supported <n>s)

Description

This command allows control of the Call Waiting supplementary service according to GSM 02.83 [5]. Activation, deactivation and status query are supported. 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>. Parameter <n> is used to disable/enable the presentation of an unsolicited result code +CCWA: <number>,<type>,<class>,[<alpha>][,<CLI validity>] to the TE when call waiting service is enabled. Command should be abortable when network is interrogated.

The interaction of this command with other commands based on other GSM supplementary services is described in the GSM standard.

Parameter

<n>

0 disable
1 enable

<mode>
0 disable
1 enable
2 query status

<classx> is a sum of integers each representing a class of information (default 7):
1 voice (telephony)
2 data (refer to all bearer services; with <mode>=2 this may refer only to some bearer service if TA does not support value 16, 32, 64, 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

<status>
0 not active
1 active

<number> string type phone number of format specified by <type>

<type> type of address octet in integer format

<alpha> optional string type alphanumeric representation of <number> corresponding to the entry found in phonebook; used character set should be the one selected with command Select TE Character Set +CSCS

<CLI validity>
0 CLI valid
1 CLI has been with held by the originator
2 CLI is not available due to interworking problems or limitations of originating network

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.13 +CHLD

Call related supplementary services

Command	Possible Response
+CHLD=[<n>]	*+CME ERROR: <err>*
+CHLD=?	+CHLD: (list of supported <n>s)

Description

This command allows the control of the following call related services:

- a call can be temporarily disconnected from the ME but the connection is retained by the network
- multiparty conversation (conference calls)
- the served subscriber who has two calls (one held and the other either active or alerting) can connect the other parties and release the served subscriber's own connection

Calls can be put on hold, recovered, released, added to conversation, and transferred similarly as defined in GSM 02.30 [19].

This is based on the GSM supplementary services HOLD (Call Hold; refer GSM 02.83 [5] clause 2), MPTY (MultiParty; refer GSM 02.84 [22]) and ECT (Explicit Call Transfer; refer GSM 02.91 [29]). The interaction of this command with other commands based on other GSM supplementary services is described in the GSM standard.

Parameter

<n> integer type; equals to numbers entered before SEND button is GSM 02.30 [19] subclause 4.5.5.1

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.14 +CUSD

Unstructured supplementary service data

Command	Possible Response
+CUSD=[<n>[,<str>[,<dcs>]]]	*+CME ERROR: <err>*
+CUSD?	+CUSD: <n>
+CUSD=?	+CUSD: (list of supported <n>s)

Description

Both network and mobile initiated operations are supported. Parameter <n> is used to disable/enable the presentation of an unsolicited result code +CUSD: <m>[,<str>,<dcs>] to the TE. In addition, value <n>=2 is used to channel an ongoing USSD session.

Parameter

<n>

0 disable the result code presentation in the TA
1 enable the result code presentation in the TA
2 cancel session

<str> string type USSD-string

- if <dcs> indicates that GSM 03.38 [25] default alphabet is used:

- if TE character set other than “HEX”: ME/TA converts GSM alphabet into current TE character set according to rules of GSM 07.05 [24] Annex A
- if TE character set is “HEX”: ME/TA converts each 7-bit character of GSM alphabet into two IRA character long hexadecimal number is presented as 17

- if <dcs> indicates that 8-bit data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number

<dcs> GSM 03.28 [25] Cell Broadcast Data Coding Scheme in integer format (default 0)

<m>

0	no further user action required
1	further user action required
2	USSD terminated by network
3	other local client has responded
4	operation not supported
5	network time out

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.15 +CAOC

Advice of Charge

Command	Possible Response
+CAOC[=<mode>]	[+CAOC: <ccm>] *+CME ERROR: <err>*
+CAOC?	+CAOC: <mode>
+CAOC=?	[+CAOC: (list of supported <mode>s)]

Description

This refers to Advice of Charge supplementary service (GSM 02.24 [26] and GSM 02.86 [27]) that enables subscriber to get information about the cost of calls. With <mode>=0, the execute command returns the current call meter value from the ME.

This command also includes the possibility to enable an unsolicited event reporting of the CCM information. The unsolicited result code +CCCM: <ccm> is sent when the CCM value changes, but not more that every 10 seconds. Deactivation of the unsolicited event reporting is made with the same command.

It is recommended (although optional) that the test command returns the supported mode values.

Parameter

<mode>

0 query CCM value
1 deactivate the unsolicited reporting of CCM value
2 activate the unsolicited reporting of CCM value

<ccm> string type; three bytes of the current call meter value in hexadecimal format; value is in home units and bytes are similarly coded as ACM max value in the SIM

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.16 +CSSN

Supplementary service notifications

Command	Possible Response
+CSSN=[<n>[,<m>]]	
+CSSN?	+CSSN: <n>,<m>
+CSSN=?	+CSSN: (list of supported <n>s), (list of supported <m>s)

Description

This command refers to supplementary service related network initiated notifications. The set command enables/disables the presentation of notification result codes from TA to TE.

When <n>=1 and a supplementary service notification is received after a mobile originated call setup, intermediate result code +CSSI: <code1>[,<index>] is sent to TE before any other MO call setup result codes presented in the present document or in V.25ter [14]. When several different <code1>s are received from the network, each of then shall have its own +CSSI result code.

When <m>=1 and a supplementary service notification is received during a mobile terminated call setup or during a call, or when a forward check supplementary service notification is received, unsolicited result code +CSSU: <code2>[,<index>[,<number>,<type>[,<subaddr>, <satype>]]] is sent to TE. In case of MT call setup, result codes sent after every +CLIP result code and when several different <code2>s are received from the network, each of then shall have its own +CSSU result code.

Parameter

<n>
0 disable
1 enable

<m>
0 disable
1 enable

<code1>
0 unconditional call forwarding is active

1 some of the conditional call forwarding are active
2 call has been forwarded
3 call is waiting
4 this is a CUG call (also <index> present)
5 outgoing calls are barred
6 incoming calls are barred
7 CLIR suppression rejected
8 call has been deflected

<index> refer “Closed user group +CCUG”

<codes>
0 this is a forwarded call (MT call setup)
1 this is a CUG call (also <index> present) (MT call setup)
2 call has been put on hold (during a voice call)
3 call has been retrieved (during a voice call)
4 multiparty call entered (during a voice call)
5 call on hold has been released (this is not a SS notification) (during a voice call)
6 forward check SS message received (can be received whenever)
7 call is being connected (alerting) with the remote party in alerting state in explicit call transfer operation (during a voice call)
8 call has been connected with the other remote party in explicit call transfer operation (also number and sub-address parameters may be present) (during a voice call or MT call setup)
9 this is a deflected call (MT call setup)

<number> string type phone number of format specified by <type>

<type> type of address octet in integer format

<subaddr> string type sub-address of format specified by <satype>

<satype> type of sub-address octet in integer format

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.17 +CLCC

List current calls

Command	Possible Response
+CLCC	[+CLSS: <id1>,<dir>,<stat>,<mode>,<mpty>[,<number,<type>[,<alpha>]] [<CR><LF>=CLSS: <id2>,<dir>,<stat>,<mode>,<mpty>[,<number>,<type.[,<alpha>]] […]]] *+CME ERROR: <err>*
+CLCC=?	

Description

Returns list of current calls of ME. If command succeeds but no calls are available, no information response is sent to TE.

Parameter

<idx> integer type; call identification number as described GSM 02.30 [19] subclause 4.5.5.1; this number can be used +CHLD command operations

<dir>
- 0 mobile originated (MO) call
- 1 mobile terminated (MT) call

<stat>
- 0 active
- 1 held
- 2 dialing (MO call)
- 3 alerting (MO call)
- 4 incoming (MT call)
- 5 waiting (MT call)

<mode>
- 0 voice
- 1 data
- 2 fax
- 3 voice followed by data, voice mode
- 4 alternating voice/data, voice mode
- 5 alternating voice/fax, voice mode
- 6 voice followed by data, data mode
- 7 alternating voice/fax, data mode
- 8 alternating voice/fax, fax mode
- 9 unknown

<mpty>
- 0 call is not one of multiparty (conference) call parties
- 1 call is one of multiparty (conference) call parties

<number> string type phone number in format specified by <type>

<type> type of address octet in integer format

<alpha> string type alphanumeric representation of <number> corresponding to the entry found in phonebook; used character set should be the one selected with command Select TE character Set +CSCS

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.18 +CPOL

Preferred operator list

Command	Possible Response
+CPOL=[<index>][,<format>[,<oper>]]	*+CME ERROR: <err>*
+CPOL?	+CPOL: <index1>,<format>,<oper1> [<CR><LF>+CPOL: <index2>,<format>,<oper2> […]] *+CME ERROR: <err>*
+CPOL=?	+CPOL: (list of supported <index>s), (list of supported <format>s) *+CMEE ERROR: <err>*

Description

This command is used to edit the SIM preferred list of networks. Execute command writes an entry in the SIM list of preferred operators (EFPLMNsel). 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.

Read command returns all used entries from the SIM list of preferred operators.

Parameter

<index> integer type; the order number of operator in the SIM preferred operator list

<format>
- 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)

4.19 +COPN

Read operator names

Command	Possible Response
+COPN	+COPN: <numeric1>,<alpha1> [<CR><LF>+COPN: <numeric2>,<alpha2>[…]] *+CME ERROR: <err>*
+COPN=?	

Description

Execute command returns the list of operator names from the ME. Each operator code <numeric*n*> that has an alphanumeric equivalent <alpha*n*> in the ME memory shall be returned.

Parameter

<numeric*n*> string type; operator in number format (see +COPS)

<alpha*n*> string type; operator in long alphanumeric format (see +COPS)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

4.20 +CEOPN

Edit operator names

Command	Possible Response
+CEOPN=<n>[,<numeric>,<alpha>]	*OK* *ERROR* *+CME ERROR: <err>*
+CEOPN	+CEOPN: <n1>,<numeric1>,<alpha1> [<CR><LF>+CEOPN: <n2>,<numeric2>,<alpha2> […]] *+CME ERROR: <err>*
+CEOPN=?	

Description

This command returns the list of operator names from the ME(same +COPN). And then addition function has editing operating list.

Parameter

<n> integer type; operator name index (1-10)

<numeric*n*> string type; operator in numeric format

<alpha*n*> string type; operator in long alphanumeric format

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5 ME control and status Commands

5.1 +CPAS

Phone activity status

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

Description

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

Parameter

<pas>

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

also all other values below 128 are reserved by the present document

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.2 +CPIN

Enter PIN

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

Description

Set command sends to the ME 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 ME and an error message, +CME ERROR, is returned to TE.

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.

Parameter

<pin>,<newpin> string type values

<code> values reserved by the present document

READY	ME is not pending for any password
SIM PIN	ME is waiting SIM PIN to be given
SIM PUK	ME is waiting SIM PUK to be given
PH-SIM PIN	ME is waiting phone-to-SIM card password to be given
PH-FSIM PIN	ME is waiting phone-to-very first SIM card password to be given
PH-FSIM PUK	ME is waiting phone-to-very first SIM card unblocking password to be given
SIM PIN2	ME 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 ME does not block its operation)
SIM PUK2	ME 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 ME does not block its operation)
PH-NET PIN	ME is waiting network personalisation password to be given
PH-NET PUK	ME is waiting network personalisation unblocking password to be given
PH-NETSUB PIN	ME is waiting network subset personalisation password to be given
PH-NETSUB PUK	ME is waiting network subset personalisation unblocking password to be given
PH-SP PIN	ME is waiting service provider personalisation password to be given
PH-SP PUK	ME is waiting service provider personalisation unblocking password to be given
PH-CORP PIN	ME is waiting corporate personalisation password to be given
PH-CORP PUK	ME is waiting corporate personalisation unblocking password to be given

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.3 +CPIN2

Enter PIN

Command	Possible Response
+CPIN2=<pin>[,<newpin>]	*+CME ERROR: <err>*
+CPIN2?	+CPIN2: <code> *+CME ERROR: <err>*
+CPIN2=?	

Description

Set command sends to the ME a password which is necessary before it can be operated (SIM PIN2, SIM PUK2). 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 ME and an error message, +CME ERROR, is returned to TE.

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

Parameter

<pin>,<newpin> string type values

<code> values reserved by the present document

`READY`	ME is not pending for any password
`SIM PIN2`	ME 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 ME does not block its operation)
`SIM PUK2`	ME 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 ME does not block its operation)

Once the required <pin> has been entered correctly, PIN2 authentication code changes to READY. After 200s, a repetition of the authentication process is required (PIN2 authentication code changes from READY to SIM PIN2).

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.4 +CBC

Battery charge

Command	Possible Response
+CBC	+CBC: <bcs>,<bcl> *+CME ERROR: <err>*
+CBC=?	+CBC: (list of supported <bcs>s),(list of supported <bcl>s)

Description

Execution command returns battery connection status <bcs> and battery charge level <bcl> of the ME.

Parameter

<bcs>

0 ME is powered by the battery

1 ME has a battery connected, but is not powered by it

2 ME does not have a battery connected
3 Recognized power fault, calls inhibited

<bcl>
0 battery is exhausted, or ME does not have a battery connected
1…100 battery has 1-100 percent of capacity remaining

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.5 +CSQ

Signal quality

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

Description

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

Parameter

<rssi>
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> (in percent):
0…7 as RXQUAL values in the table in GSM 05.08 [20] subclause 8.2.4
99 not known or not detectable

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.6 +CKPD

Keypad control

Command	Possible Response
+CKPD=<keys>[,<time>[,<pause>]]	*+CME ERROR: <err>*
+CKPD=?	

Description

Execution command emulates ME keypad by giving each keystroke as a character in a string

<keys>. <time>*0.1 seconds is the time to stroke each key and <pause>*0.1 seconds is the length of pause between two strokes. This command should be accepted (OK returned) before actually starting to press the keys. Thus unsolicited result codes of key pressings and display events can be returned.

This command is related Keypad interface for MMI. This command has no effect to SAT.

