TEXAS INSTRUMENTS

AT Command Interface Description

ACI - Application Control Interface

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0   Document Control

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*Note-1:

    Original document is modified by Liyi Yu on 01 July 2004.

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Added +CCLK, %CPMBW, %CSSD, %COPS, %SECP, %CUST, %SATCC, %CSSN (propagation of

0.2   References, Abbreviations, Terms

[GSM 07.05]   GTS 07.05: January 1998 (GSM 07.05 version 5.5.0) Use of Data Terminal Equipment -
Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS)
and Cell Broadcast Service (CBS), ETSI

[GSM 07.07]   ETS 300 916: February 1998 (GSM 07.07 version 5.5.0) AT command set for GSM Mobile
Equipment (ME)

[T.32]   T.32 (08/95) Asynchronous facsimile DCE control - service class 2, ITU

[T V.25_TER]   (ITU-T V.25 ter, 1997) ITU-T Recommendation V.25 ter; Series V: data communication
over the telephone network; Interfaces and voiceband modems; Serial asynchronous
automatic dialing and control, ITU

[TI 8411.802] 8411.802.99.104, January, 29, 1999, ACI - Application Control Interface, Functional
Interface Description, Texas Instruments

[TI 8410.001] 8410.001.98.102, September, 18, 1998, G23 Product Description, Texas Instruments

Table of Contents

1   Introduction

G23 is a software package implementing Layers 2 and 3 of the ETSI-defined GSM air interface signaling protocol, and as such represents the part of a GSM mobile station's protocol software which is both, platform and manufacturer independent. Therefore, G23 can be viewed as a building block providing standardized functionality through generic interfaces for easy integration.

The G23 suite of products consists of the following items:

- Layers 2 and 3 for speech & short message services,

- Layers 2 and 3 for fax & data services,

- Application Control Interface/AT Command Interface,

- MMI and MMI Framework (MFW) and

- Test and integration support tools.

This document describes AT Commands, which are special to the Condat implementation of the AT command interface. The commands are extensions to existing AT Commands (described by [GSM 07.07], [GSM 07.05], [T V.25_TER] and [T.32]), and new commands, which are implemented to access and control features of the Condat software that are not covered by the standardised AT Commands yet. Condat specific AT Commands are classified by the percent character '%' as the first character of a command. The document describes the syntax and parameters of the Condat specific commands, and should be understood as an Annex to [GSM 07.0x]. For further details regarding the principles of command syntax and parameter types of the AT interface, please refer to [T V.25_TER] and [GSM 07.05].

2   Texas Instruments Specific AT Commands

2.1   %NRG: Network registration and service selection

Command	Possible response(s)
%NRG=[<regMode>[,<srvMode>[,<oprFrmt>[,<opr>]]]]	+CME ERROR: <err>
%NRG?	%NRG: <regMode>,<srvMode>,<oprFrmt>,<srvStat>,<opr>
%NRG=?	%NRG: (list of supported <regMode>s), (list of supported <srvMode>s), (list of supported <oprFrmt>s)

Description

Set command forces an attempt to select and register the GSM network operator. <regMode> is used to select whether the selection is done automatically by the ME or is forced by this command to operator <opr> (it shall be given in format <oprFrmt>). If the selected operator is not available, no other operator is selected (except <regMode>=4). The selected operator name format shall apply to further read commands (%NRG?) also. <srvMode> is used to specify the different stages of service to register to. <srvMode>=3 can be used to change the behavior of registration in case of a loss of coverage. If connection to the operator is lost and <regMode> was set to automatic, ME tries to register to the previous operator automatically. In case <regMode> was set to manual, ME stays unregistered and waits for a manual registration attempt. Refer subclause 9.2 of [GSM 07.07] for possible <err> values. This command is abortable when registration attempt is made.

Read command returns the current registration mode, service mode, service status and the currently selected operator. If no operator is selected, <oprFrmt> and <opr> are omitted.

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

NOTE: The command %NRG is an expansion of the +COPS command. The new command allows specifying the service state of the registration. For a list of current available network operators please use the test command of +COPS.

Defined Values

<regMode>:

>   0   automatic registration (<opr> field is ignored)
>   1   manual registration (<opr> field shall be present on registration attempt)
>   4   manual/automatic (<opr> field shall be present); if manual selection fails, automatic mode (<regMode>=0) is entered

<srvMode>:

>   0   full service
>   1   limited service
>   2   no service
>   3   set registration mode only

<oprFrmt>:

>   0   long format alphanumeric <opr>

1   short format alphanumeric <opr>
2   numeric <oprr>

<opr>:

String type; <oprFrmt> 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; numeric format is the GSM Location Area Identification number (refer GSM 04.08 sub clause 10.5.1.3) which consists of a three BCD digit country code coded as in ITU-T E.212 Annex A, plus a two BCD digit network code, which is administration specific; returned <opr> 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)

2.2   %CACM: Query accumulated call meter using PUCT

Command	Possible response(s)
%CACM	%CACM: <cur>,<price> +CME ERROR: <err>
%CACM=?	

Description

Returns the current value of the accumulated call meter, calculated with the values given by the price per unit and currency table stored in SIM. Refer sub clause 9.2 of [GSM 07.07] for possible <err> values.

Defined Values

<cur>:

String type; three-character currency code (e.g. "GBP", "DEM"); character set as specified by command Select   TE Character Set +CSCS

<price>:

String type; calculated price value of accumulated call meter; dot is used as a decimal separator (e.g. "2.66")

2.3   %CAOC: Query current call meter using PUCT

Command	Possible response(s)
%CAOC	%CAOC: <cur>,<price> +CME ERROR: <err>
%CAOC=?	

Description

Returns the current value of the current call meter, calculated with the values given by the price per unit and currency table stored in SIM. Refer sub clause 9.2 of [GSM 07.07] for possible <err> values.

Defined Values

<cur>:

String type; three-character currency code (e.g. "GBP", "DEM"); character set as specified by

command Select TE Character Set +CSCS

<price>:

> String type; calculated price value of accumulated call meter; dot is used as a decimal separator (e.g. "2.66")

2.4 %CTV: Call timer value

Command	Possible response(s)
%CTV	%CTV: <dur> +CME ERROR: <err>
%CTV=?	

Description

Returns the current value of the last call duration in seconds. Refer sub clause 9.2 of [GSM 07.07] for possible <err> values.

Defined Values

<dur>:

> Integer type; represents the duration of the last call in unit of seconds.

2.5 %CPI: Call progress information

Command	Possible response(s)
%CPI=<n>	*+CME ERROR: <err>*
%CPI?	%CPI: <n> *+CME ERROR: <err>*
%CPI=?	%CPI: (list of supported <n>s)

Description

This command refers to call progress information, which are indicated by the network during the states of a circuit switched call. Parameter <n> is used to disable/enable the presentation of an unsolicited result code:

When <n>=1 and a call progress information is received, unsolicited result code
%CPI: <cId>,<msgType>,<ibt>,<tch> is sent to TE. <cId> identifies the call in the call table. The value of <msgType> describes the layer 3 message type that was used to transfer the call progress information. The state of in-band tones for that call and the traffic channel assignment can be monitored by the values of <ibt> and <tch>.

When <n>=2 and a call progress information is received, unsolicited result code
%CPI: <cId>,<msgType>,<ibt>,<tch>,[<dir>],[<mode>][,<number>,<type>[,<alpha>]] is sent to TE. In addition where <n>=1, <dir> describes the direction of the call. The value of <mode> describes the mode of the call (e.g. voice or data). <number> is call number. The value of <type> describes the type of number. <alpha> is the alpha identifier of the called number as stored in the phonebook.

When <n>=3 and a call progress information is received, unsolicited result code
%CPI: <cId>,<msgType>,<ibt>,<tch>,<dir>,[<mode>],[<number>],[<type>],[<alpha>],[<cause>],<line> is sent to TE. In addition to <n>=2, the value of <cause> reports the GSM specific cause values for call control

defined in 3GPP specification 04.08 annex H. The value of <line> indicates whether the call is on line1, or line2, see ALS line value defined in command %CLCC.

Test command returns values supported by the TA as compound values.

Defined Values

<n> (sets/shows the result code presentation status in the):

  <u>0</u> disable
  1 enable
  2 enable with call number information

  3 enable with call number information, GSM cause information and ALS line information

<cId>: integer type; call number in internal call table which is zero based. By adding 1 to this value you get the call identification number as described in GSM 02.30 subclause 4.5.5.1, which can then be used in +CHLD command operations.

<msgType> (layer 3 message type):

  0 setup message
  1 disconnect message
  2 alert message
  3 call proceed message
  4 synchronization message
  5 progress message
  6 call connected message

  7 release message

  8 reject message

<ibt> (status of the usage of in-band tones):

  0 no in-band tones
  1 in-band tones

<tch> (traffic channel assignment):

  0 TCH not assigned
  1 TCH assigned

<dir>:

  0 mobile originated (MO) call

  1 mobile terminated (MT) call

  2 network initiated mobile originated call (CCBS)

  3 redialling mobile originated call (auto call)

<mode> (bearer/teleservice):
  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/data, data mode

8   alternating voice/fax, fax mode
9   unknown

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

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

<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.

<cause>: GSM specific cause values for call control defined in 3GPP TS 24.008 section 04.08 annex H
    Additional the following internal cause values defined by TI are reported:
    MNCC_CAUSE_REEST_STARTED   (0xc507): call re-establishment started
    MNCC_CAUSE_REEST_FINISHED   (0xc508): call re-establishment is finished

<line>: line parameter for ALS, indicates the used line of the call:
    0   call is on line 1.
    1   call is on line 2.

2.6   %SATC: Configuration for SIM application toolkit

Command	Possible response(s)
%SATC=<n>,<satPrfl>	
%SATC?	%SATC: <n>,<satPrfl>
%SATC=?	%SATC: (list of supported <n>s),(<prflLen>)

Description

This command refers to the SIM application toolkit download mechanism, which is used to indicate to the
SIM the features that the ME is capable of. The different features that are possible for a proactive SIM card
are summarized by a table called a profile, refer to GSM 11.14 for more details. Texas Instruments' ACI,
SMS and SIM modules already implement some of these features. Therefore the profile that is indicated by
<satPrfl> will be combined with the existing one. The current profile setting could be displayed using the
read command. <n> is used to enable/disable the presentation of unsolicited notification result codes from
TA to TE.

When <n>=1 and one of the following conditions have occurred, the respective unsolicited result is sent to
TE.

- A command received from the SIM that is not handled by ME is indicated to TE by %SATI: <satCmd>.

- The result to an envelope command, which was sent by TE, is indicated using the result %SATE: <satRsp>.
For more information regarding the sending of envelope commands to SIM, please refer to the %SATE
command description.

