AT Commands Manual

Cat-1 モジュール

Revision History

Version	Date	Description
1.0	2016.12.07	First version
1.1	2017.07.05	Add %SOCKETCMD, %SOCKETDATA
1.2	2019.05.28	Delete %EXE, %SETCFG, %SETACFG, %OTPCMD
1.3	2020.01.31	• Add the "Application Version" to "Applicable products" section • Delete the following command: +CGMI, +CGMM, +CGMR, +GSN, +CIMI, +GCAP, +WS46, +CREG, +COPS, +CLCK, +CPWD, +CPNET, +CPNSTAT, +CLAC, +CRLA, +CGDCONT, +CGDSCONT, +CGTFT, +CGACT, +CGEREP, +CGCONTRDP, +CGSCONTRDP, +CGTFTRDP, +CGEQOS, +CGEQOSRDP, +CEMODE, +CEER, +CCHO, +CCHC, +CGCMOD, +CSMS, +CRSM, +CSIM, +CPOL, +CPLS, +CPMS, +CSCA, +CPAS, +CGSMS, +CDU, A, H, +CLCC, +CHLD, +CLIP, +CCWA, +CSSN, +CPNER, +CIREG, +CEVDP, +CAVIMS, +CSMP, +CEUS, +CMMS, +CNMA, +CIREP, +CNEM, +CUSATR, +CUSATW, +CUSATA, +CUSATD, +CUSATT, +CUSATE, &F, +CTZR, +CTZU, +CPINR, +CCFCU, +CSDH, +VTS, +CPSMS, +VTD, +CMUT, +COPN, +CSCM, +CSSAC, +CGAUTH, +CEMBMSCFG, +CEMBMSR, +CEN, +CEPPI, +CPBS, +CPBR, +CPBF, +CPBW, +CLIR, +CMUX, &C, &D, &S, +IFC, +ICF, S2, S12, O, V, S0, %EARFCN, %CSQ, %CULCKI, %CPININFO, %MASTERKEY, %SETLOG, %GETLOG, %DTLOG, %SCAN, %LSTASSRT, %GETID, %PPPAUTH, %TRSHCMD, %AUTH, %CEER, %RSIMREQ, %RSIMRSP, %CATSAT, %SIMREFRESH, %CATPOLLINT, %CATLOCINF, %STATEV, %NOTIFYEV, %TSTRF, %SPMMODE, %SETPCO, %MBMSCMD, %MBMSEV, %MBMSINFO, %PCOINFO, %LTEINFO, %CMGRS, %USMSF, %STATCM, %UPGCMD, %FOTAINFO, %CGINFO, %SRVLOCK, %URLRES, %SETURLIP, %OMAEV, %OMACMD, %DMSES, %FOTACMD, %FOTAEV, %GETAID, %SHUTDOWN, %APNN, %NETSEL, %CCLK, %VECEER, %RESETCID, %CGDCONT, %CHKPLMN, %SMSINFO, %GPSCMD, %GPSEV (unsolicited), %GPSINFO, %NPEV, %VLTEV, %OTDOACMD, %CMGWC, %CMGSC, %GETSPN, %CEN, %EMGCMD, %EMGCBM, %DATACMD, %CCID, %ROHCCMD,

		%EMGNUM, %VLTCMD, %NETUPD, %DEVINFO, %CLCMD, %CSMP, %PBCMD, %SMMA, %GPIOSEL, %GPIOCMD, %TSTEXT, %CSDH, +CMGR (User extended), +CMGL (User extended), %LWM2MCMD, %LWM2MEV (unsolicited), %PHYSRV, %LWM2MOPEV (unsolicited), %I2SCFG, %ADCCMD, %PPPCFG, %IMSCMD, %SCACHECMD, %SCANCFG, %SCANCMD, %GETCFG, %COUNT, %PCONI, %SRVCHANGE, %PWRSVCMD • Add the following command: +CEDRXS, +CEDRXRDP, %DNSRSLV , %FILECMD, %FILEDATA, %PINGCMD • Modify the following command: %VER, %STATUS, %MEAS, %CMATT, %PDNACT, %PDNSET, %COLLECTLOGS, %LTECMD, %SOCKETCMD, %SOCKETDATA