Parameter

<time>, <pause> 0…255 0… 25.5 seconds (default values are manufacturer specific, but should be so long that a normal ME can handle keystrokes correctly)

<keys> string of characters representing keys as listed in the following table (based on PCCA STD-101 Annex table I-3). Colon character (IRA 58) followed by one character can be used to indicate a manufacturer specific key not listed here. All characters from a semicolon character (IRA 59) to the next single semicolon character are treated as alpha entries and are not converted to key equivalents. All semicolon characters inside alpha entries should be duplicated in the TE and stripped to one before entering to the ME. Pause character (IRA 87 or 119) can be used to pause between key pressings for a time specified by <pause>. All IRA values not listed here are reserved.

Char	IRA (dec)	Comment (+ some known key symbols)
#	35	hash (number sign)
%	37	percent sign (P)
*	42	star (*)
0…9	48…57	number keys
:	58	escape character for manufacturer specific keys
;	59	escape character for string entering
<	60	left arrow
>	62	right arrow
@	64	alpha key (α /ABC)
A/a	65/97	channel A (A)
B/b	66/98	channel B (B)
C/c	67/99	clear display (C/CLR)
D/d	68/100	volume down
E/e	69/101	connection end (END)
F/f	70/102	function (FCN)
L/l	76/108	phone lock (LOCK)
M/m	77/109	menu (MENU)
P/p	80/112	power (PWR)
Q/q	81/113	quiet/mute (MUTE)
R/r	82/114	recall last number (R/RCL/MR)
S/s	83/115	connection start (SEND)
T/t	84/116	store/memory (STO/M/M+)
U/u	85/117	volume up

V/v	86/118	down arrow
W/w	87/119	pause character
X/x	88/120	auxiliary (AUX)
Y/y	89/121	delete last character (C)
[	91	soft key 1
]	93	soft key 2
^	94	up arrow

Table 6 Character codes

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.7 +CPBS

This Command selects phonebook memory storage <storage>, which is used by other phonebook commands.

Command	Possible Response
+CPBS=?	+CPBS: (list of support <storage>s)
+CPBS?	+CPBS: <storage>[,<used>,<total>]
+CPBS=<storage>	+CPBS: <storage>[,<used>,<total>]

Description

Set command selects phonebook memory storage <storage>, which is used by other phonebook commands.
Read command returns currently selected memory, and when supported by manufacturer, number of used location and total number of locations in the memory.

Parameter

<storage>

EN	SIM emergency number
FD	SIM fix dialing-phonebook
LD	SIM last dialing-phonebook
ON	SIM own numbers (MSISDNs) list
SM	SIM phonebook

<used> The number of used locations in selected memory

<total> The total number of location in selected memory

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.8 +CPBR

This command returns the phonebooks entry for location <index> of the currently selected phone book. If all queried locations are empty (but available), no information text lines may be returned.

Command	Possible Response
+CPBR=?	+CPBR: (list of support <index>s), [<nlength>],(list of supported <type>s), [<tlength>]
+CPBR=<index1>[,<index2>]	[+CPBR: <index1>,<number>,<type>,<text> … [+CPBR: <index2>,<number>,<type>,<text>]

Description

Execution command returns phonebook entries in location number range <index1>... <index2> from the current phonebook memory storage selected with +CPBS. If <index2> is left out, only location <index1> is returned. Entry fields returned are location number <index*n*>, phone number stored there <number> (of format <type>) and text <text> associated with the number.

Parameter

<index1>, <index2>, <index> range of location numbers of phonebook memory

<number> phone number in format <type>

<type> type of phone number
129 dial string without international access character
145 dial string which includes the international access character “+”

<text> text field of maximum length <tlength>

<nlength> value indicating the maximum length of field <number>

<tlength> value indicating the maximum length of field <text>

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.9 +CPBW

This Command writes an entry to location number <index> in the current phonebook.

Command	Possible Response
+CPBW=?	+CPBW: (list of support <index>s),[<nlength>],(list of supported <type>s),[<tlength>]
+CPBW=[<index>][,<number>[,<type>s[,<text>]]]	

Description

Execution command writes phonebook entry in location number <index> in the current phonebook memory storage selected with +CPBS. Entry fields written are phone number <number> (in the format <type>) and text <text> associated with the number. If those fields are omitted, phonebook entry is deleted. If <index> is left out, but <number> is given, entry is written to the first free location in the phonebook (the implementation of this feature is manufacturer specific).

Parameter

<index> range of valid location numbers for the selected phonebook memory. If this is omitted when writing an entry the first free location shall be used

<number> phone number in format <type>

<type> type of phone number
129 dial string without international access character
145 dial string which includes the international access character "+"

<text> text field of maximum length <tlength>

<nlength> value indicating the maximum length of field <number>

<tlength> value indicating the maximum length of field <text>

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.10 +CPBF

This command returns phonebook entries from the current phone book which alphanumeric field start with string <findtext>.

Command	Possible Response
+CPBF=?	+CPBF: [<nlength>],[<tlength>]
+CPBF=<findtext>	[+CPBR: <index1>,<number>,<type>,<text>] … [+CPBR: <index2>,<number>,<type>,<text>]

Description

Execution command returns phonebook entries (from the current phonebook memory storage selected with +CPBS) which alphanumeric field start with string <findtext>. Entry fields returned are location number <index*n*>, phone number stored there <number> (of format <type>) and text <text> associated with the number.

Parameter

<index1>,<index2> value in the range of location numbers of phonebook memory

<number> phone number in format <type>

<type> type of phone number
129 dial string without international access character
145 dial string which includes the international access character "+"

<findtext>,<text> field of maximum length <tlength>

<nlength> value indicating the maximum length of field <number>

<tlength> value indicating the maximum length of field <text>

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.11 +CLAC

List all available AT commands

Command	Possible Response
+CLAC	<AT Command1>[<CR><LF><AT Command2>[…]] *+CME ERROR: <err>*
+CLAC=?	*+CME ERROR: <err>*

Description

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

Parameter

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

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.12 +CLVL

Loudspeaker volume level

Command	Possible Response
+CLVL=<level>	*+CME ERROR: <err>*
+CLVL?	+CLVL: <level> *+CME ERROR: <err>*
+CLVL=?	+CLVL: (list of supported <level>s) *+CME ERROR: <err>*

Description

Set Command is used to select the volume of the internal loudspeaker of the ME.
Read command reads the setting value of loudspeaker volume.

Parameter

<level> integer type value (range 0 ~ 4)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.13 +CMUT

Mute control

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

Description

This command is used to enable and disable the uplink voice muting during a voice call. Read the current mode is mute on or mute off.

Parameter

<n>

0 mute off
1 mute on

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.14 +VTS

This command allows the transmission of DTMF tones and arbitrary tones.

Command	Possible Response
+VTS=<DTMF>[,<duration>]	*+CME ERROR: <err>*
+VTS=?	+VTS: (list of supported <DTMF>s), (list of supported <duration>s)

Description

This command allows the transmission of DTMF tones and arbitrary tones. These tones may be used (for example) when announcing the start of a recording period. The command is write only. In this profile of commands, this command does not operate in data or fax modes of operation (+FCLASS=0,1,2-7).

The string parameter of the command consists of combinations of the following separated by commas:

1. <DTMF>. A single ASCII character in the set 0-9, #,*,A-D. This is interpreted as a single ACSII character whose duration is set by the +VTD command. In GSM this operates only in voice mode.
2. {<DTMF>,<duration>}. This is interpreted as a DTMF tone of different duration from

that mandated by the +VTD command. In GSM this operates only in voice mode.

Parameter

<DTMF> A single ASCII character in the set 0-9, #, *, A-D.

<duration> integer type; Tone duration in 1/10 second.
1 ~ 255

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.15 +CRSM

Restricted SIM access

Command	Possible Response
+CRSM=<command>[,<fileid>[,<P1>,<P2>,<P3>[,<data>]]]	+CRSM: <SW1><SW2>[,<response>] *+CME ERROR: <err>*
+CRSM=?	

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 ME the SIM <command> and its required parameters. ME handles internally all SIM-ME interface locking and file selection routines. As response to the command, ME sends the actual SIM information parameters and response data. ME 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.

Parameter

<command>
176 READ BINARY
178 READ RECORD
192 GET RESPONSE
214 UPDATE BINARY
220 UPDATE RECORD
242 STATUS (not supported)

<fileid> integer type; this is the identifier of a elementary data-file on SIM. Mandatory for every command except STATUS

<P1>,<P2>,<P3> integer type; parameter passed on by the ME to SIM. These parameter are mandatory for every command, except GET RESPONSE and STATUS. The values are described in GSM 11.11[28]

<data> information which shall be written to the SIM

<SW1>,<SW2> integer type; information from the SIM about the execution of the actual command. These parameters are delivered to the TE in born cases, on successful or failed execution of the command.

<response> response of a successful completion of the command previously issued. STATUS and GET RESPONSE return data, which gives information about the current elementary data-field. This information includes the type of file and its size. After READ BINARY or READ RECORD command the requested data will be returned. <response> is not returned after a successful UPDATE BINARY or UPDATE RECORD command.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.16 +CACM

Accumulated call meter

Command	Possible Response
+CACM=[<passwd>]	*+CME ERROR: <err>*
+CACM?	+CACM: <acm> *+CME ERROR: <err>*
+CAMM=?	

Description

Set command resets the Advice of Charge related accumulated call meter value in SIM file EFACM. ACM contains the total number of home units for both the current and preceding calls. SIM PIN2 is usually required to reset the value.

Parameter

<passwd> string type; SIM PIN2

<acm> string type; accumulated call meter value similarly coded as <ccm> under +CAOC

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.17 +CAMM

Accumulated call meter maximum

Command	Possible Response
+CAMM=[<acmmax>[,<passwd>]]	*+CME ERROR: <err>*
+CAMM?	+CAMM: <acmmax> *+CME ERROR: <err>*
+CAMM=?	

Description

Set command sets the Advice of Charge related accumulated call meter maximum value in SIM file EFACMmax. ACMmax contains the maximum number of home units allowed to be consumed by the subscriber. When ACM (refer +CACM) reaches ACMmax calls are prohibited (see also GSM 02.24 [26]). SIM PIN2 is usually required to set the value.

Parameter

<passwd> string type; SIM PIN2

<acmmax> string type; accumulated call meter maximum value similarly coded as <ccm> under +CAOC; value zero disables ACMMax feature

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.18 +CPUC

Price per unit and currency table

Command	Possible Response
+CPUC=<currency>,<ppu>[,<passwd>]	*+CME ERROR: <err>*
+CPUC?	+CPUC: <currency>,<ppu> *+CME ERROR: <err>*
+CPUC=?	

Description

Set command sets the parameters of Advice of Charge related price per unit and currency table in SIM file EFPUCT. PUCT information can be used to convert the home units (as used in +CAOC, +CACM and +CAMM) into currency units. SIM PIN2 is usually required to set the parameters.

Parameter

<passwd> string type; SIM PIN2

<currency> string type; three-character currency code; character set as specified by command Select TE Character Set +CSCS

<ppu> string type; price per unit; dot is used as a decimal separator

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.19 +CXXCID

Display card ID

Command	Possible Response
+CXXCID	+CXXCID: <cid> *+CME ERROR: <err>*
+CXXCID=?	

Description

TA returns the card identification number in SIM (SIM file EF ICCID, see GSM 11.11 Chap.10.1.1) as string type.

Parameter

<cid> string type; the card identification number in SIM (SIM file EF ICCIC, GSM 11.11)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.20 +CIND

Indicator control

Command	Possible Response
+CIND=[<ind>[,<ind>[,…]]]	*+CME ERROR: <err>*
+CIND?	Not Supported
+CIND=?	+CIND: (<reced>,(list of supported <ind>s)) [,(<reced>,(list of supported <ind>s))[,…]] *+CME ERROR: <err>*

Description

Set command is used to set the values of ME indicators. <ind> value 0 means that the indicator is off (or in state which can be identified as "off"-state), 1 means that indicator is on (or in a state which is more substantial than "off"-state), 2 is more substantial than 1, and so on. If the indicator is a simple on/off style element, it has values 0 and 1. The number of elements is ME specific. If certain indicator is not writable, setting of it should be ignored. If parameter is empty field, indicator shall remain in the disable value.

Parameter

<ind> integer type value, which shall be in range of corresponding <reced>

<reced> values reserved by the present document and their <ind> ranges

“battchg”	battery charge level (0-5)
“signal”	signal quality (0-5)
“service”	service availability (0-1)
“sounder”	sounder activity (0-1)
“message”	message received (0-1)
“call”	call in progress (0-1)
“roam”	roaming indicator (0-1)
“smsfull”	a short message memory storage in the MT has become full (1), or memory locations are available (0)
“RR & GPS”	SAT & GPS Command indication control (0-1), +CIEV command not used

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.21 +CCWE

Call Meter Maximum event

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

Description

Shortly before the ACM (Accumulated Call Meter) maximum value is reached, an unsolicited result code +CCWV will be sent, if enabled by this command. The warning is issued approximately when 30 seconds call time remains. It is also issued when starting a call if less than 30 s call time remains.

Parameter

<mode>

0 Disable the call meter warning event
1 Enable the call meter warning event

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.22 +IPR

This command can be used to set or query the TE-TA interface bit rate.

Command	Possible Response
+IPR=<rate>	*OK* *ERROR* *+CME ERROR: <err>*
+IPR?	+IPR: <rate> *+CME ERROR: <err>*
+IPR=?	+IPR: (list of supported auto-detectable <rate>s), (list of supported fixed-only <rate>s) *+CME ERROR: <err>*

Description

The write command specifies the bit rate to be used for the interface. When you set a fixed-rate, make sure that both TE (DTE) and TA (DCE) are configured to the same rate. When you select autobauding, the TA will automatically recognize the bit rate currently used by the TE.
The setting is stored in the non-volatile memory and will be used whenever the engine is powered up again.