- If SIM application toolkit tries to set up a call using the Set Up Call feature described in GSM 11.14, and
the conditions for the call are checked by ME successfully, the call is indicated to TE using the result
%SATA: [<rdl>]. Using the accept command A, ME tries to establish the call, otherwise the hook-on
command H rejects the pending SAT call and sends the respective response to SIM.

- In general, commands or responses sent by ME to SIM or commands handled by ME are indicated to TE using the result %SATN: <satNtfy>. With these notifications, TE shall be able to indicate appropriate messages to a user.

Defined Values

<n>:

> (Parameter sets/shows the result code presentation status in the TA)

<satPrfl>:

> String type; SIM application toolkit profile (hexadecimal format; refer +CSCS) starting with first byte of the profile.

<satCmd>:

> String type; SIM application toolkit command (hexadecimal format; refer +CSCS) starting with command tag.

<satRsp>:

> String type; SIM application toolkit response (hexadecimal format; refer +CSCS) starting with first byte of response data.

<satNtfy>:

> String type; commands or responses sent by ME to SIM or commands handled by ME (hexadecimal format; refer +CSCS) starting with first byte of response data or command tag.

<rdl>:

> Integer type; if a pending SIM application toolkit command is alerted to TE using result %SATA:, the value of <rdl> indicates the redial timeout for the call in unit of milliseconds.

2.7   %SATE: Send SAT envelope command

Command	Possible response(s)
%SATE=<satCmd>	%SATE: <satRsp>
%SATE=?	

Description

This command provides the possibility to send a command to the SIM, using the envelope mechanism of SIM application toolkit as described in GSM 11.14. If <satCmd> is present the contents is converted and send directly to SIM. The coding of the SIM command is the task of TE, no checking is done by ME. As soon as a response from the SIM is received, the contents are send to ME using the result %SATE: <satRsp>.

Defined Values

<satCmd>:

> String type; SIM application toolkit command (hexadecimal format; refer +CSCS) starting with command tag.

<satRsp>:

> String type; SIM application toolkit response (hexadecimal format; refer +CSCS) starting with first byte of response data.

2.8   %SATR: Send SAT command response

Command	Possible response(s)
%SATR=<satRsp>	
%SATR=?	

Description

This command provides the possibility to send a response to previous received SAT command. If a SIM application toolkit command was indicated to TE using the result %SATI: <satCmd>, the TE should send an appropriate response using the %SATR command. If <satRsp> is present the contents is converted and send directly to SIM. The coding of the SIM response is the task of TE, no checking is done by ME.

Defined Values

<satRsp>:

> String type; SIM application toolkit response (hexadecimal format; refer +CSCS) starting with first byte   of response data.

2.9   %SATT: Terminate SAT command or session

Command	Possible response(s)
%SATT=<cs>	
%SATT=?	

Description

This command is used to terminate a SIM application toolkit command or session. If <cs> is present the value is coded and send to the SIM to terminate the command or session. For example, is a SAT Call Set up was indicated with the result %SATA: 60, and the redialing time is exceeded, TE shall send the cause 'end of redialing reached' to ME.

Defined Values

<cs>: (cause of command or session termination)

> 0   user stopped redialing
> 1   end of redialing reached
> 2   user ends session

2.10   %WAP: WAP Call activation/desactivation

Command	Possible response(s)
%WAP=<set>	
%WAP=?	

Description

This command is used to activate or deactivate a WAP call. It sets (or sets back according to the value <set> indicated) a flag, which causes next data call to be a WAP Call.

Defined Values

<set>: (set or unset WAP)

    0   set WAP call
    1   set back to normal calls

2.11 %ALS: Alternate line service

Command	Possible response(s)
%ALS=<ALSMode>	+CME ERROR
%ALS?	%ALS: ALSMode
%ALS=?	%ALS: range of ALSMode supported

Description

Alternate Line Service provides the MS with the capability of associating two alternate lines with one IMSI. A user will be able to make and receive calls on either line as desired and will be billed separately for calls on each line. Each line will be associated with a separate directory number (MSISDN) and separate subscription profile.

Defined Values

<ALSMode>: ALS Mode

    0   Speech Mode
    1   Auxiliary Speech Mode

2.12 %SNCNT: GPRS Byte counter.

Command	Possible response(s)
%SNCNT=<rst>	+CME ERROR
%SNCNT?	%SNCNT: <nsapi1>, <upo>, <dno>, <upp>, <dnp><CR><LF>
	%SNCNT: <nsapi2>, <upo>, <dno>, <upp>, <dnp><CR><LF>
	...
%SNCNT=?	%SNCNT: (0)

Description

Returns (or resets) the byte counts of every current connection

Defined Values

<rst>:

    Resets the counters if rst = 0

<nsapi>:

    Connection id

<upo>:

Uplink octets count.

<dno>:

Downlink octets count.

<upp>:

Uplink packets count.

<dnp>:

Downlink packets count.

2.13 %CGAATT: automatic attach mode

Command	Possible response(s)
%CGAATT=<att_m>,<det_m>	OK ERROR
%CGAATT?	%CGAATT: <att_m>,<det_m>
%CGAATT=?	%CGAATT(list of supported <att_m>s), (list of supported <det_m>s)

Description

This command is used to chose the behavior of the attach procedure.

Defined Values

<att_m>: automatic attach mode

> 0 automatic attach
> 1 manuel attach

<det_m>: automatic detach mode

> 0 automatic detach after last context deactivation
> 1 manuel detach

2.14 %CPRI: ciphering indication

Command	Possible response(s)
%CPRI=<mode>	+CME ERROR: <err>
%CPRI?	%CPRI: <state>
%CPRI=?	%CPRI: (list of supported <mode>s)

Description

This command is used to enable or disable ciphering indications.

If enabled, ciphering indications are routed to the TE using unsolicited result code:
%CPRI: <network_state>,<network_state>. The first parameter is for GSM, the second parameter is for
GPRS.

If ciphering indications are disabled on the SIM, the command %CPRI=<mode> returns +CME ERROR:

<err>.

Defined Values

<mode>: enable or disable ciphering indications

>   0   don't show ciphering indications
>   1   show ciphering indications

<network_state>:

>   0   ciphering disabled
>   1   ciphering enabled
>   2   ciphering state not applicable (ciphering state not changed)

<state>:

>   0   don't show ciphering indications (ciphering indications are enabled on the SIM or SIM is
>   removed)
>
>   1   show ciphering indications   (ciphering indications are enabled on the SIM or SIM is
>   removed)
>
>   2   ciphering indications are disabled on the SIM

2.15   %CGREG: GPRS extended registration state

Command	Possible response(s)
`%CGREG=[<n>]`	
`%CGREG?`	`%CGREG: <n>,<stat>,[<lac>],[<ci>],[<state>]` *+CME ERROR: <err>*
`%CGREG=?`	`%CGREG:` (list of supported `<n>`s)

Description

This command reports extended information about GPRS network registration state.

%CGREG behaves exactly as +CGREG does. In addition %CGREG supports additional states as well as an indicator for any activated PDP context.

Defined Values

<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>]`
>
>   3   enable network registration, location information and PDP context state
>   `%CGREG: <stat>,[<lac>],[<ci>],<state>`

<stat>: Registration status:

>   0   not registered ME is not currently searching an operator to register to

    1   registered, home network
    2   not registered, but ME is currently trying to attach or searching an operator to register to
    3   registration denied
    4   unknown
    5   registered, roaming
    6   limited service (cell might be overloaded) [GPRS suspended]
    7   GSM call active [GPRS suspended]
    8   no cell available [GPRS suspended]
    9   next attempt to update MS [GPRS suspended]

<lac>: string type; two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)

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

NOTE: At the moment <lac> and <ci> for %CGREG as well as +CGREG are not reported as string type i.e. the Quotation Marks are missing!

<state>: indicates the state of PDP context activation
    0   no PDP context activated
    1   one or more PDP contexts activated

2.16   %CGCLASS: GPRS extended mobile station class

Command	Possible response(s)
%CGCLASS=<class>	OK +CME ERROR: <err>
%CGCLASS?	%CGCLASS: <class>
%CGCLASS=?	%CGCLASS: (list of supported <class>es)

Description

The set command is used to set the MT to operate according to the specified GPRS 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.

The read command returns the current GPRS mobile class.

The test command is used for requesting information on the supported GPRS mobile classes.

Defined Values

<class>: a string parameter which indicates the GPRS mobile class

    B   GSM and GPRS, GSM stops GPRS
    BX   class BC and BG alternating mode.
    BG   like B, but CC in NMO III with PBCCH
    BC   like B, but CG in NMO III with PBCCH
    C   class C in GPRS only mode
    CG   class C in GPRS only mode
    CC   class C in circuit switched only mode

The class 'BX' only exists in MMI/ACI. This value will not provided to lower Entities. BX means an alternating mode between class BC and BG. This is an feature for network mode III.

If the MT is not GPRS attached when the set command is issued with a <class> witch supports GPRS, an attach request will be sent to the network.

If the MT is GPRS attached when the set command is issued with a <class> = CC specified, a detach request will be sent to the network.

2.17   %BAND: Dynamic Multiband

Command	Possible response(s)
%BAND=<mode>[,<band>]	+CME ERROR: <err>
%BAND?	%BAND: <mode>[,<band>]
%BAND=?	%BAND: (list of supported <mode>s),(list of supported <band>s)

Description

This command is used to manage which radio bands are to be scanned.

Defined Values

<mode>: set the radio band switch mode

> 0   automatic
> 1   manual

<band>: is a sum of integers each representing a band

> 1   GSM 900
>
> 2   DCS 1800
>
> 4   PCS 1900
>
> 8   E-GSM
>
> 16   GSM 850

(e.g: Triple band -GSM 900 / E-GSM / DCS 1800 / PCS 1900- will be set by AT%BAND=1,15)

2.18   %CUNS: unsolicited messages management.

Command	Possible response(s)
%CUNS=<bufMode>	+CME ERROR: <err>
%CUNS?	%CUNS: <bufMode>
%CUNS=?	%CUNS: (list of supported <bufMode>s)

Description

This command allows the user to control the buffering of unsolicited indications.

Set command sets the buffering mode: three different modes are available. Either no buffering at all - indications can occur at any moment, also when user is typing - or buffering while user is typing - when user

has started typing, no indication will be displayed as long as the user has not pressed <CR> - or buffering until end of a command - when user has started typing, indications may only come after the final result.

Read command returns the current buffering mode.

Defined Values

<bufMode>: buffering mode

0	unsolicited messages may occur any time.
1	unsolicited messages cannot happen while typing a command.
2	unsolicited messages cannot happen between starting typing a command and its final result.

2.19 %CBHZ: Cell Broadcast Messagetype for Homezone

Command	Possible response(s)
%CBHZ=<mode>[,<dcs>[,<timeout>]]	OK ERROR
%CBHZ?	%CBHZ: <mode>[,<dcs>[,<timeout>]]
%CBHZ=?	%CBHZ: (list of supported <mode>s),(valid range for <dcs>s),(valid range of timeout in seconds)

Description

This command is used to set or request homezone mode for activation or deactivation of the Homezone feature.