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1. AT commands list

1.1. Applicable products

This document applies to the following products:

Name	Application version
CL11DAH11	CM_01_01_00_00_45
	CM_02_00_00_01_50
CL12DAH31	CM_02_00_00_01_65
	CM_02_00_00_11_04
	CM_02_00_00_11_10
CL32DAH31	CM_02_00_00_00_119
	CM_02_00_00_00_129

1.2. Important notice

- Basically, please do not use Altair Proprietary AT Commands.
  When you need to use them, please contact Taiyo Yuden team.
- When using Altair Proprietary AT Commands, Please recognize the risks and responsibilities.
- Please refer to "3GPP TS 27.007" for the 3GPP AT Commands.

1.3. 3GPP supported AT commands list

Command Name	Description	Notes/Limitations	3GPP Rev	Support
+GMI	Request TA manufacturer identification (equals to +CGMI)	-	ITU-T V.250	Ready
+GMM	Request TA model identification (equals to +CGMM)	-	ITU-T V.250	Ready
+GMR	Request TA revision identification (equals to +CGMR)	-	ITU-T V.250	Ready
+CGSN	Request revision identification	Doesn't support additional capabilities of Rev12	Rev11	Ready

Command Name	Description	Notes/Limitations	3GPP Rev	Support
+CSCS	Select TE (Terminal) character set	Affects only SMS AT commands. Support only: · "UCS2" · "8859-1" (Latin) · "IRA" · "PCCP437"	Rev12	Ready
Z	TA sets all parameters to their defaults as specified by a user memory profile or by the manufacturer, and resets TA	Reset device but doesn't return values to factory default	ITU-T V.250	Ready
I	Request manufacturer specific information about the TA.	-	ITU-T V.250	Ready
+CNUM	Subscriber number	-	Rev12	Ready
+CFUN	Set phone functionality	Mode 2 not supported. Only mode 4 (flight mode) is stored in NV memory. <fun> doesn't support 128 and 129	Rev11	Ready
+CPIN	Enter PIN	Supported facilities: - SIM PIN - SIM PUK - SIM PIN2 - SIM PUK2 - PH-SIM PIN - PH-NET PIN	Rev12	Not Ready
+CSQ	Signal quality	instead of RSSI the modem returns RSRP	Rev12	Ready
+CMEE	Report mobile termination error	-	Rev12	Ready
+CGATT	PS attach or detach	-	Rev12	Ready
+CGPADDR	Show PDP address +CGPADDR	-	Rev12	Ready
+CEREG	EPS network registration status	-	Rev12	Ready

Command Name	Description	Notes/Limitations	3GPP Rev	Support
+CMGF	Message Format	Support only Text mode	Rev12	Ready
+CNMI	New Message Indications	Supported only in NP-enabled.	Rev12	Not Ready
+CMGL	List Messages	Support only text mode	Rev12	Ready
+CMGR	Read Messages	Support only text mode	Rev12	Ready
+CMGW	Write Message to Memory	Support only text mode	Rev12	Ready
+CMGD	Delete Messages	-	Rev12	Ready
+CMGS	Send Message from host	Support Text/PDU mode.	Rev12	Ready
+CCLK	Set the Real Time clock	-	Rev12	Ready
+CMSS	Send SMS from storage	-	Rev12	Not Ready
+CESQ	Extended Signal Quality	-	Rev12	Ready
+IPR	Fixed DTE Interface Rate	FAST UART only. Automatic detection not supported Default rate is 115200	ITU-T V.250	Ready
&K	Flow Control	FAST UART only. Support only &K0 and &K3	Rockwell Rev4	Ready
E	Command Echo	Always Returns OK. Does not do anything	ITU-T V.250	Ready
DT	Modem dial	FAST UART only. ATDT<number> launch PPP daemon and switch to binary mode. The <number> parameter is ignored.	Rockwell Rev4	Ready
+CEDRXS	Controls the setting of eDRX parameters	-	Rev13	Ready
+CEDRXRDP	Retrieves eDRX parameters	-	Rev13	Ready