Parameter

<rate>

0 (Autobauding), 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

5.23 +CMUX

Multiplexing mode

Command	Possible Response
+CMUX=<mode>[,<subset>]	*OK* *ERROR* *+CME ERROR: <err>*
+CMUX?	+CMUX: <mode>[,<subset>] *+CME ERROR: <err>*
+CMUX=?	+CMUX: (list of supported <mode>s), (list of supported <subset>s) *+CME ERROR: <err>*

Description

All information provided in this section applies to the ASC0 interface only. The second interface ASC1 has no support of Multiplex mode.
Multiplex mode according to the ETSI TS 101 669 and GSM 07.10 enables one physical serial asynchronous interface to be partitioned into three virtual channels. This allows you to take advantage of up to 3 simultaneous sessions running on the serial interface. For example, you can send or receive data or make a call on the first channel, while the other two channels are free to control the module with AT commands.

Parameter

<mode>
0 Basic option (default)
1 Advanced option (not supported)

<subset>
0 UIH frames used only (default)
1 UI frames used only (not supported)
2 I frames used only (not supported)

	SG2520	SO2510	SM2500
Supported	✓	X	X

6 Mobile Equipment errors

6.1 +CMEE

Report Mobile Equipment error

Command	Possible Response
+CMEE=[<n>]	
+CMEE?	+CMEE: <n>
+CMEE=?	+CMEE: (list of supported <n>s)

Description

Set command disables or enables the use of result code +CME ERROR: <err> as an indication of an error relating to the functionality of the ME. When enabled, ME 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.

Parameter

<n>

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

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

6.2 Mobile Equipment error result code +CME ERROR

The Operation +CME ERROR: <err> 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 executer. The format of <err> can be either numeric or verbose. This is set which command +CMEE.

<err> values (numeric format followed by verbose format):

General errors :

0 phone failure
1 no connection to phone
2 phone-adaptor link reserved
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
11 SIM PIN required

12 SIM PUK required
13 SIM failure
14 SIM busy
15 SIM wrong
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
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
51 invalid position SB
52 invalid position for LAI
53 invalid position
54 invalid position for SVPD
55 position too old
56 ongoing call unrelated ss
100 unknown

GMPRS-related errors:

- Errors related to failure to perform an Attach

103 Illegal MS (#3)
106 Illegal ME (#6)
107 GMPRS services not allowed (#7)
111 PLMN not allowed (#11)
112 Location area not allowed (#12)
113 Roaming not allowed in this location area (#13)

- Errors related to failure to Activate Context

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

- Other GMPRS errors

150 invalid mobile class
148 unspecified GMPRS error

Other values in the range 101 – 150 are reserved for use by GMPRS

Other errors

151 VBS/VGCS not supported by the network
152 No service recedence n on SIM
153 No subscriptin for group ID
154 Group Id not activated on SIM
155 No matching notification
156 VBS/VGCS call already present
157 Congestion
158 Network failure
159 Uplink busy
160 No access rights for SIM file
161 No subscription for priority
162 operation not applicable or not possible
257 call barred
260 invalid dial string
262 SIM blocked
303 Establishment failure
304 Re-establishment failure
307 Access class blocked for emergency calls
308 Access class blocked for normal calls
311 Contention failure
312 Authentication failure
314 Pre-emptive release
315 Direct signal connect re-establishment
316 User inactive
317 No channel unacceptable
318 RACH failure
319 Cell re-selection
321 Not registered
323 MS identity cannot be derived by network
324 Implicitly detached

325 MSC temporarily not reachable
326 Barred dialing number
327 Only fixed dialing number allowed
328 Max calls exceeded
329 Invalid call ID
330 Call type not allowed
331 Emergency call overriding normal call
332 Setup parameter error
333 User busy
334 Call rejected
335 No user response
338 Exceeded allowed accumulated call meter
339 Not attached
340 Minimum QOS check failed
341 Invalid NSAPI
342 Modify rejected reason unknown
343 Modify accepted
344 Invalid parameters
345 NSAPI not available
346 Detach with re-attach
347 Due to SGSN VERSION97R98
348 LLC SNDCP failure
349 Invalid in current class
350 Insufficient resources
351 Missing or unknown APN
352 Unknown PDP address or PDP type
353 Re-activation required
354 Unknown PDP context
355 Limited service
356 GMPRS services not possible
357 Emergency calls blocked
358 Incoming call present
359 Resource unavailable unspecified
360 Service not provisioned
361 Number of password attempt violation
362 Wrong Fixed Dial Number

6.3 Message Service Failure Result Code +CMS ERROR

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.

<err> values used by common messaging commands:

1 Unassigned (unallocated) number

8	Operator determined barring
10	Call barred
11	Reserved
21	Short message transfer rejected
27	Destination out of service
28	Unidentified subscriber
29	Facility rejected
30	Unknown subscriber
38	Network out of order
41	Temporary failure
42	Congestion
47	Resources unavailable, unspecified
50	Requested facility not subscribed
69	Requested facility not implemented
81	Invalid short message transfer reference value
95	Invalid message, unspecified
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message not compatible with short message protocol state
99	Information element non-existent or not implemented
100	unknown
111	Protocol error, unspecified
127	Interworking, unspecified
158	Network failure
260	invalid dial string
300	ME failure
302	Operation not allowed
304	Invalid PDU mode parameter
305	Invalid text mode parameter
310	SIM not inserted
313	SIM failure
322	Memory full
358	Incoming call present
363	position too old
500	Unknown error
512	Block mode not supported
513	SMS Message too long
514	+CSMP expected
515	SMS PDU too long
516	SMS Service not available

7 SMS and CBS Commands

7.1 +CSMS

Select Message Service

Command	Possible Response
+CSMS=<service>	+CSMS: <mt>,<mo>,<bm> *+CMS ERROR: <err>*
+CSMS?	+CSMS:<service>,<mt>,<mo,<bm>>
+CSMS=?	+CSMS: (range of supported <service>s)

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.

Parameter

<service>

0	GSM 03.40 and 03.41 (the syntax of SMS AT commands is compatible with GSM 07.05 Phase 2 version 4.7.0; Phase 2+ which do not require new command syntax may be supported (e.g. correct routing of messages with new Phase 2+ data coding schemes))
1	GSM 03.40 and 03.41 (the syntax of SMS AT commands is compatible with GSM 07.05 Phase 2+ version; the requirement of <service> setting 1 is mentioned under corresponding command descriptions)
2…127	reserved
128…	manufacturer specific

<mt>,<mo>,<bm>

0	type not supported
1	type supported

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.2 +CPMS

Preferred Message Storage

Command	Possible Response
+CPMS=<mem1>[,<mem2>[,<mem3>]]	+CPMS: <used1>,<total1>,<used2>,<total2>,<used3>,<total3> *+CMS ERROR: <err>*
+CPMS?	+CPMS:<mem1>,<used1>,<total1>,<mem2>,<used2>,<total2>,<mem3>,<used3>,<total3>

	+CMS ERROR: <err>
+CPMS=?	+CPMS: (range of supported <mem1>s), (range of supported <mem2>s), (range of supported <mem3>s)

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.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.3 +CMGF

Message Format

Command	Possible Response
+CMGF=[<mode>]	
+CMGF?	+CMGF: <mode>
+CMGF=?	+CMGF: (range of supported <mode>s)

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.

Parameter

<mode>

0 PDU mode (default when implemented)
1 text mode

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.4 +CSCA

Service Centre Address

Command	Possible Response
+CSCA=<sca>[,<tosca>]	
+CSCA?	+CSCA: <sca>,<tosca>
+CSCA=?	

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.

Parameter

<sca> Service Centre Address

<tosca> Type-of Address of <sca>

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.5 +CSDH

Show SMS text mode parameters

Command	Possible Response
+CSDH=[<show>]	
+CSDH?	+CSDH: <show>
+CSDH=?	+CSDH: (list of supported <show>s)

Description

Set command controls whether detailed header information is shown in text mode result codes.

Parameter

<show>

0 Do not show header values defined in commands result codes

1 Show the values in result codes

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.6 +CSMP

Set SMS text mode parameters

Command	Possible Response
+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]	
+CSMP?	+CSMP: <fo>,<vp>,<pid>,<dcs>
+CSMP=?	

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>.
When storing a SMS-DELIVER from the TE to the preferred memory storage in text mode.

Parameter

<fo> depending on the command or result code (default 2 or 17); 0-255

<vp> depending on <fo> setting; 0-255

<dcs> Data coding scheme; 0-247

<pid> Protocol identifier; 0-255

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.7 +CSCB

Select Cell Broad Message Types

Command	Possible Response
+CSCB=[<mode>[,<mids>[,<dcss>]]]	
+CSCB?	+CSCB: <mode>,<mids>,<dcss>
+CSCB=?	+CSCB: (list of supported <mode>s)

Description

Set command selects which types of CBMS are to be received by the ME.

Parameter

<mode>
0 message types specified in <mids> and <dcss> are accepted
1 message types specified in <mids> and <dcss> are not accepted

<mids> string type; all different possible combination of CBM message identifiers (refer <mid>) (default is empty string; e.g. “0,1,5,3,20-478,922”

<dcss> string type; all different possible combinations of CBM data coding schemes (refer <dcs>) (default is empty string); e.g. “0-3,5”

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.8 +CSAS

Save Setting

Command	Possible Response
+CSAS[=<profile>]	*+CMS ERROR: <err>*

+CSAS=?	+CSAS: (list of supported <profile>s)

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.

Parameter

<profile>
0…255 manufacturer specific profile number where setting are to be stored

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.9 +CRES

Restore Setting

Command	Possible Response
+CRES[=<profile>]	*+CMS ERROR: <err>*
+CRES=?	+CSAS: (list of supported <profile>s)

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.

Parameter

<profile>
0…255 manufacturer specific profile number where setting are to be stored

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.10 +CNMI

New Message Indications to TE

Command	Possible Response
+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	*+CMS ERROR: <err>*
+CNMI?	+CNMI : <mode>,<mt>,<bm>,<ds>,<bfr>
+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)

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. <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. 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.

Parameter

<mode> refer Figure 7.1

0 Buffer unsolicited result code in the TA. If TA result code buffer is full, indications can be buffered in some other 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. Otherwise forward them directly to the TE.

2 Buffer unsolicited result code in the TA when TA-TE link is reserved 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 specific inband technique used to embed result codes and data when TA is in on-line data mode.

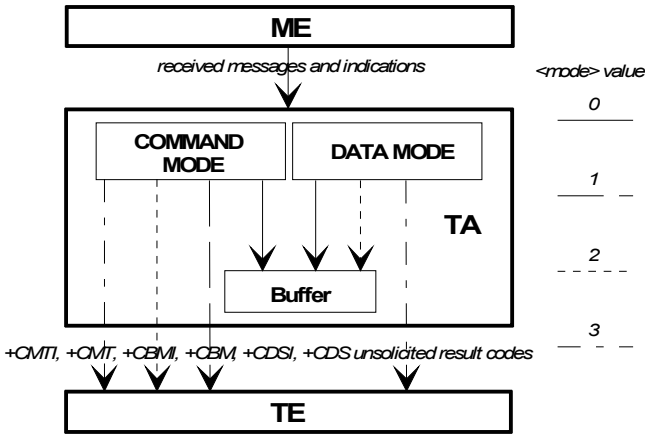

Figure 2 <mode> parameter

<mt>

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 3.4).
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.

4 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:
`+CMTA: <mem>,<index> [<alpha>],<length><CR><LF><pdu>` (PDU mode enabled)
or
`+CMTA: <mem>,<index><oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>, <length>]<CR><LF><data>` (text mode enabled; about

`<mt>`	Receiving procedure for different message data coding schemes (refer GSM 03.38 [2])
0	no class: as in GSM 03.38, but use `<mem3>` as preferred memory class 0: as in GSM 03.38, but use `<mem3>` as preferred memory if message is tried to be stored class 1: as in GSM 03.38, but use `<mem3>` as preferred memory class 2: as in GSM 03.38 class 3: as in GSM 03.38, but use `<mem3>` as preferred memory message waiting indication group (discard message): as in GSM 03.38, but use `<mem3>` as preferred memory if message is tried to be stored message waiting indication group (store message): as in GSM 03.38, but use `<mem3>` as preferred memory
1	as `<mt>`=0 but send indication if message stored successfully
2	no class: route message to TE class 0: as in GSM 03.38, but also route message to TE and do not try to store it in memory class 1: route message to TE class 2: as `<mt>`=1 class 3: route message to TE message waiting indication group (discard message): as in GSM 03.38, but also

	route message to TE and do not try to store it in memory message waiting indication group (store message): as <mt>=1
3	class 3: route message to TE others: as <mt>=1
4	no class: route message to TE class 0: as in GSM 03.38, but also route message to TE and do not try to store it in memory class 1: route message to TE class 2: as <mt>=1 class 3: route message to TE message waiting indication group (discard message): as in GSM 03.38, but also route message to TE and do not try to store it in memory message waiting indication group (store message): as <mt>=1

Table 7<mt> parameter

<mt>	no class or class 1	class 0 or message waiting indication group (discard)	class 2 or message waiting indication group (store)	class 3
1	+CMTI	[+CMTI[1]]	+CMTI	+CMTI
2	+CMT	+CMT	+CMTI	+CMT
3	+CMTI	[+CMTI[1]]	+CMTI	+CMT
4	+CMTA	[+CMTI[1]]	+CMTA	+CMTA

[1] result code is sent when ME does not have other display device than AT interface
[2] acknowledgement command must be sent when +CSMS <service> value equals 1 and ME does not have other display device than AT interface
[3] acknowledgement command must be sent when +CSMS <service> value equals 1

Table 8 SMS-DELIVER result code and acknowledgement summary

<bm>

0 No CBM indications are routed to the TE.

1 If CBM is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code:
+CBMI: <mem>,<index>

2 New CBMs are routed directly to the TE using unsolicited result code:
+CBM: <length><CR><LF><pdu> (PDU mode enabled)
or
+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> (text mode enabled)
If ME supports data coding groups which define special routing also for messages other than class 3 (e.g. SIM specific messages), ME may choose not to route messages of such data coding schemes into TE (indication of a stored CBM may be given as defined in <bm>=1).

3 Class 3 CBMs are routed directly to TE using unsolicited result codes defined in <bm>=2. If CBM storage is supported, messages of other classes result in indication as defined in <bm>=1.