By using the set command a MMI_CBCH_REQ primitive with a special homezone mode and the message id for homezone CBMs will be send to ALR.
The benefits to use the %CBHZ command instead of selecting the homezone message id by +CSCB command are:

As soon as a homezone CBM has been received only one indication for this CBM will be send to the MMI entity.
After receiving the homezone CBM or after expiration of the timeout period the MO will not be carried out until the next cell reselection occurs.

The message id of the homezone CBM will not be added to the message id list.

Defined Values

<mode>: homezone activation mode:

0	deactivation
1	activation

<dcs>: data coding scheme

   Default: 0

<timeout>: timeout period in seconds for waiting for homezone CBM

   Default: 60

2.20 %CNAP: Calling Name Presentation

Command	Possible response(s)
%CNAP=<set_mode>	+CME ERROR: <err>
%CNAP?	%CNAP: <set_mode>,<status>
%CNAP=?	

Description

The aim of this command is to provide the user with a possibility to access information delivered by the supplementary service CNAP. The set command allows the user to switch on/off the receiving of an unsolicited message when the network sends a NotifySS message including CNAP information. Unsolicited message would look as following:

%CNAP: <pres_mode>[,<dcs>,<name_length>,<name>]

The query command allows the user to query the current setting of set_mode and the status of the service, i.e whether it is provisioned or not.

Defined Values

<set_mode>: integer type value indicating:

Switch on/off the receiving of CNAP unsolicited messages.

0 – switch off

1 – switch on

<status>: integer type value indicating:

Status of CNAP service.

0 – service is not provisioned

1 – service is provisioned

2 – service status is unknown (no information available from network)

<pres_mode>: integer type value indicating:

0 – Name presentation allowed.

1 – Presentation restricted.

2 – Name unavailable.

3 – Name presentation restricted.

<dcs>: integer type value indicating:

Data coding scheme.

<name_length>: integer type value indicating:

Number of characters contained in string Name.

<name>: string type value indicating:

Calling name string.

2.21 %CPHS: CPHS Initialise/Close/Refresh CPHS Functionalities

Command	Possible response(s)
%CPHS=<init_mode>	+*CME ERROR: <err>*
%CPHS?	%CPHS: <init_mode>
	+*CME ERROR: <err>*
%CPHS=?	%CPHS: (list of supported <init_mode>s)
	+*CME ERROR: <err>*

Description

This set command allows initialising and closing CPHS functionalities. Initialising is mandatory if the user aims at using CPHS functionality (e.g. retrieving voice waiting message). When initialising, the CPHS module proceeds to retrieve data from SIM to cache them internally, this allowing direct availability of these data. Initialising means also enabling all CPHS related indications (e.g. Call Diverted Indicator, Call Waiting Message Indicator, etc…).

Closing CPHS functionality will stop CPHS indications to be displayed. It will also free the related memory needed to cache CPHS data.

If setting fails in an ME error, +CME ERROR: <err> is returned. Refer subclause 9.2 for <err> values.

Read command returns the current state of CPHS functionalities: initialised, refreshing (only while refreshing is in progress. When progress is done, initialised will be shown) or closed.

Test command returns supported <init_mode>-values.

Defined values

<init_mode>: integer type value indicating:

    0   Closes CPHS functionalities (default).

    1   Initialises CPHS functionalities.

    2   Refreshes CPHS data cached from SIM.

2.22 %CPOPN: CPHS Show Network Operator Name

Command	Possible response(s)
%CPOPN?	%CPOPN: <LONG_NAME>[,<SHORT_NAME>]
	+*CME ERROR: <err>*
%CPOPN=?	

Description

%CPOPN: "LONG NAME"[, "SHORT NAME"] will be displayed as intermediate result if operation is successful (short name is optional: it will be shown only if SIM supports this feature).

This query command returns the long and short names of the operator as stored in the corresponding SIM

fields.

Defined values

<LONG_NAME>:

> String type indicating: Operator Long Name

<SHORT_NAME>:

> String type indicating: Operator Short Name (optional: may not be present in SIM)

2.23 %CPVWI: CPHS Voice Message Waiting

Command	Possible response(s)
%CPVWI=<mode>,<line>	%CPVWI: <status>[,<line>]
	+CME ERROR: <err>
%CPVWI?	*+CME ERROR: <err>*
%CPVWI=?	%CPVWI: (list of supported <mode>s,<line>s)
	+CME ERROR: <err>

%CPVWI parameter unsolicited result syntax

Unsolicited Result
%CPVWI: <status>,<line>

Description

This set command allows setting, clearing, querying of the status of the Voice Waiting Message Flag for one or several lines.

When querying, intermediate result is %CPVWI: status(,lines) (lines is optional: either Voice Waiting Message flag is set for no line and intermediate result is %CPVWI: 0, or Voice Waiting Message flag is set for at least one line and intermediate result is %CPVWI= 1,set_lines).

An unsolicited result %CPVWI: status, line will be displayed upon receiving a Voice Message Waiting SMS from the network.

Defined values

<mode>: integer type value indicating:

> 0   Clear Voice Waiting Message Flag.
>
> 1   Set Voice Waiting Message Flag.
>
> 2   Query Voice Waiting Message Flag status.

<line>: bit field type value indicating possible sum of following values:

> 1   Line 1
>
> 2   Data
>
> 4   Fax

256 Line 2

<status>: integer type value indicating:

0 Clear

1 Set

2.24 %CPCFU: CPHS Call Diverted Flag

Command	Possible response(s)
%CPCFU=<mode>,<line>	%CPCFU: <status>[,<line>]
	+*CME ERROR: <err>*
%CPCFU?	+*CME ERROR: <err>*
%CPCFU=?	%CPCFU: (list of supported <mode>s,<line>s)
	+*CME ERROR: <err>*

Description

This set command allows setting, clearing, querying of the status of the Call Diverted Flag for one or several lines.

This query command allows querying the current status of the Call Diverted Flag on the SIM for one or several lines.

When querying, intermediate result is %CPCFU: status(,lines) (lines is optional: either Unconditional Call Forwarding has not been activated for any line and intermediate result is %CPCFU: 0, or Unconditional Call Forwarding has been activated for at least one line and intermediate result is %CPCFU= 1,set_lines).

Defined values

<mode>: integer type value indicating:

0 Clear Call Diverted Flag

1 Set Call Diverted Flag.

2 Query Call Diverted Flag status.

<line>: bit field type value indicating possible sum of following values:

1 Line 1

2 Data

4 Fax

256 Line 2

<status>: integer type value indicating:

0 Activated

1 Deactivated

2.25 %CPALS: CPHS Current Line Indicator and ALS

Command	Possible response(s)
%CPALS=<call_id>	%CPALS: <line>,<MSISDN Id>
	+*CME ERROR: <err>*
%CPALS?	%CPALS: <line>,<MSISDN Id>
	+*CME ERROR: <err>*
%CPALS=?	

Description

This set command allows querying the bearer of a given call. The user has thus the possibility to query the line of a current call.

The query command returns the current active line.

Defined values

<call_id>: integer type value indicating:

Call id of line being queried. This value is the same as the call id described in GSM 02.30 sub clause 4.5.5.1 (also see AT+CLCC).

<line>: integer type value indicating possible sum of following values:

1 Line 1

2 Data

4 Fax

256 Line 2

<MSISDN id>: string type value indicating:

This is the MSISDN identification as found on the SIM. If no MSISDN identification can be found on the SIM then the default strings "Line 1", "Data", "Fax" and "Line 2" will be applied.

Command	Possible response(s)
%CPINF?	%CPHS: <phase>,<sst>[,<csp>]
	+*CME ERROR: <err>*
%CPINF=?	

2.26 %CPINF: CPHS Information and Customer Specific Profile

Description

This query command allows query the CPHS phase, the CPHS service table and the customer service profile.

Defined values

<phase>: integer type value indicating:

> 1   Phase 1.
>
> 2   Phase 2.

<sst>: 2 bytes Hexadecimal value indicating:

> CPHS Service Table: 2 bytes (format HEX) as defined in CPHS4_2.ww6.

<csp>: Hexadecimal string indicating:

> Customer Service Profile. Format is a hexadecimal string as following: "A1B1A2B2A3B3…" where byte An is the service group code (see CPHS B.4.7.1) and byte Bn the services Byte (see CPHS B.4.7.1)

2.27   %CPMB: CPHS Mailbox Numbers

Command	Possible response(s)
%CPMB=<record_id>	%CPMB: <record_id>,<line>,<"number">,<toa>, <"alpha id"> +CME ERROR: <err>
%CPMB=?	%CPMB: (max value of <record_id>) on the SIM +CME ERROR: <err>

Description

This set command allows retrieving of the mailbox number by means of its record id on the SIM.

Test command returns the number of the existing record entries of mailbox numbers on the SIM.

Defined values

<record_id>: integer type value indicating:

> SIM record id of mailbox

<line>: integer type value indicating:

> 1   Line 1
>
> 2   Data
>
> 4   Fax
>
> 256   Line 2

<number>: string type value indicating:

> Mailbox number.

<toa>: Integer type value indicating:

> Type of address (coded as in GSM 04.08)

<alpha id>: string type value indicating:

> alpha identifier related to mailbox.

2.28 %CPMBW: Write CPHS Mailbox Numbers

Command	Possible response(s)
%CPMBW=<record_id>[,[<number> ,[<toa>],[<text>]]	+*CME ERROR: <err>*
%CPMBW=?	%CPMB: (list of supported <record_id>s),<nlength>, (list of supported <type>s),<tlength>
	+*CME ERROR: <err>*

Description

Execution command writes phonebook entry in location number <record_id> of the CPHS mailbox phonebook of the SIM. Entry fields written are phone number <number> (in the format <toa>) and text <text> associated with the number. If <number> is omitted, phonebook entry is deleted. If writing fails in an ME error, +CME ERROR: <err> is returned. Refer subclause 9.2 of 3GPP 07.07 for <err> values.

Test command returns location range supported by the CPHS mailbox phonebook as a compound value, the maximum length of <number> field, supported number formats of the storage, and the maximum length of <text> field. If ME is not currently reachable, +CME ERROR: <err> is returned. Refer subclause 9.2 of 3GPP 07.07 for <err> values.

Defined values

<record_id>: integer type values in the range of location number of mailbox phonebook memory.

Attention:

Since there is no support for the parameter the following convention is used
    (refer to the CPHS specification)

<record_id>	line_id	line description
1	1	Line 1
2	2	Data
3	4	Fax
4	256	Line 2

<number>: string type phone number

<toa>: type of address octet in integer format (refer GSM 04.08).