1.4. Altair proprietary supported AT commands list

Command Name	Description	Support
%VER	Display all FW versions (SB/MAC/PHY/ASIPS)	Ready
%STATUS	Get entity status	Ready
%MEAS	Returns measurement for specified measurement type	Ready
%CMATT	Command to Instruct eCM to attach or detach the LTE network	Ready
%PDNACT	Command to start/stop any PDN connection	Ready
%COLLECTLOGS	Command to set log storage	Ready
%PDNSET	Set run-time PDN parameters for data PDNs exposed to host	Ready
%LTECMD	LTE protocol pram's query override and toggle at run-time	Ready
%SOCKETCMD	AT command to enable socket service	Ready
%SOCKETDATA	DATA delivery for Socket service	Ready
%DNSRSLV	Resolve URL	Ready
%FILECMD	Open file transfer session between host and device	Ready
%FILEDATA	The command to download file locally chunk-by-chunk.	Ready
%PINGCMD	Run PING service	Ready

2. 3GPP supported AT commands description

2.1. Request manufacturer identification +GMI

Syntax

Command	Possible Responses(s)
+GMI	<manufacturer> +CME ERROR: <err>

Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the DCE to identify the manufacturer. Typically, the text will consist of a single line containing the name of the manufacturer, but manufacturers may choose to provide more information if desired (e.g., address, telephone number for customer service, etc.).

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

Defined values

Parameter	Type	Description
<manufacturer>	characters	including line terminators, in the information text shall not exceed 2048 characters. Text shall not contain the sequence 0<CR> or OK<CR>

2.2. Request model identification +GMM

Syntax

Command	Possible Responses(s)
+GMM	<model> +CME ERROR: <err>

Description

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

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

Defined values

Parameter	Type	Description
<model>	characters	including line terminators, in the information text shall not exceed 2048 characters. Text shall not contain the sequence 0<CR> or OK<CR>

2.3. Request revision identification +GMR

Syntax

Command	Possible Responses(s)
+GMR	<revision> +CME ERROR: <err>

Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the DCE to identify the version, revision level or date, or other pertinent information of the device. Typically, the text will consist of a single line containing the version of the product, but manufacturers may choose to provide any information desired.

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

Defined values

Parameter	Type	Description
<revision>	characters	including line terminators, in the information text shall not exceed 2048 characters. Text shall not contain the sequence 0<CR> or OK<CR>

2.4. Request product serial number identification +CGSN

Syntax

Command	Possible Responses(s)
+CGSN[=<snt>]	**when <snt>=0 (or omitted) and command successful:** <sn> **when <snt>=1 and command successful:** +CGSN: <imei> **when <snt>=2 and command successful:** +CGSN: <imeisv> **when <snt>=3 and command successful:** +CGSN: <svn> *+CME ERROR: <err>*
+CGSN=?	**when TE supports <snt> and command successful:** +CGSN: (list of supported <snt>s)

Description

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

Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

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

Defined values

Parameter	Type	Description
<snt>	integer	0: returns <sn> 1: returns the IMEI (International Mobile station Equipment Identity) 2: returns the IMEISV (International Mobile station Equipment Identity and Software Version number) 3: returns the SVN (Software Version Number)
<sn>	characters	one or more lines of information text determined by the MT manufacturer. Typically, the text will consist of a single line containing the IMEI number of the MT, but manufacturers may choose to provide more information if desired. The total number of characters, including line terminators, in the information text shall not exceed 2048 characters. Text shall not contain the sequence 0<CR> or OK<CR>

Parameter	Type	Description
<imei>	string	refer 3GPP TS 23.003 [7], subclause 6.2.1. IMEI is composed of Type Allocation Code (TAC) (8 digits), Serial Number (SNR) (6 digits) and the Check Digit (CD) (1 digit). Character set used in <imei> is as specified by command Select TE Character Set +CSCS.
<imeisv>	string	refer 3GPP TS 23.003 [7], subclause 6.2.2. The 16 digits of IMEISV are composed of Type Allocation Code (TAC) (8 digits), Serial Number (SNR) (6 digits) and the software version (SVN) (2 digits). Character set used in <imeisv> is as specified by command Select TE Character Set +CSCS.
<svn>	string	refer 3GPP TS 23.003 [7], subclause 6.2.2. This allows identifying different software versions of a given mobile. Character set used in <svn> is as specified by command Select TE Character Set +CSCS. NOTE: The default value <snt>=0 returns the information text <sn> with no command name prefixed. This has been done to retain backward compatibility. All other values of <snt> return the information text including command name prefix.