4 New CBMs are routed directly to the TE using unsolicited result code:
+CBMA: <mem>,<index>, <length><CR><LF><pdu> (PDU mode enabled)
or
+CBMA: <mem>,<index>, <sn>,<mid>,<dcs>,<page>,<pages><CR><LF>
<data> (text mode enabled)

<bm>	Receiving procedure for different message data coding schemes (refer GSM 03.38 [2])
0	all schemes: as in GSM 03.38; if CBM storage is supported, store message to "BM" (or some manufacturer or data coding scheme specific memory)
1	all schemes: as <bm>=0 but send indication if message stored successfully
2	all schemes: route message to TE unless ME has detected a special routing to somewhere else (e.g. to SIM; an indication may be sent if message stored successfully)
3	class 3: route message to TE others: as <bm>=1 (if CBM memory storage is supported)
4	all schemes: route message to TE unless ME has detected a special routing to somewhere else (e.g. to SIM; an indication may be sent if message stored successfully)

Table 9<bm> parameter

<ds>

0 No SMS-STATUS-REPORTs are routed to the TE.
1 SMS-STATUS-REPORTs are routed to the TE using unsolicited result code:
+CDS: <length><CR><LF><pdu> (PDU mode enabled)
or
+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> (text mode enabled)
2 If SMS-STATUS-REPORT is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code:
+CDSI: <mem>,<index>
3 SMS-STATUS-REPORTs are routed to the TE using unsolicited result code:
+CDSA: <mem>,<index>,<length><CR><LF><pdu> (PDU mode enabled)
or
+CDSA: <mem>,<index>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> (text mode enabled)

<ds>	result codes and commands
1	+CDS
2	+CDSI
3	+CDSA
[1)] acknowledgement command must be sent when +CSMS <service> value equals 1	

Table 10 SMS-STATUS-REPORT result code and acknowledgement summary

<bfr>

0 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).

1 TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1…3 is entered.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.11 +CMGL

List Message

Command	Possible Response
+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>[…]] **if PDU mode (+CMGF=0) and command successful:** +CMGL: <index>,<stat>,[<alpha>],<length><CR><LF><pdu> [<CR><LF>+CMGL: <index>,<stat>,[<alpha>],<length><CR><LF><pdu> […]] **otherwise:** *+CMS ERROR: <err>*
+CMGL=?	+CMGL: (list of supported <stat>s)

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'.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.12 +CMGR

Read Message

Command	Possible Response
+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> **if PDU mode (+CMGF=0) and command successful:** +CMGR: <stat>,[<alpha>],<length><CR><LF><pdu> **otherwise:** *+CMS ERROR: <err>*
+CMGR=?	

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'.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.13 +CMGS

Send Message

Command	Possible Response
if text mode (+CMGF=1): +CMGS=<da>[,<toda>]<CR> **text is entered** <CTRL-Z/ESC> **if PDU mode (+CMGF=0):** +CMGS=<length><CR> **PDU is given** <CTRL-Z/ESC>	**if text mode (+CMGF=1) and sending successful:** +CMGS: <mt>[,<scts>] **if PDU mode (+CMGF=0) and sending successful:** +CMGS: <mr>[,<ackpdu>] **if sending fails:**

	+CMS ERROR: <err>
+CMGS=?	

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.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.14 +CMSS

Send Message from Storage

Command	Possible Response
+CMSS=<index>[,<da>[,<toda>]]	**if text mode (+CMGF=1) and sending successful:** +CMSS: <mr>[,<scts>] **if PDU mode (+CMGF=0) and sending successful:** +CMSS: <mr>[,<ackpdu>] **if sending fails:** *+CMS ERROR: <err>*
+CMSS=?	

Description

Execution command sends message with location value <index> from preferred message storage <mem2> to the network (SMS-SUBMIT). 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.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.15 +CMGW

Write Message to Memory

Command	Possible Response
if text mode (+CMGF=1): +CMGW[=<oa/da>[,<tooa/toda>[,<stat>]]]<CR> **text is entered** <CTRL-Z/ESC> **if PDU mode (+CMGF=0):** +CMGW[=<length>[,<stat>]<CR> **PDU is given** <CTRL-Z/ESC>	+CMGW: <index> *+CMS ERROR: <err>*

+CMGW=?	

Description

Execution command stores message (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". The entering of text is done similarly as specified in command Send Message +CMGS.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.16 +CMGD

Delete Message

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

Description

Execution command deletes message from preferred message storage <mem1> location <index>.

Parameter

<delflag> an integer indicating multiple message deletion request as follows:

0 (or omitted) 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 Delete all messages from preferred message BM(cell broadcast messages) storage.

6 Delete all messages from preferred message ME storage.

7 Delete all messages from preferred message SIM storage.

8 Delete all messages from preferred message SR(Status Report) storage.

9 Delete all messages from preferred message storage, read and unread messages.

10 Delete all messages from preferred message storage, sent mobile originated messages.

11 Delete all messages from preferred message storage, unsent mobile originated messages untouched.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.17 +CMGC

Send Command

Command	Possible Response
if text mode (+CMGF=1): +CMGC=<fo>,<ct>[,<pid>[,<mn>[,<da>[,<toda>]]]]<CR> **text is entered**<CTRL-Z/ESC> **if PDU mode (+CMGF=0):** +CMGC=<length><CR> **PDU is given**<CTRL-Z/ESC>	**if text mode (+CMGF=1) and sending successful:** +CMGC: <mr>[,<scts>] **if PDU mode (+CMGF=0) and sending successful:** +CMGC: <mr>[,<ackpdu>] **if sending fails:** +CMS ERROR: <err>
+CMGC=?	

Description

Execution command sends a command message from a TE to the network (SMS-COMMAND). The entering of text 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.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.18 +CMMS

Mode Messages to Send

Command	Possible Response
+CMMS=[<n>]	
+CMMS?	+CMMS: <n>
+CMMS=?	+CMMS: (list of supported <n>s)

Description

Set command controls the continuity of SMS relay protocol link. When feature is enabled (and supported by network) multiple messages can be sent much faster as link is kept open.

Parameter

<n>

0 disable

1 keep enabled until the time between the response of the latest message send command (+CMGS, +CMSS, etc.) and the next send command exceeds 1-5 seconds (the exact value is up to ME implementation), then ME shall close the link and TA switches <n> automatically back to 0

2 enable (if the time between the response of the latest message send command and the next send command exceeds 1-5 seconds (the exact value is up to ME implementation), ME shall close the link but TA shall not switch automatically back to <n>=0)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

7.19 Parameter definition

<da> Destination Address, coded like GSM Technical Specification 03.40 TP-DA
<dcs> Data Coding Scheme, coded like in document [5].
<dt> Discharge Time in string format: "yy/MM/dd,hh:mm:ss_zz"(Year [00-99], Month [01-12], Day [01-31], Hour, Minute, Second and Time Zone [quarters of an hour])
<fo> First Octet, coded like SMS-SUBMIT first octet in document [4], default value is 17 for SMS-SUBMIT
<index> Place of storage in memory.
<length> Text mode (+CMGF=1): number of characters PDU mode (+CMGF=0): length of the TP data unit in octets
<mem1> Memory used to list, read and delete messages (+CMGL, +CMGR and +CMGD).
<mem2> Memory used to write and send messages (+CMGW, +CMSS).
<mid> CBM Message Identifier.
<mr> Message Reference.
<oa> Originator Address.
<pid> Protocol Identifier.
<pdu> For **SMS**: GSM 04.11 SC address followed by GSM Technical Specification 03.40 TPDU in hexadecimal format, coded as specified in doc [4] For **CBS**: GSM Technical Specification 03.41 TPDU in hexadecimal format
<ra> Recipient Address.
<sca> Service Center Address
<scts> Service Center Time Stamp in string format: "yy/MM/dd,hh:mm:ss_zz" (Year/Month/Day,Hour:Min:Seconds_TimeZone)
<sn> CBM Serial Number
<st> Status of a SMS-STATUS-REPORT
<stat> Status of message in memory.
<tooa> Type-of-Address of <oa>.
<tora> Type-of-Address of <ra>.
<tosca> Type-of-Address of <sca>.
<total1> Number of message locations in <mem1>.
<total2> Number of messages locations in <mem2.
<used1> Total number of messages locations in <mem1>.
<used2> Total number of messages locations in <mem2.
<vp> Validity Period of the short message, default value is 167

8 FAX Commands

8.1 +FCLASS

DCE mode select (All classes command)

Command	Possible Response
+FCLASS=<mode>	
+FCLASS?	+FCLASS: <mode>
+FCLASS=?	+FCLASS: (list of supported <mode>s)

Description

Switches the DCE into the requested mode. To start or to accept calls in a certain mode, the DTE has to be switched into this mode. After each call attempt the mode is reset to 0 (data mode). Mode 8 (voice) only supports dialing and accepting voice calls and generating DTMF tones. It does not support transfer of speech samples, etc.

Parameter

<mode>

0	Data
2.0	Fax Class 2.0
8	Voice

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.2 +FLO

Select flow control (All classes command)

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

Description

Sets local flow control between DTE/DCT.

Parameter

<n>

0	None
1	SW (XON/XOFF)
2	HW(RTS/CTS) (default)

	SG2520	SO2510	SM2500

Supported	✓	✓	✓

8.3 +FAA

Adaptive answer mode (Fax class 2.0 command)

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

Description

Sets the detection of incoming fax calls. This event is reported using the unsolicited result code +FDM.

Parameter

<n>
0 disabled
1 enabled

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.4 +FAP

Address and polling capabilities (Fax class 2.0 command)

Command	Possible Response
+FAP=<sub>[,<sep>[,<pwd>]]	*+CME ERROR: <err>*
+FAP?	+FAP: <sub>,<sep>,<pwd>
+FAP=?	+FAP: (list of supported <sub>s), (list of supported <sep>s), (list of supported <pwd>s)

Description

Defines the polling capabilities of the DCE. Since polling is not supported by this DCE, only disabling is supported.

Parameter

<sub> inbound sub-addressing report +FSA
0 disable

<sep> selective polling report +FPA
0 disable

<pwd> password report +FPW
0 disable

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.5 +FBO

Data bit order (Fax class 2.0 command)

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

Description

Controls the mapping between PSTN facsimile data and the DTE-DCE link. There are two choices.

Direct The first bit transferred of each octet on the DTE-DCE link is the first bit transferred on the GSTN data carrier.

Reversed The last bit transferred of each octet on the DTE-DCE link is the first bit transferred on the GSTN data carrier.

Parameter

<n>

0 no reversed phase
1 Phase C reversed
2 Rev Phase B/D
3 Rev Phase B/C/D

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.6 +FBS

Buffer size (Fax class 2.0 command)

Command	Possible Response
+FBS	
+FBS?	+FAP: <tbs>,<rbs>
+FBS=?	

Description

Reports the V.24 rx/tx buffer sizes in the DCE.

Parameter

<tbs> Transmit (DTE to DCE) buffer size

<rbs> Receive (DCE to ETE) buffer size

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.7 +FBU

HDLC frame reporting enable (Fax class 2.0 command)

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

Description

Enables HDLC frame reporting using +FHR and +FHT responses.

Parameter

<n> Frame reporting
0 disabled
1 enabled

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.8 +FCC

DCE capabilities (Fax class 2.0 command)

Command	Possible Response
+FCC=<VR>[, [,<WD>[,<LN>[,<DF>[,<EC>[,<BF>[,<ST>[,<JP>]]]]]]]	*+CME ERROR: <err>*
+FCC?	+FCC:<VR>, ,<WD>,<LN>,<DF>,<EC>,<BF>,<ST>,<JP>
+FCC=?	+FCC: (list of supported <VR>s), (list of supported s), (list of supported <WD>s), (list of supported <LN>s), (list of supported <DF>s), (list of supported <EC>s), (list of supported <BF>s), (list of supported <ST>s), (list of supported <JP>s)

Description

Allows the DTE to sense and constrain the capabilities of the facsimile.

Parameter

<VR> Resolution
0 normal
1 fine

 Bit Rate

0 2400 bps
1 4800 bps
2 7200 bps
3 9600 bps

<WD> Page Width
0 1728 pixels

<LN> Page Length
0 A4
1 B4
2 Unlimited length

<DF> Data Compression Format
0 1-D Modified Huffman

<EC> Error Correction
0 Disable ECM

<BF> File Transfer
0 Disable file transfer modes

<ST> Scan Time per Line
0 0 ms
1 5 ms
2 <VR>=0: 10ms else 5 ms
3 10 ms
4 <VR>=0: 20 ms else 10 ms
5 20 ms
6 <VR>=0: 40 ms else 20 ms
7 40 ms

<JP> JPEG
0 Disable JPEG coding

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.9 +FCQ

Copy quality (Fax class 2.0 command)

Command	Possible Response
+FCQ=<rq>[,<tq>]	*+CME ERROR: <err>*
+FCQ?	+FCQ: <rq>,<tq>
+FCQ=?	+FCQ: (list of supported <rq>s), (list of supported <tq>s)

Description

Controls the automatic check of Phase C data for bad scan lines.

Parameter

<rq>
0 disable Phase C check (from the network)

<tq>
0 disable Phase C check (from the local DTE)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.10 +FCR

Capability to receive (Fax class 2.0 command)

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

Description

Controls bit 10 in the DIS frame. This bit defines whether a station is able to receive a fax message or not.

Parameter

<n>
1 DTE is able to receive fax message

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.11 +FCS

Report the DCS frame information (Fax class 2.0 command)

Command	Possible Response
+FCS	
+FCS?	+FCC: <VR>, ,<WD>,<LN>,<DF>,<EC>,<BF>,<ST>,<JP>
+FCS=?	

Description

Reports the negotiated session parameters.