<text>: string type field of maximum length <tlength>

<nlength>: integer type value indicating the maximum length of field <number>

<tlength>: integer type value indicating the maximum length of field <text>

2.29 %CPNUMS: CPHS Information Numbers

Command	Possible response(s)
%CPNUMS=<element_id>,<mode>	%CPNUMS: <element_id>,<alpha tag>,<number>, <index_level>,<premium_flag>, <network_flag> +*CME ERROR: <err>*
%CPNUMS=?	list the whole table: %CPNUMS: <element_id>,<alpha tag>,<number>, <index_level>,<premium_flag>,<network_flag> +*CME ERROR: <err>*

Description

This set command has 2 modes: exploring and querying. Exploring is only allowed for elements of type folder. Exploring returns the elements belonging to folder having id "element_id" (To be able to start, an extra element ROOT is here defined with element_id 0. It is of type folder). Querying element returns information related to element having id "element_id".

Test command queries a list of all entries to be found on the SIM.

Defined values

<element_id>: integer type value indicating:

> Each information number entry on the SIM gets a unique Id from the CPHS module.

> 0   Default Id for element ROOT (to be used for getting the first elements: exploring ROOT)

<mode>: integer type value indicating:

> 1   Exploring element (only if element is a folder): returns elements belonging to folder.

> 2   Querying element: returns information related to element.

<alpha tag>: string type value indicating:

> alpha tag of element

<number>: string type value indicating:

> Telephone number of element (empty string if element is a folder)

<index_level>: integer type value indicating:

> Index level of element. The elements belonging to ROOT have index level 1.

<premium_flag>: integer type value indicating:

> 0   Premium flag is not set for element.

> 1   Premium flag is set for element.

<network_flag>: integer type value indicating:

> 0   Network specific flag is not set for element.

> 1   Network specific flag is set for element.

2.30 %CTTY: Controls the TTY Service

Command	Possible Response
%CTTY=<n>,<req>	
%CTTY?	%CTTY: <n>,<req>,<m>[,<trx>]
%CTTY=?	%CTTY: (list of supported <n>s),(list of supported <req>s)

Description

This command controls the TTY Service of the ME. It enables unsolicited notifications about changes of the state of the TTY Service and controls the activation on incoming and outgoing voice calls. The settings of the command have no impact on any kind of non-voice calls. They remain effective until they are changed with another invocation of command. The request for TTY can be temporarily overwritten by a Dial Prefix (see below).

If parameter <n> is set to 1, then Unsolicited Message %CTYI: <neg>[,<trx>] is given under the conditions decribed below.

Defined Values

<n>   sets/shows whether unsolicited notifications are generated on change of the TTY Service

        0   disable (default)
        1   enable

<req>   set/shows how TTY shall be handled for an outgoing or incoming call. This affects the Compatibility Check for income calls done in Entity CC, therefore on any change of this setting ACI has to send a primitive MNCC_CONFIGURE_REQ to CC to adjust the Bearer Capabilities.

        0   do not request TTY for the next and subsequent calls (default)
        1   request TTY for the next and subsequent calls

<m>   actual state of the TTY Service

        0   call active with TTY deactivated
        1   call active with TTY activated
        2   unknown (i. e. no call active)

<trx>   (optional) integer representation of a 2 bit field, where bit 0 indicates actual reception of a TTY signal and bit 1 indicates actual transmission of a TTY signal. If the ME is not able to determine the state of the signal paths, or the current state of the ME is not applicable to provide this information (i. e. no call or call without TTY), then the parameter shall be omitted.

        0   no TTY reception and transmission ongoing
        1   TTY reception ongoing
        2   TTY transmission ongoing
        3   TTY reception and transmission ongoing

<neg>   shows the state of the negociation of the TTY Service for the current call. This is done by the appropriate reading/setting of the Bearer Capabilites Information Element of the related Call Control Primitives.

        0   TTY Service not requested
        1   TTY Service requested
        2   TTY Service not granted
        3   TTY Service granted

2.31 %CGPCO: Set the GPRS PCO's (protocol configuration options)

Command	Possible response(s)
%CGPCO=<mode>,<format>,[<pco>[,<cid>]]	+CME ERROR: <err> %CGPCO: <pco hex string>,<cid> %CGPCO: <pco hex string>,<cid> ... %CGPCO: <pco ASCII string>,<cid> %CGPCO: <pco ASCII string>,<cid> ...
%CGPCO=?	%CGPCO: (list of supported <mode>s,(list of supported <format>s),(list of supported <cid>s)

Description

This command set the PCO for context activation. This command has no effect if PPP is the layer 2 protocol.
If <mode>=1 (query) then the following output will be displayed: %CGPCO:
[<DNS1>],[<DNS2>],[<gateway>],<cid>

Defined Values

<mode>: execution mode (numeric)

      0   set PCO
      1   query active PCO

<format>: format of the PCO parameter (numeric)

      0   hex format (coding defined in GSM 04.08; only implemented for the "set PCO" command)
      1   ASCII (user friendly format)

<pco>: protocol configuration options (string)
hex format   hex byte string (coding defined in GSM 04.08)
ASCII format ASCII which include the following elements, separated with a comma (string)
           authentication protocol (only PAP),   (set)
           user,   (set)
           password   (set)
           DNS1   (set/query)
           DNS2   (set/query)
           gateway   (query)
           In the output, the string as a whole is enclosed in double quotation marks; undefined
           elements are left empty; the commas are not omitted. Example:
                %CGPCO: "80.167.23.19,,",1

<cid>: parameter which specifies a particular PDP context definition (numeric)
      0 is used to indicate that this PCO should be set for all possible PDP contexts

2.32 %CGPPP: PPP authentication protocol

Command	Possible response(s)
%CGPPP=<protocol>	+CME ERROR: <err>
%CGPPP=?	%CGPPP: (list of supported <protocol>s)
%CGPPP?	% CGPPP: <protocol>

Description

Set the PPP authentication protocol in case of GPRS.

Defined values

<protocol>:   authentication protocol

>   0   no authentication
>   1   password authentication protocol
>   2   challenge handshake authentication protocol
>   3   automatic authentication

2.33 %EM: Engineering Mode - Infrastructure and Mobile Data

Command	Possible response(s)
`%EM=<mode>,<type>`	`%EM: <details of each mode/type>`
	`%EM: ERROR: <err>`
`%EM=?`	

Description

AT-cmd for the EM infrastructure and mobile data. For a more detailed description see em_man.doc.

Defined values

    <mode>:

   DIS_AUTO_REP   = 0,

   EN_AUTO_REP   = 1,

   SIN_REP   = 2,

   PCO_REP   = 3

   < type > (valid for EM%=SIN_REP , type):

1   Serving cell

2   Serving cell GPRS

3   Neighbouring cell

4   Location and paging parameter

5   PLMN Parameters

6   Ciphering, hopping and dtx parameters

7   Power parameters

8   Identity parameters

9   Version parameters

10   GMM information

11   GRLC information

The type is organized as a value corresponding to request one type of information.

   < type > (valid for EM%=PCO_REP , type):

2^0 Serving cell

2^1 Serving cell GPRS

2^2 Neighbouring cell

2^3 Location and paging parameter

2^4 PLMN Parameters

2^5   Ciphering, hopping and dtx parameters

2^6   Power parameters

2^7   Identity parameters

2^8   Version parameters

2^9   GMM information

2^10   GRLC information

The type is organized as a bitmap to request multiple types of information.

Examples for mode = SIN_REP:

Command: at%em=2,1

Output (idle):
90,59,59,63,27,15,1,1,0,0,0,0,0,12294,0,0

Output (dedicated):
90,0,0,0,27,0,1,2,24,1,51,50,0,0,0,0,0

Order of appearance: arfcn, c1, c2, bsic, dsc, txlev, tn, rlt, tav, rxlev_f, rxlev_s, rxqual_f, rxqual_s, lac, cba, cbq

Command: at%em=2,3

Output (idle):
6
17,19,42,98,96,124
21,50,15,26,16,13
21,50,15,26,16,13
27,56,21,32,22,19
31,25,24,25,26,27
56776,56770,49001,49441,39725,10932
12294,12294,12294,12296,12294,12294
152034,27976,1121398,1664380,1227366,1038025
2640,885,3956,2772,2772,28
0,0,0,0,0,0
0,0,0,0,0,0

Order of appearance: #of neighbour cells, arfcn, c1, c2, rxlev, bsic, cid, lac, frame offset, time alignment, cba, cbq

Examples for mode = PCO_REP:

Command:

AT%EM=3,4　　　　　Request EM Data about Neighbour Cells.

Output (dedicated):

The output is only shown as a PCO trace.

EM_NC_INFO_REQ_DEDICATED: num_nc: 2

EM_NC_INFO_REQ_DEDICATED: index:0 arfcn:19 rx_lev:17 bsic:27 f_o:1 t_a:4997

EM_NC_INFO_REQ_DEDICATED: index:1 arfcn:15 rx_lev:16 bsic:24 f_o:359 t_a:3400

Command:

AT%EM=3,2047　　　　Request complete EM Data.

Output (idle):

The output is only shown as a PCO trace.

EM_GMM_INFO_REQ: ready_st:1 tlli:4294967295 ptmsi:3571567697 ptmsi_sig:16777215
　　　　　　　　ready_tim:44000 ciph_alg:0

EM_SC_GPRS_INFO_REQ: dl_nts:0 nmo:0 nw:0 pri_acc_thr:0 cba:0

EM_SC_GPRS_INFO_REQ: rac:255 tav:255 dsc:0 c31:0 c32:0

EM_GRLC_INFO_REQ: grlc_sta:0 tbf_mode:0 dl_tfi:255 dl_mac_mode:0

EM_GRLC_INFO_REQ: ul_tfi:255 ul_mac_mode:0 ul_nb_blocks:65535 ul_cv:255 ul_cs:255

EM_SC_INFO_REQ_IDLE_DECODED: arfcn:124 c1:27 c2:27 rxlev:27 bsic:24 cell_id:36630

EM_SC_INFO_REQ_IDLE_DECODED: dsc:15 txlev:1 tn:1 lac:12294 cba:0 cbq:0

EM_NC_INFO_REQ_IDLE: num_nc:3

EM_NC_INFO_REQ_IDLE_DECODED: index:0 arfcn:589 c1:16 c2:8 rxlev:18 bsic:31

EM_NC_INFO_REQ_IDLE_DECODED: cid:46074 lac:12294 f_o:2715331 t_a:3633 cba:1 cbq:0

EM_NC_INFO_REQ_IDLE_DECODED: index:1 arfcn:19 c1:18 c2:18 rxlev:20 bsic:27

EM_NC_INFO_REQ_IDLE_DECODED: cid:0 lac:12294 f_o:2715331 t_a:3636 cba:0 cbq:0

EM_NC_INFO_REQ_IDLE_DECODED: index:2 arfcn:15 c1:21 c2:21 rxlev:23 bsic:31

EM_NC_INFO_REQ_IDLE_DECODED: cid:46074 lac:12294 f_o:2715331 t_a:3636 cba:0 cbq:0