Example

To get <sn> which returns IMEI of the MT

AT+CGSN

123456789012345

OK

To get <imei> which returns IMEI of the MT

AT+CGSN=1

+CGSN: "123456789012345"

OK

2.5. Select TE character set +CSCS [TBD]

Syntax

Command	Possible Responses(s)
+CSCS=[<chset>]	
+CSCS?	+CSCS: <chset>
+CSCS=?	+CSCS: (list of supported <chset>s)

Description

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

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

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

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

Test command returns values supported as a compound value.

Defined values

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

2.6. Reset to default configuration Z

Syntax

Command	Possible Responses(s)
Z	OK

Description

TA sets all parameters to their defaults as specified by a user memory profile or by the manufacturer, and resets TA.

Reset device but doesn't return values to factory default

2.7. Request identification information I

Syntax

Command	Possible Responses(s)
I	<ordering_code> OK

Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, followed by a final result code.

Defined values

Parameter	Type	Description
<ordering_code>	string	Product ordering code

2.8. Subscriber number +CNUM

Syntax

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

Description

Action command returns the MSISDNs related to the subscriber (this information can be stored in the SIM/UICC or in the MT). When storing information in the SIM/UICC, if the currently selected card slot contains a SIM card or a UICC with an active GSM application, the information is stored in the EFMSISDN under DFTelecom. If the currently selected card slot contains a UICC with an active USIM application, the information is stored in the EFMSISDN under ADFUSIM). If subscriber has different MSISDN for different services, each MSISDN is returned on a separate line. Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

Defined values

Parameter	Type	Description
<alphax>	string	used character set should be the one selected with command Select TE Character Set +CSCS
<numberx>	string	string type phone number of format specified by <typex>
<typex>	integer	type of address octet in integer format (refer 3GPP TS 24.008 [8] subclause 10.5.4.7)
<speed>	integer	integer type as defined in subclause 6.7
<service>	integer	0: asynchronous modem 1: synchronous modem 2: PAD Access (asynchronous) 3: Packet Access (synchronous) 4: voice 5: fax all other values below 128 are reserved by the present document
<itc>	integer	0: 3,1 kHz 1: UDI

2.9. Set phone functionality +CFUN

Syntax

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

Description

Set command selects the level of functionality <fun> in the MT. Level "full functionality" is where the highest level of power is drawn. "Minimum functionality" is where minimum power is drawn. Level of functionality between these may also be specified by manufacturers. When supported by manufacturers, MT resetting with <rst> parameter may be utilized. Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

NOTE 1: It is manufacturer specific if this command affects network registration. Command Operator Selection +COPS is used to force registration/deregistration.

Read command returns the current setting of <fun>.

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

Defined values

Parameter	Type	Description
<fun>	integer	0: minimum functionality 1: full functionality. Enable (turn on) the transmit and receive RF circuits for all supported radio access technologies. For MTs supporting +CSRA, this equals the RATs indicated by the response of +CSRA=?. Current +CSRA setting is ignored. It is not required that the MT transmit and receive RF circuits are in a disabled state for this setting to have effect. 2: disable (turn off) MT transmit RF circuits only 3: disable (turn off) MT receive RF circuits only 4: disable (turn off) both MT transmit and receive RF circuits 5...127: reserved for manufacturers as intermediate states between full and minimum functionality 128: Full functionality with radio access support according to the setting of +CSRA. Enables (turns on) the transmit and receive RF circuits if not already enabled. This <fun> setting is applicable for MTs supporting +CSRA. 129: Prepare for shutdown. This setting has its prime use when some of the MT's resources (e.g. file system) are located on a tightly integrated TE (host). The MT will execute pending actions resulting in "permanent" changes, e.g. execute pending file system operations. The MT will also make an orderly network detach. After this action and +CFUN has returned OK, the MT can be shut down with <fun>=0, or by other means. After setting <fun>=129, only <fun>=0 is valid. All other values will make +CFUN return ERROR.
<rst>	integer	0: do not reset the MT before setting it to <fun> power level NOTE 2: This shall be always default when <rst> is not given. 1: reset the MT before setting it to <fun> power level