Parameter

<VR> Resolution
0 normal
1 fine

 Bit Rate
0 2400 bps
1 4800 bps
2 7200 bps
3 9600 bps

<WD> Page Width
0 1728 pixels

<LN> Page Length
0 A4
1 B4
2 Unlimited length

<DF> Data Compression Format
0 1-D Modified Huffman

<EC> Error Correction
0 Disable ECM

<BF> File Transfer
0 Disable file transfer modes

<ST> Scan Time per Line
0 0 ms
1 5 ms
2 <VR>=0: 10ms else 5 ms
3 10 ms
4 <VR>=0: 20 ms else 10 ms
5 20 ms
6 <VR>=0: 40 ms else 20 ms
7 40 ms

<JP> JPEG
0 Disable JPEG coding

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.12 +FCT

Phase C timeout (Fax class 2.0 command)

Command	Possible Response
+FCT=<timeout>	*+CME ERROR: <err>*

+FCT?	+FCT: <timeout>
+FCT=?	+FCT: (list of supported <timeout>s)

Description

Determines how long the DCE will wait for a command after having transmitted all available Phase C data. Attention: This common has no effect and is only supported for compatibility reasons.

Parameter

<timeout> seconds
1E 30 seconds (default)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.13 +FDR

Receive a page (Fax class 2.0 command)

Command	Possible Response
+FDR	*+CME ERROR: <err>*
+FDR?	
+FDR=?	

Description

This command initiates transition to Phase C to receive binary T.4 data from the remote Fax machine and forwards the data to the local DTE.
All following AT commands in the same line are ignored.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.14 +FDT

Send a page (Fax class 2.0 command)

Command	Possible Response
+FDT	*+CME ERROR: <err>*
+FDT?	
+FDT=?	

Description

This command initiates transition to Phase C to transmit binary T.4 data from the local DTE to the remote Fax machine.
All following AT commands in the same line are ignored.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.15 +FEA

Phase C received EOL alignment </H3> (Fax class 2.0 command)

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

Description

Sets optional octet-alignment of EOL markers in reserved T.4 data streams.

Parameter

<n>
0 disable octet-alignment

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.16 +FFC

Image data format conversion (Fax class 2.0 command)

Command	Possible Response
+FFC=[<vrc>[,<dfc>[,<lnc>[,<wdc>]]]]	*+CME ERROR: <err>*
+FFC?	+FFC: <vrc>,<dfc>,<lnc>,<wdc>
+FFC=?	+FFC: (list of supported <vrc>s), (list of supported <dfc>s), (list of supported <lnc>s), (list of supported <wdc>s)

Description

This compound parameter determines the DCE response to mismatches between the Phase C data delivered after the +FDT command and the data format parameters negotiated for the facsimile session.

Parameter

<vrc> Vertical resolution format codes
0 ignored

<dfc> Data format codes
0 ignored

<lnc> Page length format codes
0 ignored

<wdc> Page width format codes
0 ignored

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.17 +FHS

Inquire call termination status (Fax class 2.0 command)

Command	Possible Response
+FHS	*+CME ERROR: <err>*
+FHS?	+FHS: <hsc>
+FHS=?	

Description

Returns call termination status. The status is set by the DCE at the conclusion of a fax session. The DCE resets <hsc> to 00 at the beginning of Phase A.

Parameter

<hsc> Hang-up status code (two-digit hexadecimal value)
00 Normal and proper end of connection

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.18 +FIE

Procedure interrupt enable (Fax class 2.0 command)

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

Description

Sets the DCE to accept Procedure Interrupt Requests sent by the remote fax machine and initiate transition to voice after successful completion of the Procedure Interrupt Request. Precondition: TS61 fax services must be used.

Parameter

<n> PRI-Q requests
0 disabled
1 enabled

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.19 +FIP

Initialize Service Class 2.0 parameters (Fax class 2.0 command)

Command	Possible Response
+FIP=<profile>	*+CME ERROR: <err>*
+FIP?	+FIP: <profile>
+FIP=?	+FIP: (list of supported <profile>s)

Description

Causes the DCE to initialize all Service Class 2.0 Facsimile Parameters to the manufacturer determined default settings. This command does not change the setting of AT+FCLASS.

Parameter

<profile>
0 Standard

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.20 +FIS

Report the DIS frame information (Fax class 2.0 command)

Command	Possible Response
+FIS=<VR>[, [,<WD>[,<LN>[,<DF>[,<EC>[,<BF>[,<ST>[,<JP>]]]]]]]	*+CME ERROR: <err>*
+FIS?	+FIS: <VR>, ,<WD>,<LN>,<DF>,<EC>,<BF>,<ST>,<JP>
+FIS=?	+FIS: (list of supported <VR>s), (list of supported s), (list of supported <WD>s), (list of supported <LN>s), (list of supported <DF>s), (list of supported <EC>s), (list of supported <BF>s), (list of supported <ST>s), (list of supported <JP>s)

Description

Allows the DCE to sense and constrain the capabilities used for the current session. The DCE uses +FIS to generate DIS messages directly, and uses +FIS and received DIS messages to generate DCS messages.

Parameter

<VR> Resolution
0 normal
1 fine

 Bit Rate
0 2400 bps

1 4800 bps
2 7200 bps
3 9600 bps

<WD> Page Width
0 1728 pixels

<LN> Page Length
0 A4
1 B4
2 Unlimited length

<DF> Data Compression Format
0 1-D Modified Huffman

<EC> Error Correction
0 Disable ECM

<BF> File Transfer
0 Disable file transfer modes

<ST> Scan Time per Line
0 0 ms
1 5 ms
2 <VR>=0: 10ms else 5 ms
3 10 ms
4 <VR>=0: 20 ms else 10 ms
5 20 ms
6 <VR>=0: 40 ms else 20 ms
7 40 ms

<JP> JPEG
0 Disable JPEG coding

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.21 +FIT

DTE inactivity timer (Fax class 2.0 command)

Command	Possible Response
+FIT=<time>,<action>	*+CME ERROR: <err>*
+FIT?	+FIT: <time>,<action>
+FIT=?	+FIT: (list of supported <time>s), (list of supported <action>s)

Description

Sets the inactivity timeout value. Each single activity on the DTE-DCE link resets the timer.

Parameter

<time>
00 timeout disabled
01-FF inactivity timeout in seconds

<action>
0 upon timeout go on-hook and reset to AT+FCLASS=0

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.22 +FKS

Terminate a session, orderly fax abort (Fax class 2.0 command)

Command	Possible Response
+FKS	*+CME ERROR: <err>*
+FKS?	
+FKS=?	

Description

Causes the DCE to terminate the session in an orderly manner. In particular, it will send a DCN message at the next opportunity and hang up.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.23 +FLI

Local ID string parameter, TSI or CSI (Fax class 2.0 command)

Command	Possible Response
+FLI=<TSI/CSI>	*+CME ERROR: <err>*
+FLI?	+FLI: <TSI/CSI>
+FLI=?	+FLI: (list of supported <TSI/CSI>s)

Description

The 20 character printable T.50 string set with +FLI is used when sending a TSI or CSI frame to the remote fax.

Parameter

<TSI/CSI> string (20-7E)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.24 +FLP

Indicate document available for polling (Fax class 2.0 command)

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

Description

Indicates whether the DTE has a document to poll. Polling is not supported by this DCE.

Parameter

<n>

0 No document to poll

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.25 +FMI

Request manufacturer identification (Fax class 2.0 command)

Command	Possible Response
+FMI	<manufacturer> *+CME ERROR: <err>*
+FMI?	
+FMI=?	

Description

Returns information to identify the TA manufacturer.

Parameter

<manufacturer> alphanumeric

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.26 +FMM

Request model identification (Fax class 2.0 command)

Command	Possible Response
+FMM	<model>

	+CME ERROR: <err>
+FMM?	
+FMM=?	

Description

Returns information to identify the TA model.

Parameter

<model> alphanumeric

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.27 +FMR

Request revision identification (Fax class 2.0 command)

Command	Possible Response
+FMR	<revision> *+CME ERROR: <err>*
+FMR?	
+FMR=?	

Description

Returns information to identify the TA version, revision level or date.

Parameter

< revision > alphanumeric

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.28 +FMS

Minimum Phase C speed (Fax class 2.0 command)

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

Description

Sets the minimum speed to be used by the DCE during a fax transfer. When the defined speed cannot be used (Training failed or remote fax does not support requested speed) the call will be aborted.

Parameter

0 2400
1 4800
2 7200
3 9600

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.29 +FNR

Negotiation message reporting control parameters (Fax class 2.0 command)

Command	Possible Response
+FNR=<rpr>,<tpr>,<idr>,<nsr>	*+CME ERROR: <err>*
+FNR?	+FNR: <rpr>,<tpr>,<idr>,<nsr>
+FNR=?	+FNR: (list of supported <rpr>s), (list of supported <tpr>s), (list of supported <idr>s), (list of supported <nsr>s)

Description

Set different reports during T.30 negotiation phases.

Parameter

<rpr> Receiver parameters reports +FIS and +FTC
0 suppressed
1 generated

<tpr> Transmitter parameters report +FCS
0 suppressed
1 generated

<idr> ID strings reports +FTI,+FCI and +FPI
0 suppressed
1 generated

<nsr> Non-standard frames reports +FNF,+FNS and +FNC
0 suppressed
1 generated

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.30 +FND

Non-standard message data indication (Fax class 2.0 command)

Command	Possible Response
+FND=[<n>]	*+CME ERROR: <err>*

+FND?	+FND: <n>
+FND=?	+FND: (list of supported <n>s)

Description

This command is only supported for compatibility reasons. According to GSM 03.45 a GSM terminal is not allowed to forward a NSF message in either direction.

Parameter

<n>

0 specified in DCS (default)
1 non-standard

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.31 +FPA

Selective polling address parameter (Fax class 2.0 command)

Command	Possible Response
+FPA=<spa>	*+CME ERROR: <err>*
+FPA?	+FPA: <spa>
+FPA=?	+FPA: (character set of <spa>)

Description

Polling is not supported by this DCE.

Parameter

<spa> Selective Polling Address

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.32 +FPI

Local polling ID string parameter (Fax class 2.0 command)

Command	Possible Response
+FPI=<CIG>	*+CME ERROR: <err>*
+FPI?	+FPI: <CIG>
+FPI=?	+FPI: (character set of <CIG>)

Description

Polling is not supported by this DCE.

Parameter

<CIG> string (20-7E)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.33 +FSA

Sub-Address parameter (Fax class 2.0 command)

Command	Possible Response
+FSA=<subaddr>	*+CME ERROR: <err>*
+FSA?	+FSA: <subaddr>
+FSA=?	+FSA: (character set of <subaddr>)

Description

Sub Addressing is not supported with this DCE.

Parameter

<subaddr> Sub Address

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.34 +FPW

Password parameter (Fax class 2.0 command)

Command	Possible Response
+FPW=<password>	*+CME ERROR: <err>*
+FPW?	+FPW: <password>
+FPW=?	+FPW: (character set of <password>)

Description

Password is not supported with this DCE.

Parameter

<password> string

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.35 +FPP

Packet protocol control (Fax class 2.0 command)

Command	Possible Response
+FPP=<n>	*+CME ERROR: <err>*

+FPP?	+FPP: <n>
+FPP=?	+FPP: (list of supported <n>s)

Description

Packet protocols is not supported with this DCE.

Parameter

<n> 0

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.36 +FPS

Page status parameter (Fax class 2.0 command)

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

Description

Set page status parameter.

Parameter

<n>

1 MCF – Page good
2 RTN – Page bad, retain requested
3 RTP – Page good, retain requested
4 PIN – Page bad, interrupt requested
5 PIP – Page good, interrupt requested

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.37 +FRQ

Receive quality thresholds parameters (Fax class 2.0 command)

Command	Possible Response
+FRQ=<pgl>,<cbl>	*+CME ERROR: <err>*
+FRQ?	+FRQ: <pgl>,<cbl>
+FRQ=?	+FRQ: (list of supported <pgl>s), (list of supported <cbl>s)

Description

Copy quality checking is not supported by this DCE.

Parameter

<pgl> Percentage of good lines

<cbl> Maximum tolerable number of consecutive bad lines

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.38 +FRY

ECM Retry value parameter (Fax class 2.0 command)

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

Description

Packet protocol is not supported by this DCE.

Parameter

<n> 0

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

8.39 +FSP

Request to poll parameter (Fax class 2.0 command)

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

Description

Polling is not supported by this DCE.

Parameter

<n> 0

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

9 GMPRS Commands

9.1 +CGDCONT

Define PDP Context

Command	Possible Response
+CGDCONT=[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp>[,<h_comp>]]]]]	OK ERROR
+CGDCONT?	+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>[,<pd1>[,…[,pdN]]] [<CR><LF>+CGDCONT: <cid>,<PDP_type>,<APN>,<PDP_addr>,<d_comp>,<h_comp>]
+CGDCONT=?	+CGDCONT: (range of supported <cid>s), <PDP_type>,,, (list of supported <d_comp>s), (list of supported <h_comp> s)[, (list of supported <pd1>s)[, …[,(list of supported <pdN>s)]]] [<CR><LF>+CGDCONT: (range of supported <cid>s), <PDP_type>,,, (list of supported <d_comp>s), (list of supported <h_comp> s)]

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.

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

Parameter

<cid> (PDP Context Identifier) a numeric parameter 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 from of the command.

<PDP_type> (Packet Data Protocol type) a string parameter which specifies the type of packet data protocol

X25	ITU-T/CCITT X.25 layer 3
IP	Internet Protocol (IETF STD 5)
OSPIH	Internet Hosted Octet Stream Protocol (Obsolete)
PPP	Point to Point Protocol (IETF STD 51)

<APN> (Access Point Name) a string parameter which is a logical name that is used to select the CGSN or the external packet data network.

<PDP_address> a string parameter that identifies the MT in the address space applicable to the PDP. If the value is null or omitted, then a value a may be provided by the TE during the PDP stat-up procedure or, failing that, a dynamic will be requested. The read from of the command will continue to return the null string even if an address has been allocated during the PDP start-up procedure. The allocated address may be read using the +CGPADDR command.