EM_LOC_PAG_INFO_REQ_DECODED: mcc:2 6 2 mnc:0 0 1 bs_pa_mfrms:4 t3212:60

EM_LOC_PAG_INFO_REQ_TMSI: 787547994

EM_PLMN_INFO_REQ: no_creq_max:2 re_flag:1 TXPOW_max:5 RXLEV_acc_min:4

EM_CIP_HOP_DTX_INFO_REQ: ciph:1 dtx:1 v_start:0 hop:1 hsn:0

EM_CIP_HOP_DTX_INFO_REQ_FREQ: 24 40 43 124

EM_POWER_INFO_REQ_CLASSMARK_2: rev_lev:1 es_ind:1 a5_1:0 rf_pow_cap:3 ps_cap:0
ss_screen:1

EM_POWER_INFO_REQ_CLASSMARK_2: sm_cap:1 freq_cap:0 class_3:0 cmsp:1 a5_3:1 a5_2:0

EM_POWER_INFO_REQ_CLASSMARK_3: mb_sub:6 a5_7:0 a5_6:0 a5_5:0 a5_4:0 v_radio_cap_2:1

EM_POWER_INFO_REQ_CLASSMARK_3: ra_cap_2:1 v_ra_cap_1:1 ra_cap_1:4 v_r_sup:0 r_sup:0
v_m_s_class:0

EM_POWER_INFO_REQ_CLASSMARK_3: m_s_class:0 ucs2_treat:1 ext_meas_cap:0 v_meas_cap:0
sw_time:0 sws_time:0

EM_IDENTITY_INFO_REQ_IMEI: id_type:3 v_id:1 c_id:16 odd_even:0

EM_IDENTITY_INFO_REQ: imei_1: 4 4 6 0 1 9 1 9

EM_IDENTITY_INFO_REQ: imei_2: 7 5 0 7 5 9 0 0

EM_IDENTITY_INFO_REQ_IMSI: id_type:1 v_id:1 c_id:15 odd_even:1

EM_IDENTITY_INFO_REQ: imsi_1: 2 6 2 0 1 1 2 4

EM_IDENTITY_INFO_REQ: imsi_2: 2 0 0 0 7 7 9 255

EM_IDENTITY_INFO_REQ: tmsi_bin: 787547994

EM_SW_SIM: sim A039 AM2_EMW_improv 15:19:54 09/03/04

EM_SW_SMS: sms A039 AM2_EMW_improv 15:20:20 09/03/04

EM_SW_SS: ss A039 AM2_EMW_improv 15:21:04 09/03/04

EM_SW_CC: cc A039 AM2_EMW_improv 15:12:37 09/03/04

EM_SW_MM: mm A039 AM2_EMW_improv 15:17:12 09/03/04

EM_SW_RR: rr A039 AM2_EMW_improv 12:09:00 18/03/04

EM_SW_DL: dl A039 AM2_EMW_improv 15:13:49 09/03/04

EM_SW_L1: alr A039 AM2_EMW_improv 15:21:19 09/03/04

2.34 %DATA: Configure the data flow

Command	Possible response(s)
%DATA=<mode>,<des_dev_name>,<des_dev_no>, [<sub_no>],<cap> [,<src_dev_name>,<src_dev_no>,[<sub_no>],[,<cid>]]	+CME ERROR: <err>
%DATA?	%DATA: <mode>,<des_dev_name>,<des_dev_no>, <sub_no>,<cap>,<src_dev_name>,<src_dev_no>,<sub_no> [,<cid>] %DATA: <mode>,<des_dev_name>,<des_dev_no>, <sub_no>,<cap>,<src_dev_name>,<src_dev_no>,<sub

	_no> [,<cid>] …
%DATA=?	%DATA: (list of supported <mode>s)

Description

This command configures the data flow. It is possible to split the data channel from the AT-Interpreter channel.

If no source device is given then the current channel (which has sent this command) is the source.

Defined Values

<mode>: redirection mode (numeric)

> 0   delete redirection
> 1   activate redirection (once)
> 2   activate redirection (always)

<des_dev_name>: destination device name (string)

> UART   UART device
> PKTIO   Packet I/O device
> RIV   Riviera interface

<des_dev_no>: destination device number (numeric)

<sub_no>: destination sub device number (numeric)
> (e.g. will be used for devices which are multiplexed)

<cap>: capability of the destination channel (string)

> CMD   command mode (AT-Interpreter or local MMI)
> PKT   channel for packet data
> SER   channel for serial data

<src_dev_name>: source device name (string)

<src_dev_no>: source device number (numeric)

<sub_no>: source sub device number (numeric)
> (e.g. will be used for devices which are multiplexed)

<cid>: parameter which specifies a particular PDP context definition

2.35 %DINF: Show data information

Command	Possible response(s)
%DINF=<mode>	%DINF: <dev_name>,<dev_no>,<sub_no>,<cap>,<cur_cap>,<cur_chn> %DINF: <dev_name>,<dev_no>,<sub_no>,<cap>,<cur_cap>,<cur_chn> ...
%DINF=?	%DINF: (list of supported <format>s)

Description

This command lists all available data and AT-Interpreter channels and their capabilities.

Defined Values

<mode>: kind of information (numeric)

      0   show only current channel information
      1   show all available channel information

<dev_name>: device name (string)

      UART UART device
      PKTIO Packet I/O device
      RIV   Riviera interface

<dev_no>: device number (numeric)

<sub_no>: sub device number (numeric)
        (e.g. will be used for devices which are multiplexed)

<cap>: possible capabilities

      CMD   command mode (AT-Interpreter or local MMI)
      PKT   channel for packet data
      SER   channel for serial data

<cur_cap>: current used capability

<cur_chn>: indicate which is the current channel

      0   current channel
      1   other channel

2.36 %PPP: Prepare Circuit-Switched Data call

Command	Possible response(s)
%PPP=<authprot>,<user>,<password>,[<conn_type>]	OK +CME ERROR: <err>
%PPP?	%PPP: <own_ipaddr>,<dns1_ipaddr>,<dns2_ipaddr>
%PPP=?	%PPP: (list of supported <authprot>s)

Description

This command is used to prepare a circuit-switched data call, set up authentication data for PPP, and to query IP-related information after PPP connection setup.

Defined Values

<authprot>: authentication protocol to use with PPP:

        0   no authentication (authentication data is ignored)
        1   PAP
        2   CHAP
        3   automatic authentication

Caution: For a CSD connection to any peer like an Internet Provider only PAP (=1) is supported, everything else will prevent from a successfull connect.

<user>: user login name (string)

<password>: user password (string)

<conn_type>: connection type:

        0:      don't use PPP (Riviera application will be connected directly to L2R)
        1:      use PPP (Riviera application will be connected to PPP

<own_ipaddr>: IP address of the mobile as negotiated with the network (valid only during PPP connection)

<dns1_ipaddr>, <dns2_ipaddr>: IP address of first and second DNS server to use (valid only during PPP connection)

2.37 %CSQ: Signal quality

Command	Possible response(s)
%CSQ=<n>	%CSQ: <n> OK %CSQ ERROR: <err>
%CSQ?	%CSQ: <rssi>,<ber>,<actLevel>
%CSQ=?	%CSQ: (list of supported <rssi>), (list of supported <ber>),(range of <actLevel >)

Description

Set to enable or disable CSQ (signal quality).

Query returns received signal strength indication <rssi> and channel bit error rate <ber> and actual signal level.

Unsolicited message of the changed field string (as signal level) will be send to all the enabled sources.

Defined values

<n>:

Disable CSQ

Enable CSQ

<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

<actLevel>:

0…4   as actual level of signal, divided into 4 levels.

2.38 %ATR: Answer to reset

Command	Possible response(s)
%ATR?	%ATR: <phase>,<atr>
	+CME ERROR: <err>
%ATR=?	

Description

The query command can be used by an application to obtain information about the phase, status and answer to reset (ATR) of the SIM.

Defined values

<phase>   :   integer type; phase of the SIM that is stored in the EF Phase (GSM 11.11)

<atr>   :   answer to reset (hexadecimal character format), described in GSM 11.11

2.39 %CHPL: Home Network Information

Command	Possible response(s)
%CHPL=<oprFrmt>	%CHPL: <type>, <oper>[<CR><LF> %CHPL: <type>, <oper>]... *+CME ERROR: <err>*
%CHPL=?	%CHPL: (list of supported <oprFrmt>s)

Description

This command is used to get the list of HPLMNs. It will return the list of operator names in either long alphanumeric, short alphanumeric or numeric format, depending upon the requested formats, and those that are supported.

Defined Values

<oprFrmt>: Operator String Format:

0	long alphanumeric format.
1	short alphanumeric format.
2	numeric format.

<type>: Type of the entry

0   from IMS

<opr>: Operator String:

This is the string containing the operator name in the format specified by <oprFrmt>. In the case of long alphanumeric, this can be up to 16 characters in length. For short alphanumeric it can be up to 8 characters in length. Numeric format, is the Location Area Information (LAI) number, which consists of a 3 digit BCD country code (MCC) and a 2 or 3 digit BCD network code (MNC).

2.40 %VTS: Start or Stop DTMF Tones

Command	Possible response(s)
%VTS=<char>[,<mode>]	OK ERROR
%VTS=?	%VTS: (list of supported <tone>s),(list of supported <mode>s)

Description

This command is used to start and stop DTMF tones. It is similar to +VTS, except that, instead of supplying <duration>, <mode> is used to indicate whether sending the DTMF tone should be started or stopped.

Defined Values

<char>: DTMF character:

This is the tone to start, in the range 0-9, #, *, A-D.

<mode>: DTMF mode:

0	stop DTMF tone.
1	start DTMF tone.
2	automatic mode – default value.

2.41   %CREG: Network registration

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

Description

This command is similar to +CREG but in addition it returns the parameter <gprs_ind>, which is used to determine whether a GPRS connection is available and GPRS can be started or not and <rt> Radio Access Technology, indicates whether the cell supports GSM, GPRS, EDGE or UMTS.

Defined Values

<n>: Registration mode:

0   disable network registration unsolicited result code.

1   enable network registration unsolicited result code
     %CREG: <stat>,,,<gprs_ind>,<rt>

2   enable network registration and location information unsolicited result code
     %CREG: <stat>,[<lac>],[<ci>],<gprs_ind>,<rt>

<stat>: Registration status:

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

<lac>: string type; two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)

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

<gprs_ind>: GPRS Registration indicator:

0   GPRS is not supported within the cell.
1   GPRS is supported in limited service.
2   GPRS is supported within the cell.