2.10. Enter PIN +CPIN

Syntax

Command	Possible Responses(s)
+CPIN=<pin>[,<newpin>]	+CME ERROR: <err>
+CPIN?	+CPIN: <code> +CME ERROR: <err>
+CPIN=?	+CMEE: (list of supported <n>s)

Description

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

NOTE:

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

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

NOTE:

Commands which interact with MT that are accepted when MT is pending SIM PIN, SIM PUK, or PH SIM are:

+CGMI, +CGMM, +CGMR, +CGSN, D112; (emergency call), +CPAS, +CFUN, +CPIN, +CPINR, +CDIS (read and test command only), and +CIND (read and test command only).

It is implementation specific whether

additional commands can be accepted when MT is pending SIM PIN, SIM PUK, or PH SIM.

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

Defined values

Parameter	Type	Description
<pin>	string	Pin value
<newpin>	string	Second pin value
<code>	integer	**values reserved by the present document:** READY: MT is not pending for any password SIM PIN: MT is waiting SIM PIN to be given SIM PUK: MT is waiting SIM PUK to be given PH-SIM PIN: MT is waiting phone to SIM card password to be given SIM PIN2: MT is waiting SIM PIN2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PIN2 authentication failure (i.e. +CME ERROR: 17); if PIN2 is not entered right after the failure, it is recommended that MT does not block its operation) SIM PUK2: MT is waiting SIM PUK2 to be given (this <code> is recommended to be returned only when the last executed command resulted in PUK2 authentication failure (i.e. +CME ERROR: 18); if PUK2 and new PIN2 are not entered right after the failure, it is recommended that MT does not block its operation) PH-NET PIN: MT is waiting network personalization password to be given

2.11. Signal quality +CSQ

Syntax

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

Description

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

Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

Test command returns values supported as compound values.

Defined values

Parameter	Type	Description
<rssi>	integer	0: -113 dBm or less 1: -111 dBm 2...30: -109 ... -53 dBm 31: -51 dBm or greater 99: not known or not detectable
<ber>	integer	channel bit error rate (in percent) 0...7: as RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4 99: not known or not detectable

2.12. Report mobile termination error +CMEE

Syntax

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

Description

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

Read command returns the current setting of <n>.

Test command returns values supported as a compound value.

Defined values

Parameter	Type	Description
<n>	integer	0: disable +CME ERROR: <err> result code and use ERROR instead 1: enable +CME ERROR: <err> result code and use numeric <err> values (refer subclause 9.2) 2: enable +CME ERROR: <err> result code and use verbose <err> values (refer subclause 9.2)

2.13. PS attach or detach +CGATT

Syntax

Command	Possible Responses(s)
+CGATT=<state>	+CME ERROR: <err>
+CGATT?	+CGATT: <state>
+CGATT=?	+CGATT: (list of supported <state>s)

Description

The execution command is used to attach the MT to, or detach the MT from, the Packet Domain service. After the command has completed, the MT remains in V.250 command state. If the MT is already in the requested state, the command is ignored and the OK response is returned. If the requested state cannot be achieved, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command. Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

NOTE 1: If the initial PDP context is supported, the context with <cid>=0 is automatically defined at startup, see subclause 10.1.0.

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

The read command returns the current Packet Domain service state.

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

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

Defined values

Parameter	Type	Description
<state>	integer	indicates the state of PS attachment 0: detached 1: attached

2.14. Show PDP address(es) +CGPADDR

Syntax

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

NOTE: The syntax of the AT Set Command is corrected to be according to ITU-T Recommendation V.250 [14]. Older versions of the specification specify incorrect syntax +CGPADDR=[,<cid>[,<cid>[,...]]].