<d_comp> a numeric parameter that controls PDP data compression
0 off (default if value is omitted)
1 on
other values are reserved

<h_comp> a numeric parameter that controls PDP header compression
0 off (default if value is omitted)
1 on
other values are reserved

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

9.2 +CGQREQ

Quality of Service Profile

Command	Possible Response
+CGQREQ=[<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]]	OK ERROR
+CGQREQ?	+CGQREQ: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean> [<CR><LF>+CGQREQ: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean> […]]
+CGQREQ=?	+CGQREQ: <PDP_type>, (range of supported <precedence>s), (range of supported <delay>s), (range of supported <reliability>s), (range of supported <peak>s), (range of supported <mean>s) [<CR><LF>+CGQREQ: <PDP_type>, (range of supported <precedence>s), (range of supported <delay>s), (range of supported <reliability>s), (range of supported <peak>s), (range of supported <mean>s) […]]

Description

This command allows the TE to specify a Quality of Service Profile that is used when the MT sends an Activate PDP Context Request message to the network.

The set command specifies a profile for the context identified by the (local) context identification parameter, <cid>. Since this is the same parameter that is used in the +CGDCONT and +CGDSCONT commands, the +CGQREQ command is effectively an extension to these commands. The QoS profile consists of a number of parameters, each of which may be set to a separate value.

A special form of the set command, +CGQREQ= <cid> causes the requested profile for context number <cid> to become undefined.

Parameter

<cid> a numeric parameter which specifies a particular PDP context definition (see +CGDCONT command).

<precedence> a numeric parameter which specifies the precedence class

0 network subscribed value
1 High Priority
Service commitments shall be maintained ahead of precedence classes 2 and 3
2 Normal priority
Service commitments shall be maintained ahead of precedence class 3
3 Low priority
Service commitments shall be maintained

<delay> a numeric parameter which specifies the delay class

0 network subscribed value
1~4 with SDU size = 128 octets

Delay Class	Mean Transfer Delay	95 percentile
1 (Predictive)	< 0.5	< 1.5
2 (Predictive)	< 5	< 25
3 (Predictive)	< 50	< 250
4 (Best Effort)	Unspecified	-

with SDU size = 1024 octets

Delay Class	Mean Transfer Delay	95 percentile
1 (Predictive)	< 0.5	< 1.5
2 (Predictive)	< 5	< 25
3 (Predictive)	< 50	< 250
4 (Best Effort)	Unspecified	-

<reliability> a numeric parameter which specifies the reliability class

0 network subscribed value
1 Non real-time traffic, error-sensitive application that cannot cope with data loss
2 Non real-time traffic, error-sensitive application that can cope with infrequent data loss
3 Non real-time traffic, error-sensitive application that can cope with data loss, GMM/SM, and SMS
4 Real-time traffic, error-sensitive application that can cope with data loss
5 Real-time traffic, error non-sensitive application that can cope with data loss

<peak> a numeric parameter which specifies the peak throughput class
0 network subscribed value
1 Up to 1000 (8 kbit/s)
2 Up to 2000 (16 kbit/s)
3 Up to 4000 (32 kbit/s)
4 Up to 8000 (64 kbit/s)
5 Up to 16000 (128 kbit/s)
6 Up to 32000 (256 kbit/s)
7 Up to 64000 (512 kbit/s)
8 Up to 128000 (1024 kbit/s)
9 Up to 256000 (2048 kbit/s)

<mean> a numeric parameter which specifies the mean throughput class
0 network subscribed value
1 100 (~0.22 bit/s)
2 200 (~0.44 bit/s)
3 500 (~1.11 bit/s)
4 1000 (~2.2 bit/s)
5 2000 (~4.4 bit/s)
6 5000 (~11.1 bit/s)
7 10000 (~22 bit/s)
8 20000 (~44 bit/s)
9 50000 (~111 bit/s)
10 100000 (~0.22 kbit/s)
11 200000 (~0.44 kbit/s)
12 500000 (~1.11 kbit/s)
13 1000000 (~2.2 kbit/s)
14 2000000 (~4.4 kbit/s)
15 5000000 (~11.1 kbit/s)
16 10000000 (~22 kbit/s)
17 20000000 (~44 kbit/s)
18 50000000 (~111 kbit/s)
31 best effort

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

9.3 +CGQMIN

Quality of Service Profile (Minimum acceptable)

Command	Possible Response
+CGQMIN=[<cid>[,<precedence>[,<delay>[,<reliability>[,<peak>[,<mean>]]]]]]	OK ERROR
+CGQMIN?	+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean> [<CR><LF>+CGQMIN: <cid>,<precedence>,<delay>,<reliability>,<peak>,<mean> […]]

+CGQMIN=?	+CGQMIN: <PDP_type>, (range of supported <precedence>s), (range of supported <delay>s), (range of supported <reliability>s), (range of supported <peak>s), (range of supported <mean>s) [<CR><LF>+CGQMIN: <PDP_type>, (range of supported <precedence>s), (range of supported <delay>s), (range of supported <reliability>s), (range of supported <peak>s), (range of supported <mean>s) […]]

Description

This command allows the TE to specify a minimum acceptable profile which is checked by the MT against the negotiated profile returned in the Activate PDP Context Accept message.

The set command specifies a profile for the context identified by the (local) context identification parameter, <cid>. Since this is the same parameter that is used in the +CGDCONT and +CGDSCONT commands, the +CGQMIN command is effectively an extension to these commands. The QoS profile consists of a number of parameters, each of which may be set to a separate value.

A special form of the set command, +CGQMIN= <cid> causes the minimum acceptable profile for context number <cid> to become undefined. In this case no check is made against the negotiated profile.

Parameter

<cid> a numeric parameter which specifies a particular PDP context definition (see +CGDCONT command).

<precedence> a numeric parameter which specifies the precedence class
- 0 network subscribed value
- 1 High Priority
  Service commitments shall be maintained ahead of precedence classes 2 and 3
- 2 Normal priority
  Service commitments shall be maintained ahead of precedence class 3
- 3 Low priority
  Service commitments shall be maintained

<delay> a numeric parameter which specifies the delay class
- 0 network subscribed value
- 1~4 with SDU size = 128 octets

Delay Class	Mean Transfer Delay	95 percentile
1 (Predictive)	< 0.5	< 1.5
2 (Predictive)	< 5	< 25
3 (Predictive)	< 50	< 250
4 (Best Effort)	Unspecified	-

with SDU size = 1024 octets

Delay Class	Mean Transfer Delay	95 percentile
1 (Predictive)	< 0.5	< 1.5

2 (Predictive)	< 5	< 25
3 (Predictive)	< 50	< 250
4 (Best Effort)	Unspecified	-

<reliability> a numeric parameter which specifies the reliability class
- 0 network subscribed value
- 1 Non real-time traffic, error-sensitive application that cannot cope with data loss
- 2 Non real-time traffic, error-sensitive application that can cope with infrequent data loss
- 3 Non real-time traffic, error-sensitive application that can cope with data loss, GMM/SM, and SMS
- 4 Real-time traffic, error-sensitive application that can cope with data loss
- 5 Real-time traffic, error non-sensitive application that can cope with data loss

<peak> a numeric parameter which specifies the peak throughput class
- 0 network subscribed value
- 1 Up to 1000 (8 kbit/s)
- 2 Up to 2000 (16 kbit/s)
- 3 Up to 4000 (32 kbit/s)
- 4 Up to 8000 (64 kbit/s)
- 5 Up to 16000 (128 kbit/s)
- 6 Up to 32000 (256 kbit/s)
- 7 Up to 64000 (512 kbit/s)
- 8 Up to 128000 (1024 kbit/s)
- 9 Up to 256000 (2048 kbit/s)

<mean> a numeric parameter which specifies the mean throughput class
- 0 network subscribed value
- 1 100 (~0.22 bit/s)
- 2 200 (~0.44 bit/s)
- 3 500 (~1.11 bit/s)
- 4 1000 (~2.2 bit/s)
- 5 2000 (~4.4 bit/s)
- 6 5000 (~11.1 bit/s)
- 7 10000 (~22 bit/s)
- 8 20000 (~44 bit/s)
- 9 50000 (~111 bit/s)
- 10 100000 (~0.22 kbit/s)
- 11 200000 (~0.44 kbit/s)
- 12 500000 (~1.11 kbit/s)
- 13 1000000 (~2.2 kbit/s)
- 14 2000000 (~4.4 kbit/s)
- 15 5000000 (~11.1 kbit/s)
- 16 10000000 (~22 kbit/s)
- 17 20000000 (~44 kbit/s)
- 18 50000000 (~111 kbit/s)
- 31 best effort

	SG2520	SO2510	SM2500

Supported	✓	✓	✓

9.4 +CGATT

GMPRS attach or detach

Command	Possible Response
+CGATT=[<state>]	OK ERROR
+CGATT?	+CGATT: <state>
+CGATT=?	+CGATT: (range of supported <state>s)

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.25ter command state. If the MT is already in the requested state, the command is ignored and the OK response is returned. Extended error responses are enabled by the +CMEE command.

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

Parameter

<state> indicates the state of GMPRS attachment
0 detached
1 attached
Other values are reserved and will result in an ERROR response to the execution command

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

9.5 +CGACT

PDP context activate or deactivate

Command	Possible Response
+CGACT=[<state>[,<cid>[,<cid>[,…]]]]	OK ERROR
+CGACT?	+CGACT: <cid>,<state> [<CR><LF>+CGACT: <cid>,<state>[…]]
+CGACT=?	+CGACT: (range of supported <state>s)

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.25ter 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 them 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.

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.

An active secondary context can exist if and only if the corresponding active primary context exists. If the primary PDP context associated with a PDP address is deactivated, all the associated secondary contexts are deactivated too and the data transfer for that PDP address is disabled.

Parameter

<state> indicates the state of GMPRS attachment
0 detached
1 attached
Other values are reserved and will result in an ERROR response to the execution command

<cid> a numeric parameter which specifies a particular PDP context definition (see +CGDCONT command).

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

9.6 +CGDATA

Enter data state

Command	Possible Response
+CGDATA=[<L2P>[,<cid>[,<cid>[,…]]]]	CONNECT ERROR
+CGDATA=?	+CGDATA: (range of supported <L2P>s)

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.25ter online data state.

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

The detailed behavior 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 +CGATT and +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.25ter 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.25ter 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.

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

Parameter

<L2P> a string parameter that indicates the layer 2 protocol to be used between the TE and MT

NULL	none, for PDP type OPS: IHOSS (Obsolete)
PPP	Point-to-point protocol for a PDP such as IP

PAD character steam for X.25 character (triple X PAD) mode
X25 X.25 L2 (LAPB) for X.25 packet mode
M-xxxx manufacturer-specific protocol (xxxx is an alphanumeric string)
If the value is omitted, the layer 2 protocol is unspecified. Other values are reserved and will result in an ERROR response.

<cid> a numeric parameter which specifies a particular PDP context definition (see +CGDCONT command).

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

9.7 +CGPADDR

Show PDP address

Command	Possible Response
+CGPADDR=[<cid>[,<cid>[,…]]]	+CGPADDR: <cid>,<PDP_addr> [<CR><LF>+CGPADDR: <cid>,<PDP_addr>
+CGPADDR=?	+CGPADDR: (range of supported <cid>s)

Description

The execution command returns a list of PDP addresses for the specified context identifiers.

Parameter

<cid> a numeric parameter which specifies a particular PDP context definition (see +CGDCONT command). If no <cid> is specified, the address for all defined context are returned.

<PDP_address> a string 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 command 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>. <PDP_address> is omitted if none is available.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

9.8 +CGAUTO

Automatic response to network request for PDP context activation

Command	Possible Response
+CGAUTO=[<n>]	OK ERROR

+CGAUTO?	+CGAUTO: <n>
+CGAUTO=?	+CGAUTO: (range of supported <n>s)

Description

The set command disables or enables an automatic positive response (auto-answer) to the receipt of a Request PDP Context Activation message from the network. It also provides control over the use of the V.25ter basic commands 'S0', 'A and 'H' for handling network requests for PDP context activation. The setting does not affect the issuing of the unsolicited result code RING or +CRING.
The test command returns the values of <n> supported by the MT as a compound value.
When the +CGAUTO=0 command is received, the MT shall not perform a PS detach if it is attached. Subsequently, when the MT announces a network request for PDP context activation by issuing the unsolicited result code RING or +CRING, the TE may manually accept or reject the request by issuing the +CGANS command or may simply ignore the network request.
When the +CGAUTO=1 command is received, the MT shall attempt to perform a PS attach if it is not already attached. Failure will result in ERROR or, if enabled, +CME ERROR being returned to the TE. Subsequently, when the MT announces a network request for PDP context activation by issuing the unsolicited result code RING or +CRING to the TE, this is followed by the intermediate result code CONNECT. The MT then enters V.25ter online data state and follows the same procedure as it would after having received a +CGANS=1 with no <L2P> or <cid> values specified.

Parameter

<n>

0	turn off automatic response for GMPRS only
1	turn on automatic response for GMPRS only
2	modem compatibility mode, GMPRS only
3	modem compatibility mode, GMPRS and circuit switched calls (default)

For <n> = 0 GMPRS network requests are manually accepted or rejected by the +CGANS command.
For <n> = 1 GMPRS network requests are automatically accepted according to the description above.
For <n> = 2, automatic acceptance of GMPRS network requests is controlled by the ‘S0’ command. Manual control uses the ‘A’ and ‘H’ commands, respectively, to accept and reject GPRS requests. (+CGANS may also be used.) Incoming circuit switched calls can be neither manually nor automatically answered.
For <n> = 3, automatic acceptance of both GMPRS network requests and incoming circuit switched calls is controlled by the ‘S0’ command. Manual control uses the ‘A’ and ‘H’ commands, respectively, to accept and reject GMPRS requests. (+CGANS may also be used.) Circuit switched calls are handled as described elsewhere in this specification.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

9.9 +CGANS

Manual response to a network request for PDP context activation

Command	Possible Response
+CGANS=[<response>[,<L2P>[,<cid>]]]	OK ERROR
+CGANS=?	+CGANS: (range of supported <response>s), (range of supported <L2P>s)

Description

The execution command requests the MT to respond to a network request for Packet Domain PDP context activation which has been signaled to the TE by the RING or +CRING: unsolicited result code. The <response> parameter allows the TE to accept or reject the request.
If <response> is 0, the request is rejected and the MT returns OK to the TE.
If <response> is 1, the following procedure is followed by the MT.
Commands following the +CGANS command in the AT command line shall not be processed by the MT.
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.25ter online data state.
The detailed behavior 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. PDP context activation procedures shall take place prior to or during the PDP startup.
One or more <cid>s may be specified in order to provide the values needed for the context activation request.
During the PDP startup procedure the MT has the PDP type and the PDP address provided by the network in the Request PDP Context Activation message. The MT may also have 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 one or both of PDP type and PDP address to the MT in the PDP startup.