<rt>: Radio Access Technology:

0   GSM Only.
1   GPRS is supportedby the cell.
2   GPRS-EDGE is supported within the cell.
3   UMTS is supported by the cell.

NOTE: At the moment <lac> and <ci> for %CREG as well as +CREG are not reported as string type i.e. the Quotation Marks are missing!

2.42 %CLCC: List Current Calls

Command	Possible response(s)
%CLCC	[%CLCC: <idx>,<dir>,<stat>,<mode>,<mpty>,<line> [, [<number><type><alpha>]]
	[[<CR>,<LF>%CLCC: <idx>,<dir>,<stat>,<mode>,<mpty>,<line>[, [<number><type><alpha>]]
	[...]]]
	+CME ERROR: <err>
%CLCC=?	

Description

Returns list of current calls of ME. It is an extended version of the +CLCC command with the addition of the line parameter for ALS, indicating whether the call is on line 1, or on line 2. If command succeeds but no calls are available, no information response is sent to TE

Defined values

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

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

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

<mode> (bearer/teleservice):
  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/data, 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

<line>: line parameter for ALS, indicates the used line of the call:
  0   call is on line 1.
  1   call is on line 2.

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

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

<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

2.43 %CWUP: Wakeup

Command	Possible response(s)
%CWUP=<type>	*+CME ERROR: <err>*
%CWUP=?	%CWUP: (list of supported <type>s)

Description

This command is used to wake up parts of the protocol stack.

Defined Values

<type>: Wake Up Type:

1   Wake Up RR.

2.44 %PVRF: Status of PIN

Command	Possible response(s)
%PVRF=<type>,<old pin>, <new pin>	OK
%PVRF?	%PVRF: (current counter for PIN and PUK)

Description

This command is responsible to verify or check the status of the PIN.

Defined Values

<type>:

        0 PVRF_TYPE_Pin1

        1 PVRF_TYPE_Pin2

        2 PVRF_TYPE_Puk1

        3 PVRF_TYPE_Puk2

2.45 %CHPL: Home Network Information

Command	Possible response(s)
%CHPL=<oprFrmt>	%CHPL: <type>, <oper>[<CR><LF>
	%CHPL: <type>, <oper>]...
	+CME ERROR: <err>

%CHPL=?	%CHPL: (list of supported <oprFrmt>s)

Description

This command is used to get the list of HPLMNs. It will return the list of operator names in either long alphanumeric, short alphanumeric or numeric format, depending upon the requested formats, and those that are supported.

Defined Values

<oprFrmt>: Operator String Format:

0	long alphanumeric format.
1	short alphanumeric format.
2	numeric format.

<type>: Type of the entry

0	from IMS

<opr>: Operator String:

This is the string containing the operator name in the format specified by <oprFrmt>. In the case of long alphanumeric, this can be up to 16 characters in length. For short alphanumeric it can be up to 8 characters in length. Numeric format, is the Location Area Information (LAI) number, which consists of a 3 digit BCD country code (MCC) and a 2 or 3 digit BCD network code (MNC).

2.46   %VTS: Start or Stop DTMF Tones

Command	Possible response(s)
%VTS=<char>[,<mode>]	OK
	ERROR
%VTS=?	%VTS: (list of supported <tone>s),(list of supported <mode>s)

Description

This command is used to start and stop DTMF tones. It is similar to +VTS, except that, instead of supplying <duration>, <mode> is used to indicate whether sending the DTMF tone should be started or stopped.

Defined Values

<char>: DTMF character:

This is the tone to start, in the range 0-9, #, *, A-D.

<mode>: DTMF mode:

0	stop DTMF tone.
1	start DTMF tone.
2	automatic mode – default value.

2.47 +CPWD: Change password (extention)

Command	Possible response(s)
+CPWD=<fac>,<oldpwd>,<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. Refer subclause 9.2 for possible <err> values.

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

Defined values

<fac>:

     "P2"   SIM PIN2

     "AS"   All services

 refer Facility Lock +CLCK for other values

<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

2.48 %CWUP: Wakeup

Command	Possible response(s)
%CWUP=<type>	+*CME ERROR: <err>*
%CWUP=?	%CWUP: (list of supported <type>s)

Description

This command is used to wake up parts of the protocol stack.

Defined Values

<type>: Wake Up Type:

     1   Wake Up RR.

2.49 %PVRF: Status of PIN

Command	Possible response(s)
%PVRF=<type>,<old pin>, <new ping>	OK
%PVRF?	%PVRF: (current counter for PIN and PUK)

Description

This command is responsible to verify or check the status of the PIN.

Defined Values

<type>:

0	PVRF_TYPE_Pin1
1	PVRF_TYPE_Pin2
2	PVRF_TYPE_Puk1
3	PVRF_TYPE_Puk2

2.50 %CCBS: Completion of calls to busy subscriber

Command	Possible response(s)
%CCBS=[<mode>],[<idx>]	+CME ERROR: <err>
%CCBS?	%CCBS: [<ind>,[<stat>,[<idx>,<no>,<toa>,<class>,<ptn>]]]
%CCBS=?	%CCBS: (list of supported <mode>s),(list of supported <idx>s)

Description

This command is used to handle CCBS. If the index is given then the CCBS entry will be cleared.

If mode=1 then unsolicited CCBS Messages will be displayed.
%CCBS: <ind>,[<stat>,[<idx>,<no>,<toa>,<class>,<ptn>]]]

This feature is dependent on the network.

Defined Values

<mode>: displaying unsolicited CCBS messages

> 0   disable
> 1   enable

<idx>: CCBS index

> 0   clear all entiers
> 1…5   specific CCBS index

<ind>: type of CCBS indication

> 0   possibility time out
> 1   possible
> 2   registered
> 3   recall time out

<stat>: CCBS status

> 0   not provisioned
> 1   provisioned
> 2   active

<no>: number

<toa>: type of address

<class>: > is a sum of integers each representing a class of information

> 0   none
> 1   voice
> 2   data
> 4   FAX
> 8   SMS
> 256   auxiliary voice

<ptn>: alerting pattern

> 0   level 0
> 1   level 1
> 2   level 2

4	category 1
5	category 2
6	category 3
7	category 4
8	category 5

2.51 %DAR: Reason for last stack crash

Command	Possible response(s)
%DAR	%DAR: <reason>
	[<CR><LF>%DAR: <reason>[...]]
%DAR=?	

Description

Print the in DAR stored cause for the last stack crash.

Defined values

<reason> Plaintext from GPF about the last stack crash.

Example

if a crash occoured:

%DAR: DAR: SYSTEM ERROR: write attempt to L1 queue failed, vsi_com.c(297)

If no crash occoured:

%DAR: No DAR entry stored

2.52 %RDL: Automatic Call Repeat

Command	Possible response(s)
%RDL=[<mode>,[<n>]]	+CME ERROR: <err>
%RDL?	%RDL: <mode>, <n>
%RDL =?	%RDL: (supported < mode >, supported <n>s)

Description

This function allows the user to set and reset the automatic calling repeat of unsuccessful outgoing call attempts. If the max counter of call attempts is reached the number is set in the blacklist. If a number is entry of the blacklist a MOC with this number is not possible. The causes starting the automatic call repeats are described in GSM 2.07.

When <n>=1 the unsolicited result %RDL: <state> is sent to TE.

Defined values:

<mode> :

0	Disable automatic calling repeat
1	Enable automatic calling repeat

<n>:

0	No redial state indication to TE
1	Redial state indication to TE

<state>:

2	Redialling timer is started
3	Automatic call repeat is started
4	Call attempt fails
5	Call attempt successful
6	Automatic call repeat is stopped

2.53 %RDLB: Control black list

Command	Possible response(s)
%RDLB =[<mode>,[<n>]]	+CME ERROR: <err>
%RDLB?	%RDLB: <n>
	%RDLB: <counter>, <number>[[…]
	<CR>><LF>%RDLB: <number>]]
	+CME ERROR: <err>
%RDLB =?	%RDLB: (list of supported <max counter >, supported <n>s)

Description

This function allows the user to show and delete the entries of the blacklist. This list contains forbidden phone numbers filled by unsuccessful automatic call repeats.

When <n>=1 the unsolicited result %RDLB: <state> is sent to TE.

Defined values:

<mode> :

0	No delete black list
1	Delete black list

<n>:

0	No black list state indication to TE

1 Black list state indication to TE

<counter> : number of black list entries

<number>: phone number

<max counter >: maximal number of black list entries

<state>:

2 Black list is full

3 Phone number entry is set in black list

4 Phone number is an black list entry

2.54 %CSTAT: State information

Command	Possible response(s)
%CSTAT=<n>	
%CSTAT?	%CSTAT: <n>
%CSTAT=?	%CSTAT: (list of supported <n>s)

Description

This command refers to state information, which is indicated by the MS. The set command enable/disables the presentation of unsolicited notification result codes from TA to TE.

When <n>=1 result code %CSTAT: <entity>,<status> is sent to TE. The value of <entity> describes which entity is reporting. The value of <status> reports the status of the reporting entity Test command returns values supported by the TA as compound value.

Defined Values

<n>: (parameter sets/shows the result code presentation status in the TA)

0 disable
1 enable

<entity>: (code of reporting entity)

PHB (phone book)
SMS
RDY (Ready when both PHB and SMS have reported they are ready)

<status>: (state of reporting entity)

0 Not ready

1 Ready

2.55 %CSCN Network service change notify

Command	Possible response(s)

%CSCN=<ss>, <ss dir>, <cc>, <cc_dir>	OK +CME ERROR: <err>
%CSCN?	%CSCN: <ss>, <ss_dir>, <cc>, <cc_dir>
%CSCN=?	%CSCN: (0,1),(0,1,2),(0,1)(0,1,2)

Description

This function allows the user to be notified when a network service is changed.

Some can be mapped with the command +CSSN(+CSSI/+CSSU) but some notifications required new AT Commands such as the ECT status. May be create a new unsolicited message for all these notifications or check one by one how these notifications can be found?

The %CSCN switched the trace output to the AT-command interface, separate by supplementary service and call control service.

If a service is switched on, the unsolicited commands will be raised if a network service change occurs:

-        %CCCN displays the NW service change for call control service

-        %CSSN displays the NW service change for supplementary service

Command	Possible response(s)
-	%CCCN: <direction>,<cId>,<FacilityIEString>
-	%CSSN: <direction>,<trans_part>,<FacilityIEString>

Defined values

<ss> :

0   Disable

1   Enable

<ss_dir> :

0   in

1   out

2   both

<cc> :

0   Disable

1   Enable

<cc_dir> :

0   in

1   out

2   both

<direction> :

0   in

1   out

2   both

<trans_part>

0   BeginTrans

1   FacTrans

2   EndTrans

<cId> :

integer type; call identification number as described in GSM 02.30 subclause 4.5.5.1

<FacilityIEString> :

"string" of information elements as described in 'fac.doc' (Air Interface Message Specification)

2.56 %CPRSM Pause Receiving Short Messages

Command	Possible response(s)
%CPRSM=<set_mode>	OK +CMS ERROR: <err>
%CPRSM?	%CPRSM: <set_mode> +CMS ERROR: <err>
%CPRSM=?	%CPRSM: (0,1) +CMS ERROR: <err>

Description

The aim of this command is to provide the user the possibility to pause and resume the receiving of short messages. If the user sets the <set_mode> paramter to 1 and the command is preformed successfully, the ME will block all incoming messages until the <set_mode> is set to 0. The SMSC will buffer the messages that have not been acknowledged. Receiving the resume the SMSC will immediately start to send the short messages stored in the buffer.