Description

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

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

Defined values

Parameter	Type	Description
<cid>	integer	specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands)
<PDP_addr_1>, <PDP_addr_2>	string	each is a string type that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the +CGDCONT and +CGDSCONT commands when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. Both <PDP_addr_1> and <PDP_addr_2>are omitted if none is available. Both <PDP_addr_1> and <PDP_addr_2> are included when both IPv4 and IPv6 addresses are assigned, with <PDP_addr_1> containing the IPv4 address and <PDP_addr_2> containing the IPv6 address. The string is given as dot-separated numeric (0-255) parameter of the form: a1.a2.a3.a4 for IPv4 and a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16 for IPv6. When +CGPIAF is supported, its settings can influence the format of the IPv6 address in parameter <PDP_addr_1> or <PDP_addr_2> returned with the execute form of +CGPADDR. NOTE: In dual-stack terminals (<PDP_type> IPV4V6), the IPv6 address will be provided in <PDP_addr_2>.For terminals with a single IPv6 stack (<PDP_type> IPV6) or due to backwards compatibility, the IPv6 address can be provided in parameter <PDP_addr_1>.

2.15. EPS network registration status +CEREG

Syntax

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

Description

The set command controls the presentation of an unsolicited result code +CEREG: <stat> when <n>=1 and there is a change in the MT's EPS network registration status in E-UTRAN, or unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>]] when <n>=2 and there is a change of the network cell in EUTRAN.

The parameters <AcT>, <tac> and <ci> are provided only if available.The value <n>=3 further extends the unsolicited result code with [,<cause_type>,<reject_cause>], when available, when the value of <stat> changes.

If the UE wants to apply PSM for reducing its power consumption, see +CPSMS command and 3GPP TS 23.682 [149], the set command controls the presentation of an unsolicited result code+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]. When <n>=4 the unsolicited result code will provide the UE with additional information for the Active Time value and the extended periodic TAU value if there is a change of the network cell in E-UTRAN. The value <n>=5 further enhances the unsolicited result code with <cause_type> and <reject_cause> when the value of <stat> changes. The parameters <AcT>, <tac>, <ci>, <cause_type>, <reject_cause>, <Active-Time> and <Periodic-TAU> are provided only if available.

Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

NOTE 1: If the EPS MT in GERAN/UTRAN/E-UTRAN also supports circuit mode services and/or GPRS services, the +CREG command and +CREG: result codes and/or the +CGREG command and +CGREG: result codes apply to the registration status and location information for those services.

The read command returns the status of result code presentation and an integer <stat> which shows whether the network has currently indicated the registration of the MT. Location information elements <tac>, <ci> and <AcT>, if available, are returned only when <n>=2 and MT is registered in the network. The parameters [,<cause_type>,<reject_cause>], if available, are

returned when <n>=3.

Test command returns values supported as a compound value.

Defined values

Parameter	Type	Description
<n>	integer	0: disable network registration unsolicited result code 1: enable network registration unsolicited result code +CEREG: <stat> 2: enable network registration and location information unsolicited result code+CEREG: <stat>[,[<tac>],[<ci>],[<AcT>]] 3: enable network registration, location information and EMM cause value information unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,<cause_type>,<reject_cause>]] 4: For a UE that wants to apply PSM, enable network registration and location information unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,,[,[<Active Time>],[<Periodic-TAU>]]]] 5: For a UE that wants to apply PSM, enable network registration, location information and EMM cause value information unsolicited result code +CEREG: <stat>[,[<tac>],[<ci>],[<AcT>][,[<cause_type>],[<reject_cause>][,[<Active-Time>],[<Periodic-TAU>]]]]
<stat>	integer	indicates the EPS registration status 0: not registered, MT is not currently searching an operator to register to 1: registered, home network 2: not registered, but MT is currently trying to attach or searching an operator to register to 3: registration denied 4: unknown (e.g. out of E-UTRAN coverage) 5: registered, roaming 6: registered for "SMS only", home network (not applicable) 7: registered for "SMS only", roaming (not applicable) 8: attached for emergency bearer services only (See NOTE 2) 9: registered for "CSFB not preferred", home network (not applicable) 10: registered for "CSFB not preferred", roaming (not applicable)