If any of this information is in conflict, the command will fail.
If one or more <cid> is given then an attempt shall be made to identify an appropriate context definition by matching the PDP type and PDP address in the network request with the PDP type and PDP address in each of the specified context definitions (in the order in which their <cid>s appear in the command) as follows -

The PDP type must match exactly.
The PDP addresses are considered to match if they are identical or if the address in the context definition is unspecified.

The context shall be activated using the values for PDP type and PDP address provided by the network, together with the other information found in the PDP context definition. An APN may or may not re required, depending on the application.
If no <cid> is given or if there is no matching context definition, the MT will attempt to activate the context using the values for PDP type and PDP address provided by the network, together with any other relevant information known to the MT. The other context parameters will 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.25ter 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 startup, the V.25ter 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. It is also an error to issue the +CGANS command when there is no outstanding network request.
This command may be used in both normal and modem compatibility modes.

Parameter

<response> is a numeric parameter which specifies how the request should be responded to.
- 0 reject the request
- 1 accept and request that the PDP context be activated

<L2P> a string parameter which indicates the layer 2 protocol to be used (see +CGDATA command)

<cid> a numeric parameter which specifies a particular PDP context definition (see +CGDCONT command)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

9.10 +CGCLASS

GMPRS mobile station class

Command	Possible Response
+CGCLASS=[<class>]	OK ERROR
+CGCLASS?	+CGCLASS: <class>
+CGCLASS=?	+CGCLASS: (range of supported <class>s)

Description

The set command is used to set the MT to operate according to the specified GMPRS mobile class. If the requested class is not supported, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command.

Parameter

<class> a string parameter which indicates the GMPRS mobile class (in descending order of functionality)
- A class A
- B class B
- CG class C in GMPRS only mode
- CC class C in circuit switched only mode

	SG2520	SO2510	SM2500

Supported	✓	✓	✓

9.11 +CGEREP

GMPRS mobile station class

Command	Possible Response
+CGEREP=[<mode>[,<bfr>]]	OK ERROR
+CGEREP?	+CGEREP: <mode>,<bfr>
+CGEREP=?	+CGEREP: (range of supported <mode>s), (range of supported <bfr>s)

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.

Parameter

<mode>

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; otherwise forward them directly to the TE.

2 buffer unsolicited result codes in the MT when MT-TE link is reserved and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE.

<bfr>

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)

Defined events

The following unsolicited result codes and the corresponding events are defined –

+CGEV: REJECT <PDP_type>, <PDP_addr>

A network request for PDP context activation occurred when the MT was unable to report it to the TE with a +CRING unsolicited result code and was automatically rejected.

+CGEV: NW REACT <PDP_type>, <PDP_addr>, [<cid>]

The network has requested a context reactivation. The <cid> that was used to reactivate the context is provided if known to the MT.

+CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>]
The network has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the MT.

+CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>]
The mobile equipment has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the MT.

+CGEV: NW DETACH
The network has forced a GPRS detach. This implies that all active contexts have been deactivated. These are not reported separately.

+CGEV: ME DETACH
The mobile equipment has forced a GPRS detach. This implies that all active contexts have been deactivated. These are not reported separately.

+CGEV: NW CLASS <class>
The network has forced a change of MS class. The highest available class is reported (see +CGCLASS).

+CGEV: ME CLASS <class>
The mobile equipment has forced a change of MS class. The highest available class is reported (see +CGCLASS).

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

9.12 +CGREG

GMPRS network registration status

Command	Possible Response
+CGREG=[<n>]	OK ERROR
+CGREG?	+CGREG: <n>,<stat>[,<lac>,<ci>] *+CME ERROR: <err>*
+CGREG =?	+CGREG: (list pf supported <n>s)

Description

The set command controls the presentation of an unsolicited result code +CGREG: <stat> when <n>=1 and there is a change in the MT's GMPRS network registration status, or code +CGREG: <stat>[,<lac>,<ci>] when <n>=2 and there is a change of the network cell.

Parameter

<n>
0 disable network registration unsolicited result code
1 enable network registration unsolicited result code +CGREG: <stat>

2 enable network registration and location information unsolicited result code +CGREG: <stat>[,<lac>,<ci>]

<stat>
0 not registered, not currently searching
1 registered, home network
2 not registered, currently trying to attach or searching
3 registration denied
4 unknown
5 registered, roaming

<lac> string type; two byte location area code in hexadecimal format

<ci> string type; two byte cell ID in hexadecimal format

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

9.13 +CGSMS

Select service for MO SMS message

Command	Possible Response
+CGSMS=[<service>]	OK ERROR
+CGSMS?	+CGSMS: <service>
+CGSMS=?	+CGSMS: (range of currently available <service>s)

Description

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

Parameter

<service> a numeric parameter which indicates the service preference to be used
0 GMPRS
1 circuit switched
2 GMPRS preferred (use circuit switched if GMPRS not available)
3 circuit switched preferred (use GMPRS if circuit switched not available)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10 SAT Commands

10.1 +CINFO

LAI information

Command	Possible Response
+CINFO	*ERROR*
	+CINFO : <id>,<mcc>,<mnc>,<lac>

Description

It report LAI information after cell selection/reselection.

Parameter

<id> cell Id

<mcc>,<mnc> ,<lac> LAI consists of PLMN and LAC on the current serving SPOTBEAM

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.2 +RCIPH

ciphering state

Command	Possible Response
+RCIPH	*ERROR*
	+RCIPH: <ciph>

Description

It indicate the current ciphering state.

Parameter

<ciph>
0 inactive
1 active

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.3 +ERINGI

GPS needed state or ALERT state

Command	Possible Response
+ERINGI	*ERROR*

	+ERINGI: <type>,<time>

Description

It indicate GPS needed state or ALERT state.

Parameter

<type> ring type
0 ALERT state
1 GPS needed state

<time> remaining time

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.4 +ERINGF

change the previous +ERING state

Command	Possible Response
+ERINGF	*ERROR*
	+ERINGF: <cause>

Description

It indicate to change the previous +ERING state.

Parameter

<cause>
0 No Error
1 No Carrier
2 No Cell
3 Invalid PLMN
4 Handover
5 Channel release
6 Link establish failure
7 RA failure
8 Link abort
9 L2, L1 failure
10 HPLMN search fail
11 IMM ASS reject
12 Abnormal release
13 Access not allowed
14~19 reserved
20 Invalid position for SB
21 Invalid position for LAI
22 Invalid position
23 Invalid position for SVPD
24 GPS too old

25 ERING timeout
26 ERING normal penetration
27 ERING GPS answering page

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.5 +ERING

Early Ring

Command	Possible Response
+ERING	OK ERROR

Description

It response for +ERINGI, +ERINGF command. When GPS need state or ALERT state, if MT call receive then this command send to DTE.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.6 +PVERIF

verify the position information

Command	Possible Response
+PVERIF	OK ERROR

Description

It requests to verify the position information from network.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.7 +APVERIF

abort the ongoing position verification request

Command	Possible Response
+APVERIF	OK ERROR

Description

It send to abort the ongoing position verification request.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.8 +MBCCH

save the ARFCN to NVRAM as the last camped on ARFCN

Command	Possible Response
+MBCCH=<n>	+MBCCH: <r>
+MBCCH=?	

Description

It requests to save the ARFCN to NVRAM as the last camped on ARFCN.

Parameter

<n> entry number

<r> 0 call clearing
1 MBCCH confirm

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.9 +RINFO

information for region

Command	Possible Response
+RINFO	+RINFO: <avail>,<region> *OK* *ERROR*
indication	+RINFO: <avail>,<region>

Description

It indicate or request information for region.

Parameter

<avail>
0 use old region
1 no region info
2 region info available

<region> region info string; refer GSM 03.38 [6.2.1] Default alphabet

10.10 +RSSISTRT

RSSI Start

Command	Possible Response
+RSSISTRT=<n>	OK ERROR
+RSSISTRT=?	

Description

It Requests the RSSI Unit to report its signal strength measurements on a periodic basis as specified in the message parameters.

Parameter

<n> report interval in msecs; minimum interval is 320 msec

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.11 +RSSIEND

RSSI End (stop)

Command	Possible Response
+RSSIEND	OK ERROR

Description

Its request the RSSI Unit to stop reporting its signal strength measurements.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.12 +RSSISTAT

RSSI Stat

Command	Possible Response
+RSSISTAT	
	+RSSISTAT: <fsnr>,<ssnr>,<cfact>,<pre>,<qual>

Description

This command message contains the last SNR measurement result, which are returned on a periodic basis as determined by the RSSISTRT Command.

Parameter

<fsnr> SNR normalized to a 0-30 scale, averaged over short duration

<ssnr> SNR normalized to a 0-30 scale, averaged over long duration

<cfact> Adjustment to compensate for varying TX Power Levels across

<pre> TRUE if following parameter is valid, FALSE otherwise

<qual> Receive signal quality, valid only if <pre> is TRUE

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.13 +DIAG

SAT diagnostic

Command	Possible Response
+DIAG=<str>	+DIAG: <str>
+DIAG=?	

Description

GMTS communication AT Command.

Parameter

<str> hexa-string

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.14 +GGMI

Request manufacture identification

Command	Possible Response
+GGMI	+GGMI: <manufacturer> *+CME ERROR: <err>*
+GGMI=?	

Description

This command is used to obtain the manufacturer identification information.

Parameter

<manufacturer> the total number of characters, including line terminators, in the information text shall not exceed 2048 characters.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.15 +GGMM

Request model identification

Command	Possible Response

+GGMM	+GGMM: <model> *+CME ERROR: <err>*
+GGMM=?	

Description

This command is used to obtain the manufacturer model identification information.

Parameter

<model> the total number of characters, including line terminators, in the information text shall not exceed 2048 characters.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.16 +GGMR

Request revision identification

Command	Possible Response
+GGMR	+GGMR: <revision> *+CME ERROR: <err>*
+GGMR=?	

Description

This command is used to obtain the manufacturer embedded firmware information.

Parameter

<revision> the total numbers of characters, including line terminations, in the information text shall not exceed 2048 characters.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.17 +GGSN

Request product serial number identification

Command	Possible Response
+GGSN	+GGSN: <sn> *+CME ERROR: <err>*
+GGSN=?	

Description

This command is used to obtain the manufacturer international Mobile Equipment Identity (IMEI).

Parameter

<sn> the total number of characters, including line terminators, in the information text shall not exceed 2048 characters.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.18 +GIMI

Request international mobile Subscriber identity

Command	Possible Response
+GIMI	+GIMI: <IMSI> *+CME ERROR: <err>*
+GIMI=?	

Description

This command is used to obtain the International Mobile subscriber Identity (IMSI) value assigned to the SIM.

Parameter

<IMSI> International Mobile Subscriber Identity (string without double quotes)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.19 +GPIC

Display PIN counter

Command	Possible Response
+GPIC	+GPIC : <n> *+CME ERROR: <err>*
+GPIC=<fac>	+GPIC : <n> *+CME ERROR: <err>*
+GPIC?	+GPIC : <code>
+GPIC=?	+GPIC : <p1>, <p2>, <p3>, <p4>

Description

Remain PIN and PUK count notify.

Parameter

<n> Number of attempts left to enter the currently required password. This number will be countered down after each failure.

<fac> Password for which the corresponding PIN counter is to be displayed.

"SC" SIM PIN or SIM PUK. If the SIM PIN has been deactivated after three failed attempts, the counter for SIM PUK will be returned instead.

"P2" SIM PIN2 or SIM PUK2. If the SIM Pin2 has been deactivated after three failed attempts, the counter for SIM PUK2 will be returned instead.

<code> Identification of the currently required password

SIM PIN	ME is waiting for SIM PIN1.
SIM PUK	ME is waiting for SIM PUK1 if PIN1 was disabled after three failed attempts enter PIN1.
SIM PIN2	ME is waiting for PIN2, when the attempts to access PIN2 requiring features was acknowledged with CME ERROR.
SIM PUK2	ME is waiting for PUK2 to unblock a disabled PIN2. Necessary if preceding command was acknowledged with CME ERROR.

<p1> Number of attempts left to enter the currently required PIN1.

<p2> Number of attempts left to enter the currently required PUK.

<p3> Number of attempts left to enter the currently required PIN2.

<p4> Number of attempts left to enter the currently required PUK2.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.20 +PWR

Power control

Command	Possible Response
+PWR=<n>	*OK* *ERROR* *+CME ERROR: <err>*
+PWR=?	+PWR: power on(1)/off(0) *+CME ERROR: <err>*

Description

This command request to network and Low layer that power on/off.

Parameter

<n>

0	power off
1	power on

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.21 +CEXT

Set Docking State

Command	Possible Response
+CEXT=<state>	*OK* *ERROR* *+CME ERROR: <err>*
+CEXT=?	+CEXT: 0-17 *+CME ERROR: <err>*

Description

This command sets Power Class and Docking Status.

Parameter

<state>

0	not connect
1	UT, Handheld, Data terminal C(Data Cable)
2	Vehicular, No adjustable antenna
3	Vehicular, adjustable antenna
4	Vehicular, adjustable antenna
5	Maritime antenna
6	Fixed
7	PCO
8	Data terminal A&B
9	External encryptor
10	reserved
11	reserved
12	reserved
13	reserved
14	reserved
15	reserved
16	reserved
17	USB (Only SO2510)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.22 +ARFCN

Set the last ARFCN

Command	Possible Response
+ARFCN=<rfcn>	*OK* *ERROR* *+CME ERROR: <err>*
+ARFCN?	+ARFCN: <rfcn>

Description

Set the last ARFCN(Absolute Radio Frequency Channel Number) camped on.