The query command informs the user about the current mode of the %CPRSM.

Defined values

<set_mode> :

0   Resume receiving of short messages

1   Pause receiving of short messages

2.57 %CHLD Call related supplementary services

Table 1: +CHLD action command syntax

Command	Possible response(s)
%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. Refer subclause 9.2 for possible `<err>` values.

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

> NOTE: Call Hold, MultiParty and Explicit Call Transfer are only applicable to teleservice 11.

It is recommended (although optional) that test command returns a list of operations which are supported. The call number required by some operations shall be denoted by "x"

(e.g. `%CHLD: (0,1,1x,2,2x,3,4,5,6,6x,7x,h|H,i|I)`).

Defined values

<n>: char type; equals to numbers entered before SEND button in GSM 02.30 [19] subclause 4.5.5.1. **Additionally the following numbers and chars are also valid for this command:**

6	retrieve the first held call and hold the active call. Held calls are still held. Waiting calls are still waiting.
6x	retrieve a specified held call and hold the active call. Held calls are still held. Waiting calls are still waiting.
7x	releases a specified call regardless of the state.
'h' or 'H'	put active call on hold without accepting waiting or held calls automatically
'i' or 'I'	release dialling call, without dropping current call.

> NOTE: The "directory number" case shall be handled with dial command D, and the END case with hangup command H (or +CHUP). The 4*"directory number" case is handled with +CTFR command.

2.58 %CSSD Supplementary Service Diagnostic

Command	Possible response(s)
%CSSD	%CSSD: <ss_diagnostic> ERROR

Description

The aim of this command is to provide the information of the supplementary service byte sent by the network to the user <ss_diagnostic>. This byte provides a deeper analysis of the cause of the disconnection of the last call.

This byte is only set in for special disconnect causes. Please refer to 3GPP TS 24.008 V3.19.0 section 10.5.4.11 (2004-06) specification for further details.

In the cases that there has no diagnostic value been delivered by the network the ss diagnostic value will be set to default 255 (0xFF).

Defined values

<ss_diagnostic> :

1	Outgoing call bared within CUG
2	No CUG selected
3	Unknown CUG index
4	CUG index incompatible with requested basic service
5	CUG call failure, unspecified
6	CLIR not subscribed
7	CCBS possible
8	CCBS not possible
255	No information provided

2.59 &W: Store profile to FFS

Command	Possible response(s)
AT&W[<prfl>]	*ERROR*
	OK

Description

Set command stores the current settings (profile) according to the pre-defined command list stored in the non-volatile memory. If the storing of the profile fails, an unknown error message will be returned and the profile has not been stored.

Defined values

<prfl>:

1 - Profile 1.

2 - Profile 2.

2.60 Z – Reset to default or user configuration

Command	Possible response(s)
ATZ[<prfl>]	*ERROR*
	OK

Description

This command instructs the DCE to set all parameters to defaults as specified by the manufacturer or by the user. If <prfl> is present and greater than 0 a user defined profile will be used.

Defined values

<prfl>:

0 - manufacturer specific default, same as ATZ

1 - Profile 1.

2 - Profile 2

2.61 +CLCK="AL": Lock %ALS Setting

Command	Possible response(s)
`AT+CLCK=<fac>,<mode>[,<passwd>]`	*+CME ERROR: <err>* **when `<mode>`=2 and command successful:** *+CLCK: <status>*

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.

Test command returns facility values supported by the TA as a compound value.This command will enbale to lock the current ALS line.

Defined values

<fac>: (in addidion to those already defined in 07.07)

"AL"   lock phone to the current selected line, PIN2 required as password.

Note: Setting og the line is done with %ALS. Loging implicit sets the selected line on each source to the ALS setting of the current source. This lock will also remain active if the SIM is swapped.

2.62 %CTZV-Set Time and Date Report

TEXAS INSTRUMENTS

Command	Possible response(s)
%CTZV = <onoff>	*+CME ERROR: <err>*
%CTZV?	%CTZV: <onoff>
	+CME ERROR: <err>
%CTZV=?	%CTZV: (list of supported <onoff>s)
	+CME ERROR: <err>

Description

Set command enables and disables automatic time and date report to the MT when time and date information is received from the network. If setting fails in an MT error, +CME ERROR: <err> is returned.

Read command returns the current settings in the MT.

Test command returns supported on- and off-values.

<on/off>: integer type value indicating:

    0 – Disable automatic time and date reporting (default).

    1 – Enable automatic time and date reporting.

If this feature is set to on, an unsolicited code will be received when the time and date information is received from the network. Refer to 3.4 for more details.

2.63   %CNIV- Set Operator Name Report/Query

Command	Possible response(s)
%CNIV = <onoff>	*+CME ERROR: <err>*
%CNIV?	%CNIV: <onoff>
	+CME ERROR: <err>
%CNIV=?	%CNIV: (list of supported <onoff>s)
	+CME ERROR: <err>

Description

This proposal is a simple way of making use of the operator name information. When ACI receives the NITZ primitive MMR_INFO_IND, ACI checks the CNIV mode. If the CNIV mode is activated, ACI will provide an unsolicited report to the MT in the following format:

Set command enables and disables network identity report to the MT when NI is received from the network. If setting fails in an MT error, +CME ERROR: <err> is returned.

Read command returns the current settings in the MT.

Test command returns supported on- and off-values.

<on/off>: integer type value indicating:

     0 – Disable NI reporting (default).

     1 – Enable NI reporting.

If this feature is set to on, an unsolicited code will be received when the time and date information is received from the network. Refer to 3.5 for more details.

2.64 %COLR: Query Connected Line Identification Restriction

Command	Possible response(s)
%COLR	%COLR: <stat>

Description

The COLR Supplementary Service enables the connected party to prevent presentation of its line identity to the calling party.

Defined values

<stat> values:

-1 = COLR status Not Present

0 = COLR status Not Provided

1 = COLR status Provided

2 = COLR status Unknown

2.65 %SECP Verify / Change MMI security code

Command	Possible response(s)
%SECP= [<security code>[,<new security code>]]	+CME ERROR
%SECP=?	

This is a customised AT command to Verify / Change MMI access security code.

2.66 %SECS Modify / Query MMI security code state

Command	Possible response(s)
%SECS= <state>,<security code>	+CME ERROR
%SECS=?	%SECS: (list of supported <state>s)
%SECS?	%SECS: <state>

This is a customised AT command to Modify / Retrieve MMI security code state.

Thus MMI will decide if a password is required for access.

Defined values

    <state>:

    <u>0</u>   The security code is not required

    <u>1</u>   The security code is required

    <security code>:

        <security code> ,<new security code> string type: <security code> shall be the same as password specified for the facility using the command %SECP for change of password and <new security code> is the new password; passwords will have length = 5 as default but the length is programmable via FFS data.

2.67   %CUST: Activate MMI Customisation Mode

Command	Possible response(s)
%CUST=<cust_mode>	*OK* *ERROR*
%CUST=?	%CUST: (list of supported <cust_mode>s)
%CUST?	%CUST: current <cust_mode> value

Description

The purpose of the AT%CUST command is to provide a mechanism for customer specific modifications to be applied in the ACI and other entities, without impacting on the generic nature of the software. With this command the modem part switches to another mode with different SAT behaviour than before. This AT command must be received in the modem part earlier than either the AT%SATC command or the AT+CFUN command.

Defined values

<cust_mode>: integer type value indicating:

      Customisation Mode required

<cust_mode>	description
0	Normal Behaviour
1	Customisation Mode 1
2 ... 255	Reserved for Future Use

2.68 %SATCC: Enable, or Disable, Call or MO Short Msg Control By SIM

Command	Possible response(s)
%SATCC=<cc_mode>	*OK*
	ERROR
%SATCC?	%SATCC: current <cc_mode>

Description

The purpose of the AT%SATCC command is to allow the MMI to enable or disable Call Control By SIM, or the Short Message Control By SIM, functionality within the modem part. While this provides for a way in which the MMI may contravene the ETSI GSM SIM Application Toolkit Specifications, that is not the intention. However the conditions under which this command is used is left to the discretion of the MMI producer

Defined values

<cc_mode>: integer type value indicating:

Call or MO SM Control By SIM mode

<cc_mode>	description
0	Call or MO SM Control is Disabled
1	Call or MO SM Control is Enabled

Note: *Enabling Call Control By SIM where it is not supported in the SIM Service Table will have no effect. It will remain inactive.*

2.69 %CSSN: Supplementary service notifications

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

Description

This AT command allows using the AT command D in a non-blocking way when +CSSI is enabled.

Defined values

<n> (parameter sets/shows the +CSSI result code presentation status in the TA):

<u>0</u>   disable

1   enable

*2   **enable and non-blocking atD** (Added value to parameter <n>)

<m> (parameter sets/shows the +CSSU result code presentation status in the TA):

<u>0</u>   disable

1   enable

This parameter will have the same functionality as +CSSN, defined in 3GPP 27.007, version 3.13, section 7.17, plus the added value to the parameter <n>

2.70   %COPS: Operator selection.

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

Description

Set command forces an attempt to select and register the GSM/UMTS network operator. `<mode>` is used to select whether the selection is done automatically by the MT or is forced by this command to operator `<oper>` (it shall be given in format `<format>`).

If <mode>=1, <oper> is not given, and the SIM card has not been changed since the last network registration, the MT will try to register to that operator which had been registered the last time. That operator will be stored in the Flash File System. If the SIM card has been changed, the MT will try to register to the operator stored in the EF(LOCI) in the SIM Card.

To achieve the "limited service" state, <mode>=0 should be set when the SIM is not activated or, if the SIM is already activated and there is Full service status, "limited service" will be obtained by using<mode>=2.

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 and leads the MT to limited service.

The selected mode affects to all further network registration (e.g. after <mode>=2, MT shall be unregistered until <mode>=0 or 1 is selected). 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, the currently selected operator, and the current service status <svrStat>. Please note that an additional comma has been added for "forward compatibility" reasons, to support the new <AcT> (Access technology) parameter in the future, added to +COPS in G3PP 27.007, version 5.0.

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/UICC, and other networks.