Parameter	Type	Description
		NOTE 2: 3GPP TS 24.008 [8] and 3GPP TS 24.301 [83] specify the condition when the MS is considered as attached for emergency bearer services.
<tac>	string	two byte tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)
<ci>	string	four byte E-UTRAN cell ID in hexadecimal format
<AcT>	integer	indicates the access technology of the serving cell 0: GSM (not applicable) 1: GSM Compact (not applicable) 2: UTRAN (not applicable) 3: GSM w/EGPRS (see NOTE 3) (not applicable) 4: UTRAN w/HSDPA (see NOTE 4) (not applicable) 5: UTRAN w/HSUPA (see NOTE 4) (not applicable) 6: UTRAN w/HSDPA and HSUPA (see NOTE 4) (not applicable) 7: E-UTRAN NOTE 3: 3GPP TS 44.060 [71] specifies the System Information messages which give the information about whether the serving cell supports EGPRS. NOTE 4: 3GPP TS 25.331 [74] specifies the System Information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.
<cause_type>	integer	indicates the type of <reject_cause>. 0: Indicates that <reject_cause> contains an EMM cause value, see 3GPP TS 24.301 [83] Annex A. 1: Indicates that <reject_cause> contains a manufacturer specific cause.
<reject_cause>	integer	contains the cause of the failed registration. The value is of type as defined by <cause_type>.
<reject_cause>	integer	<Active-Time>: string type; one byte in an 8 bit format. Indicates the Active Time value (T3324) allocated to the UE in E-UTRAN. The Active Time value is coded as one byte (octet 3) of the GPRS Timer 2 information element coded as bit format (e.g. "00100100" equals 4 minutes). For the coding and the value range, see the GPRS Timer 2 IE in 3GPP TS 24.008 [8] Table 10.5.163/3GPP TS 24.008. See also 3GPP TS 23.682 [149] and 3GPP TS 23.401 [82].

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

2.16. Preferred message format +CMGF

Syntax

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

Description

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

Defined values

Parameter	Type	Description
<mode>	integer	0: PDU mode 1: text mode

2.17. New message indication +CNMI

Syntax

Command	Possible Responses(s)
+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	+CMS ERROR: <err>
+CNMI?	+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>
+CNMI=?	+CNMI: (list of supported <mode>s),(list of supported <mt>s),(list of supported <bm>s),(list of supported <ds>s),(list of supported <bfr>s)

Description

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

NOTE 1: When DTR signal is not available or the state of the signal is ignored (V.25ter command &D0), reliable message transfer can be assured by using +CNMA acknowledgement procedure.

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

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

NOTE 2: Command Select Message Service +CSMS should be used to detect ME support of mobile terminated SMs and CBMs, and to define whether a message routed directly to TE should be acknowledged or not (refer command +CNMA).

Defined values

Parameter	Type	Description
<mode>	integer	NOTE 3:The buffering mechanism may as well be located in the ME; the setting affects only to unsolicited result codes specified within this command): 1: Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode). Otherwise forward them directly to the TE. **[TBD]** 2: Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE. **[TBD]** NOTE 4:It is possible that ME/TA result code buffer is in volatile memory. In this case messages may get lost if the power of ME/TA is switched off before codes are sent to TE. Thus, it is not recommended to use direct message routing (<mt>=2 or 3, <bm>=2 or 3, or <ds>=1) with <mode> value 0 or 2.
<mt>	integer	NOTE 5: If AT command interface is acting as the only display device, the ME must support storing of class 0 messages and messages in the message waiting indication group (discard message). 0: No SMS-DELIVER indications are routed to the TE. 1: If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CMTI: <mem>,<index> 2: SMS-DELIVERs (except class 2 messages and messages in the message waiting indication group (store message)) are routed directly to the TE using unsolicited result code: +CMT: [<alpha>],<length><CR><LF><pdu> (PDU mode enabled); or +CMT: <oa>,[<alpha>],<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]<CR><LF><data> (text mode enabled; about parameters in italics, refer command Show Text Mode Parameters +CSDH). If ME has its own display device then class 0 messages and messages in the message waiting indication group (discard message) may be copied to both ME display and to TE. In this case, ME shall send the acknowledgement to the network. Class 2 messages and messages in the message waiting indication group (store message) result in indication as defined in <mt>=1.