Parameter

<rfcn> Integer type; Radio Frequency Channel Number (1 ~ 1087)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.23 +GMODE

Mode switch and set

Command	Possible Response
+GMODE=<mode>	*OK* *ERROR* *<result>* *+CME ERROR: <err>*
+GMODE=?	+GMODE: (0-3)
+GMODE?	+GMODE: <stat>

Description

SAT or GSM mode set and un-set, SIM Device switch for each mode.

Parameter

<mode> Integer type;
0 SAT Mode
1 GSM Mode
2 SAT Stop
3 GSM Stop

<result> string type; It notify result comment
INVALID TRANSITION
INVALID MODE
SAT NOT READY
DSP ERROR
RESET ERROR
UNDEFINED

<state> Integer type;
0 unknown
1 inactive
2 stand-by
3 setup
4 active
5 upgrading
6 deactivating

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.24 +CALLING

MO Call indicate

Command	Possible Response
+CALLING	*ERROR*
	+CALLING: <type>, <number>, <type>

Description

MO Call type and call number indicates to DTE.

Parameter

<type> Integer type;

0	vocie call
1	alternate call voice and fax
2	fax call
3	alternate call voice and data starting with voice (not supported)
4	data call
5	alternate call voice and fax starting with fax
6	alternate call voice and data starting with data (not supported)
7	none
8	GMPRS

<number> string type; dialing number

<type> type of phone number

129	dial string without international access character
145	dial string which includes the international access character “+”

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.25 +CONNECT

Call connection indicate

Command	Possible Response
+CONNECT	*ERROR*
	+CONNECT: <type>

Description

It indicates to DTE that Current connection type.

Parameter

<type> Integer type;

0	voice call
1	fax call
2	data call
3	external voice call
4	GMPRS
5	GMPRS suspend
6	GMPRS resume

[Notice] <type> 4,5,6 are excluded in SG2520.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.26 +UPBOOT

Call Stack Boot-loader upgrades.

Command	Possible Response
+UPBOOT	*OK* *ERROR* *+CME ERROR: <err>*

Description

Call Stack Boot-loader upgrades.

	SG2520	SO2510	SM2500
Supported	✓	X	X

10.27 +UPAPP

Call Stack Application upgrades.

Command	Possible Response
+UPAPP	*OK* *ERROR* *+CME ERROR: <err>*

Description

Call Stack Application upgrades.

	SG2520	SO2510	SM2500
Supported	✓	X	X

10.28 +GDHT

Dual Hold Time check.

Command	Possible Response

+GDHT	*OK* *ERROR* *+CME ERROR: <err>* +GDHT: <time>

Description

Dual Hold Time check for SAT/GSM.

Parameter

<time> Integer type; unit minutes

	SG2520	SO2510	SM2500
Supported	✓	X	X

10.29 +GCLB

Codec Loop Back

Command	Possible Response
+GCLB=<mode>	+GCLB: <result> OK *ERROR* *+CME ERROR: <err>*
+GCLB=?	+GCLB: (list of supported<mode>s) OK

Description

SAT Codec Loop Back.

Parameter

<mode> Integer type;
0 Deactivate
1 Activate

<result> Integer type;
0 fail
1 success

	SG2520	SO2510	SM2500
Supported	✓	X	X

10.30 +GTEMP

temperature status indicate

Command	Possible Response

+GTEMP	+GTEMP: <temp> *OK* *ERROR*
	+GTEMP: <temp>

Description

It indicate ME temperature status.

Parameter

<temp> temperature status
0 Normal
1 Critical

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.31 +GSTM

SAT Test mode set.

Command	Possible Response
+GSTM=<mode>[,<arfcn>]	OK *ERROR* *+CME ERROR: <err>*
+GSTM=?	+GSTM: (list of supported<mode>s), (list of supported<arfcn>s) OK

Description

SAT Test mode set (RTB setting).

Parameter

<mode> Integer type;
0 Off
1 On

<arfcn> Integer type; 1~ 1087

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.32 +GENC

External Encryption

Command	Possible Response

+GENC=<mode>	+GENC: <mode> OK *ERROR* *+CME ERROR: <err>*
+GENC=?	+GENC: (list of supported<mode>s) OK
+GENC?	+GENC: <mode>, <t2t> OK

Description

External Encryption set.

Parameter

<mode> Integer type; External Encryption Mode
0 External Encryption Off
1 External Encryption On

<t2t> Integer type; T2T Check
0 not T2T Call
1 T2T Call connecting

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.33 +SSAP

Audio Path set

Command	Possible Response
+ SSAP=<audMode>	OK *ERROR* *+CME ERROR: <err>*
+ SSAP=?	+SSAP: (list of supported<audMode>s) OK *+CME ERROR: <err>*
+ SSAP?	+SSAP: <audMode> OK *+CME ERROR: <err>*

Description

Satellite, Selection of Audio Path.

Parameter

< audMode > Integer type
1 phone speaker, phone mic
2 ear speaker, ear mic
3 UDC

4 BLUETOOTH

	SG2520	SO2510	SM2500
Supported	✓	X	X

10.34 +HOOK

Hook On/Off

Command	Possible Response
+ HOOK =<hookOnOff>	OK *ERROR* *+CME ERROR: <err>*
+ HOOK =?	+HOOK: (list of supported<hookOnOff>s) OK *+CME ERROR: <err>*
+ HOOK?	+ SSAP: <hookOnOff> OK *+CME ERROR: <err>*

Description

Hook On/Off set.

Parameter

< hookOnOff > Integer type
0 hook off
1 hook on

	SG2520	SO2510	SM2500
Supported	X	✓	X

10.35 +STOPRING

Ring stop indicate

Command	Possible Response
+STOPRING	*ERROR*
	+STOPRING

Description

It indicate that received “ATA Command” from external DTE.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.36 +BATCHG

Battery Charge Status

Command	Possible Response
+ BATCHG =<conn>	*OK* *ERROR* *+CME ERROR: <err>*
+ BATCHG?	+ BATCHG: <stts> *+CME ERROR: <err>*

Description

The purpose of this command is to inform the battery charge status.
The write command is to set whether the charging adapter is connected or not. If you set it 1, the Unsolicited Result Code is sent whenever the battery charge status is changed. Otherwise, nothing is sent.
The read command is to get the information of the battery charge status. Therefore, whenever you would like to get the information of the battery charge status, just simply use this command. Then you will get the information of the battery charge status.

Parameter

<conn>
0 No charging adapter is connected.
1 Charging adapter is connected.

<stts>
0 No charging adapter is connected
1 Charging adapter is connected, charging in progress
2 Charging adapter is connected, charging has finished

	SG2520	SO2510	SM2500
Supported	✓	X	X

10.37 +SBV

Battery ADC

Command	Possible Response
+ SBV	*+SBV: <adc>* *OK* *ERROR* *+CME ERROR: <err>*

Description

The execute command allows to monitor the battery ADC of the module.
The displayed value is constant over the measurement period. The duration of the measurement period depends on the operating mode on the radio interface.

Parameter

<adc>
Battery ADC

	SG2520	SO2510	SM2500
Supported	✓	X	X

10.38 +SGPCA

GMPRS Packet Current Amount

Command	Possible Response
+ SGPCA	+SGPCA: <sent>, <received> *OK* *ERROR* *+CME ERROR: <err>*

Description

This command is to get the current amount of data uplinked/downlinked during a GMPRS packet session. By the way, Notice that the current amount is never accumulated among sessions, which means that the current amount is reset at the start of every session.

Parameter

<sent> the unit is a byte;
The current amount of data uplinked.

<received> the unit is a byte;
The current amount of data downlinked.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

10.39 +SGPSA

GMPRS Packet Session Amount

Command	Possible Response
	+SGPSA: <sent>, <received>

Description

This command is the Unsolicited Result Code which informs the last session amount of data uplinked/downlinked as often as a GMPRS packet session is finished.

Parameter

<sent> the unit is a byte; The last session amount of data uplinked.
<received> the unit is a byte;
The last session amount of data downlinked.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

11 GPS Commands

11.1 +GPSTRACK

GPS tracking set

Command	Possible Response
+GPSTRACK= <track_state>, <output_rate>, <nmea_msgs>	OK ERROR
+GPSTRACK=?	

Description

This Command may be used both in SAT and GSM modes. It requests the GPS Receiver to stat tracking, and report position with periodic NMEA-1083 formatted messages.

Parameter

<track_state>
- 0 Set tracking OFF
- 1 Set tracking ON

<output_rate>
- 0 poll once
- 1-255 output-rate

<nmea_msgs> (1-127)
- 0x01 GPGGA : GPS Fix Data
- 0x02 GPGLL : Geographic Position Latitude/Longitude
- 0x04 GPGSA : GPS DOP and Active Satellites
- 0x08 GPGSV : GPS Satellites in View
- 0x10 GPRMC : Recommended Minimum Specific GPS/Transit Data
- 0x20 GPVTG : Track Mane Good and Ground Speed
- 0x40 GPZDA : Time and Date

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

11.2 +GPSSERVICE

GPS session check

Command	Possible Response
+GPSSERVICE=<enable_mode>	OK ERROR
+GPSSERVICE=?	

Description

This command is a request to enable or disable the GPS Receiver in preparation for a “GPS Session” containing multiple GPS requests.

Parameter

<enable_mode>
0 GPS disabled mode
1 GPS enabled mode

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

11.3 +GPSGMT

GPS time request

Command	Possible Response
+GPSGMT	+GPSGMT: <isdst>, <yday>, <wday>, <year>, <mon>, <mday>, <hour>, <min>, <sec>

Description

This Command requests the GMT date/time from the GPS Receiver.

Parameter

<isdst>	Daylight Saving Time flag	
<yday>	days since January 1	(0-365)
<wday>	days since Sunday	(0,6)
<year>	year since 1900	
<mon>	months since January	(0,11)
<mday>	day of the month	(1,31)
<hour>	hours after midnight	(0,23)
<min>	minutes after the hour	(0,59)
<sec>	seconds after the minute	(0,59)

[Note: Please remind that the values of +GPSGMT are not valid if the parameter of <year> is indicated with 70, which means the GPS hasn’t been fixed after the GPS Receiver powers on.

	SG2520	SO2510	SM2500

Supported	✓	✓	✓

11.4 +GPSSWREV

GPS Receiver revision check

Command	Possible Response
+GPSSWREV	+GPSSWREV: <rev>

Description

This command requests the GPS Software Revision from the GPS Receiver.

Parameter

<rev> Software revision String

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

11.5 +GPSCAPA

GPS services available indication

Command	Possible Response
+GPSCAPA	+GPSCAPA: <service_available> OK *ERROR*
	+GPSCAPA: <service_available>

Description

Indicates whether GPS services are available or not. It is only broadcast when entering SAT mode for the first time after power-up, and never changes during run-time.

Parameter

<service_available>

0 GPS services not available
1 GPS services available
2 SAT implicitly detached
3 SAT attached

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

11.6 +GPSFIXREQ

GPS fixed indication

Command	Possible Response
+GPSFIXREQ	+GPSFIXREQ: <fix_required>

	OK *ERROR*
	+GPSFIXREQ: <fix_required>

Description

Indicates whether a new GPS fix is required. While in SAT mode, the GPS task broadcasts this primitive to its subscribers whenever a change is detected.
A fix is considered to be required, if:
- the current fix is older than the age threshold
and
- GPS position reporting is required by the network.

Parameter

<fix_required>
0 no GPS fix required
1 new GPS fix required

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

11.7 +GPSTRACKD

NMEA Tracking data.

Command	Possible Response
+GPSTRACKD	*ERROR*
	+GPSTRACKD: <msg_length>, <nmea_msg>

Description

NMEA Tracking data

Parameter

<msg_length> NMEA message length

<nmea_msg> NMEA message

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

11.8 +GPSTRACKS

NMEA Tracking state.

Command	Possible Response
+GPSTRACKS	*ERROR*
	+GPSTRACKS: <curr_state>, <status>

Description

NMEA Tracking state

Parameter

<curr_state>
0 GPS tracking OFF
1 GPS tracking ON

<status>
0 GPS tracking ON success
1 GPS tracking OFF success
2 GPS tracking device failed
3 GPS tracking already ON
4 GPS tracking already OFF
5 GPS tracking invalid PARMS
6 GPS tracking ON pending
7 GPS tracking timeout

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

11.9 +GPSUTC

Indicate UTC time from the GPS Receiver.

Command	Possible Response
+GPSUTC	*ERROR*
	+GPSUTC: <isdst>, <yday>, <wday>, <year>, <mon>, <mday>, <hour>, <min>, <sec>

Description

This Command indicates the UTC time from the GPS Receiver.

Parameter

<isdst>	Daylight Saving Time flag	
<yday>	days since January 1	(0-365)
<wday>	days since Sunday	(0,6)
<year>	year since 1900	
<mon>	months since January	(0,11)
<mday>	day of the month	(0,31)
<hour>	hours after midnight	(0,23)

<min> minutes after the hour (0,59)

<sec> seconds after the minute (0,59)

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

11.10 +GPSDOWN

GPS F/W download

Command	Possible Response
+GPSDOWN	OK ERROR

Description

This Command indicates GPS F/W download starting to the GPS Receiver.

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

11.11 +GPSLOCAL

Set the local time to GPS module

Command	Possible Response
+GPSLOCAL=<curr_local_time>,<flag>	+GPSLOCAL: <rsp_type> OK ERROR

Description

This command allows a user to set a local time to the GPS receiver.

Parameter

<curr_local_time> string type; changed local time (seconds unit)

<flag> 0 NONE
1 SAT only
2 SAT Module
3 SAT/GSM

<rsp_type> 0 GPS Local Time set Fail
1 GPS Local Time set Success

	SG2520	SO2510	SM2500
Supported	✓	✓	✓