Defined values

`<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

`<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 upto 16 characters long and short format up to 8 characters (refer GSM MoU SE.13 [9]); numeric format is the GSM Location Area Identification number (refer GSM 04.08 [8] subclause 10.5.1.3) which consists of a three BCD 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

\<svrStat\>

0	full service
1	limited service
2	no service

2.71 %CKWP (Key was pressed)

Command	Possible Response(s)
%CKWP=\<src\>,\<key\>,\<press\>	*+CME ERROR: \<err\>*

Description

This is an indication from the MMI to the ACI that a key was pressed. There is only a set command, no query or test command is available for %CKWP. It makes only sense if this command is issued by the source, which owns/controls the keypad driver.

Defined values

\<src\>:

0 :	local (internal) keypad was pressed
1 :	keypad command was issued by an external source (+CKPD)

It depends on the value of this \<src\> parameter and the +CMER settings if ACI sends +CKEV.

\<key\>:   key code of the key that was pressed (refer IRA values, see [2])

\<press\>:

1 :	key is pressed
0 :	key is released

2.72 %CPKY (Press key)

Command	Possible Response(s)
%CPKY=\<mode\>	*+CME ERROR: \<err\>*

Description

This command activates or deactivates the 'press key' indications from ACI to the source that has issued this command (usually the source that owns/controls the keypad driver).

Defined values

\<mode\>:

0 :	ACI does not send %CPKY
1 :	ACI sends %CPKY when +CKPD is received

TEXAS INSTRUMENTS

2.73 %CMGRS : Message Retransmission Service

Command	Possible response(s)
`%CMGRS=[<mode>]`	`[%CMGRS: <mode>, <mr>]` `[+CME ERROR: <err>]` `[OK]`
`%CMGRS?`	`%CMGRS: <mode>`
`%CMGRS =?`	`%CMGRS: (list of supported <mode>s)`

Description

This Command can be used to do following two.

- Control the message retransmission mechanism provided by SMS entity.

- Do manual retransmission of the last failed message.

In the SET mode, the format of the command is %CMGRS=<mode>

For each retransmission of the SMS message, an indication will be received from SMS entity and the following information will be sent to user.

"%CMGRS: <mode>, <resend count>, <max retransmission>"

where <mode> is 1 (to indicate that this answer is the result of the automatic retransmission), < retransmission count> is the number of current retransmission attempt and <max retransmission> the max number of retransmission attempts.

If automatic retransmission is deactivated by %CMGRS=0 automatic retransmission will not be attempted and hence user will not get the following message

"%CMGRS: <mode>, <resend count>, <max retransmission >"

Mode 2 of this command ("%CMGRS=2") can be used to request retransmission of the last failed message. This can be done if the SMS transmission immediately before this command failed. Also, this cannot be done in the case of concatenated SMS. The response to this request in the case of a successful retransmission would be

"%CMGRS: <mode>, <mr>"

"OK"

where <mode> will be 2. and <mr> is the message reference number for this message.

Or if there retransmission is not possible, +CME ERROR: <err> will be returned

The read mode of the command can be used to find the status of the automatic retransmission. i.e. It will return a value of 0 or 1, where 0 indicates that automatic retransmission is disabled.

Defined Values:

<mode>:

	0	clear auto_repeat_flag
	1	set auto_repeat_flag
	2	send manual resent request to SMS

2.74 %CGEREP : extended GPRS event reporting

Command	Possible response(s)
%CGEREP=[<n>]	
%CGEREP?	%CGEREP: <n> +CME ERROR: <err>
%CGEREP=?	%CGEREP: (list of supported <n>'s)

Description

This command changes the state of the Texas Instruments extended GPRS event reporting.

AT%CGEREP command (de-)activates %CGEV notifications. It has a different format to +CGEREP, as described in GSM 27.007, since %CGEREP does not support event buffering. Also, %CGEREP will activate %CGEV notifications rather than the +CGEV notification.

Defined Values:

<n>:

| | 0 | Disable reporting of the GPRS unsolicited result code %CGEV |
| | 1 | Enable reporting of the GPRS unsolicited result code %CGEV. |

2.75 +CEER: Extended error report

Command	Possible response(s)
+CEER	+CEER: <Def>,<Origin>,<Entity>,<Cause>,<Text>
+CEER=?	

Description

This is the TI implementation of the +CEER AT command of 3GPP spec 27.007. The information text +CEER: <report> defined in 3GPP spec 27.007, is defined by TI as +CEER: <Def>,<Origin>,<Entity>,<Cause>,<Text>.

Execution command causes the TA to return one or more lines of information text defined as +CEER: <Def>,<Origin>,<Entity>,<Cause>,<Text> , determined by TI, which should offer the user of the TA an

extended report of the reason for

- the failure in the last unsuccessful call setup (originating or answering) or in-call modification;

- the last call release;

- the last unsuccessful GPRS attach or unsuccessful PDP context activation;

- the last GPRS detach or PDP context deactivation.

It also offers the user of the TA an TI Proprietary extended report of the reason for

- ACM (Accumulated Call Meter) reached the ACM maximum value.

- Number to dial not found in FDN list.

Defined Values

<Def>:

0	Cause Value is defined by a standardization body (usually 3GPP)
1	Cause Value is defined by TI, i.e. internally

<Origin>:

0	The network is the originating side
1	The mobile station is the originating side

<Entity>:

0	SIM is the entity originating the cause
1	ACI is the entity originating the cause
2	RLP is the entity originating the cause
3	RR is the entity originating the cause
4	MM is the entity originating the cause
5	CC is the entity originating the cause
6	SS is the entity originating the cause
7	SMS-CP is the entity originating the cause
8	SMS-RP is the entity originating the cause
9	SMS-TL is the entity originating the cause
10	GMM is the entity originating the cause
11	SM is the entity originating the cause
12	FAD is the entity originating the cause
13	T30 is the entity originating the cause
14	GRR is the entity originating the cause
15	PPP is the entity originating the cause
16	LLC is the entity originating the cause
17	SNDCP is the entity originating the cause

<Cause>:

> In case of Defined By = 0 the meaning of the Cause Value is defined by an appropriate technical specification issued by a standardization body.

> In case of Defined By = 1 the meaning of the Cause Value is defined by an appropriate TI originated SAP value 255: NOT PRESENT, is used to indicate that no cause is present / provided.

<Text>:

> Information text representation of the Cause Value.

> <Text> is optional.

3 Unsolicited Result Codes

3.1 %CPROAM: CPHS Home Country Roaming Indicator

Unsolicited Result
%CPROAM: <roam_status>

Description

This unsolicited result will be displayed whenever the mobile's Roaming registration state has changed.

Defined values

< roam_status>: integer type value indicating:

    0   Mobile is not in Roaming state.

    1   Mobile is in Roaming state (mobile is registered to an other than the home network).

3.2 %CPVWI: CPHS Voice Message Waiting

See Section 2.23.

3.3 %CGREG: reports extended information about GPRS registration state

Unsolicited Result
%CGREG: <stat>,[<lac>],[<ci>],[<state>]

Description

This unsolicited result will be displayed when information about GPRS registration state has changed.

<stat>:

    0   not registered, ME is not currently searching an operator to register to
    1   registered, home network
    2   not registered, but ME is currently trying to attach or searching an operator to register to
    3   registration denied
    4   unknown
    5   registered, roaming
    6   limited service (cell might be overloaded) [GPRS suspended]
    7   GSM call active [GPRS suspended]
    8   no cell available [GPRS suspended]
    9   next attempt to update MS [GPRS suspended]

<lac>: string type; two byte location area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)

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

NOTE: At the moment <lac> and <ci> for %CGREG as well as +CGREG are not reported as string type i.e. the Quotation Marks are missing!

    <state>: indicates the state of PDP context activation

        0   no PDP context activated
        1   one or more PDP contexts activated

3.4 %CTZV: reports network time and date information

Unsolicited Result
%CTZV: <network-time>

Description

It is a customized AT command for automatic time and date reporting. the time and date information will be reported to the MT if this command is set to %CTZV =1. This feature is explicitly for P2 sample and Calypso+.

<network-time>:

    In the format of "yy/mm/dd,hh:mm:ss+/-tz", where characters indicate year (two last digits), month, Day, hour, minutes, seconds and time zone. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08"

3.5 %CNIV: reports network name information

Unsolicited Result
%CNIV: <full_name>, <short_name>, <plmn>

Description

It is a customized AT command for automatic network name reporting. The network name information will be reported to the MT if this command is set to %CNIV =1. This command is explicitly for P2 sample and Calypso.

<full_name>:

    Full network name in string, up to 40 characters

<short_name>:

    Short network name in string, up to 40 characters

<plmn>:

    The plmn of the network in digits, has the following structure: (country code digit 3)(country code digit 2)(country code digit 1)(network code digit 2)(network code digit 1)

3.6   %CPKY: Press Key

Unsolicited result code
%CPKY: <keys>[,<time>[,<pause>]]

Description

This 'press key' indication shall be sent from the ACI to the source that owns/controls the keypad driver (MMI). If the ACI receives a +CKPD from any source it sends %CPKY. If the MMI receives the indication, it has to interpret this %CPKY and it has to process the keystrokes likes the ones received from the keypad driver.

Defined values

<keys>: string of characters representing keys as listed in a table, see GSM 07.07 chapter 8.7 (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.

<time>, <pause>:

0...255 0... 25.5 seconds (default values is 1)

3.7   %CMGRS: Message Retransmission Service

If automatic retransmission is activated by %CMGRS=1, then the SMS module will try retransmission as mentioned in sec 9.2.3.6 of **23.040.** For each retransmission of the SMS message, an indication will be received from SMS entity and the following information will be sent to user.

Unsolicited Result
"%CMGRS: <mode>, <resend count>, <max retransmission>"

Where <mode> is 1 (to indicate that this answer is the result of the automatic retransmission), retransmission count> is the number of current retransmission attempt and <max retransmission> the max number of retransmission attempts.

Defined Values:

<mode>:

      0   clear auto_repeat_flag

      1   set auto_repeat_flag

3.8 %CGEV: reports GPRS network events

Description

%CGEV notification extends the current +CGEV definition given in GSM 27.007 by providing 2 additional notifications to the application (note: the new notifications all have the format %CGEV even when they are providing the equivalent to the existing +CGEV). This description provides details only of the extensions to the standard definition.

The 2 additional notifications are:
* %CGEV: NW ACT <PDP_type>, <PDP_addr>, [<cid>]
  There has been a context activation following a network-originated request. The <cid> that was used to activate the context is provided if known to the MT.
* %CGEV: ME ACT <PDP_type>, <PDP_addr>, [<cid>]
  The mobile equipment has triggered a context activation. The <cid> that was used to activate the context is provided if known to the MT.

<PDP_type> and <PDP_addr> will be string types, and <cid> will be an integer