Parameter	Type	Description
<bm>	integer	0: No CBM indications are routed to the TE. 1: If CBM is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: [not supported] +CBMI: <mem>,<index> 2: New CBMs are routed directly to the TE using unsolicited result code: [TBD] +CBM: <length><CR><LF><pdu> (PDU mode enabled); or +CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> (text mode enabled) If ME supports data coding groups which define special routing also for messages other than class 3 (e.g. (U)SIM specific messages), ME may choose not to route messages of such data coding schemes into TE (indication of a stored CBM may be given as defined in <bm>=1).
<ds>	integer	0: No SMS-STATUS-REPORTs are routed to the TE. 1: SMS-STATUS-REPORTs are routed to the TE using unsolicited result code: +CDS: <length><CR><LF><pdu> (PDU mode enabled); or +CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> (text mode enabled) 2: If SMS-STATUS-REPORT is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CDSI: <mem>,<index>
<bfr>	integer	0: TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...3 is entered (OK response shall be given before flushing the codes).[TBD] 1: TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered. [TBD]

2.18. List message +CMGL

Syntax

Command	Possible Responses(s)
+CMGL[=<stat>]	**if text mode (+CMGF=1), command successful and SMS-SUBMITs and/or SMS-DELIVERs:** +CMGL: <index>,<stat>,<oa/da>,[<alpha>],[<scts>]*[,<tooa/toda>,<length>]*<CR><LF><data>[<CR><LF> +CMGL: <index>,<stat>,<da/oa>,[<alpha>],[<scts>]*[,<tooa/toda>,<length>]*<CR><LF><data>[...]] **if text mode (+CMGF=1), command successful and SMS-STATUS-REPORTs:** +CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> [<CR><LF> +CMGL: <index>,<stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> [...]] **if text mode (+CMGF=1), command successful and SMS-COMMANDs:** +CMGL: <index>,<stat>,<fo>,<ct>[<CR><LF> +CMGL: <index>,<stat>,<fo>,<ct>[...]] **if text mode (+CMGF=1), command successful and CBM storage:** +CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages> <CR><LF><data>[<CR><LF> +CMGL: <index>,<stat>,<sn>,<mid>,<page>,<pages> <CR><LF><data>[...]] **if PDU mode (+CMGF=0) and command successful:** **+CMGL:** <index>,<stat>,[<alpha>],<length><CR><LF><pdu> [<CR><LF>+CMGL:<index>,<stat>,[<alpha>],<length><CR><LF><pdu> [...]] **otherwise:** *+CMS ERROR: <err>*
+CMGL=?	+CMGL: (list of supported <stat>s)

Description

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

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

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

Defined values

Parameter	Type	Description
<stat>	integer	indicates the status of message in memory; defined values: 0: "REC UNREAD" received unread message (i.e. new message) 1: "REC READ" received read message 2: "STO UNSENT" stored unsent message (only applicable to SMs) 3: "STO SENT" stored sent message (only applicable to SMs) 4: "ALL" all messages (only applicable to +CMGL command)
<index>	integer	value in the range of location numbers supported by the associated memory
<alpha>	string	implementation of this feature is manufacturer specific; used character set should be the one selected with command Select TE Character Set +CSCS (see definition of this command in 3GPP TS 27.007 [9])
<scts>	string	3GPP TS 23.040 [3] TP-Service-Centre-Time-Stamp in time-string format (refer <dt>)
<oa>	string	BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in TS 07.07); type of address given by <tooa>
<tora>	number	3GPP TS 24.011 [6] TP-Recipient-Address Type-of-Address octet in integer format (default refer <toda>)

Parameter	Type	Description
<data>	string	In the case of SMS: 3GPP TS 23.040 [3] TP-User-Data in text mode responses; format: -if <dcs> indicates that 3GPP TS 23.038 [2] GSM 7 bit default alphabet is used and <fo> indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is not set: -if TE character set other than "HEX" (refer command Select TE Character Set +CSCS in 3GPP TS 27.007 [9]): ME/TA converts GSM alphabet into current TE character set according to rules of Annex A -if TE character set is "HEX": ME/TA converts each 7-bit character of GSM 7 bit default alphabet into two IRA character long hexadecimal number (e.g. character Ψ (GSM 7 bit default alphabet decimal 23) is presented as 17 (IRA 49 and 55)) -if <dcs> indicates that 8-bit or UCS2 data coding scheme is used, or <fo> indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is set: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)) In the case of CBS: 3GPP TS 23.041 [4] CBM Content of Message in text mode responses; format: -if <dcs> indicates that 3GPP TS 23.038 [2] GSM 7 bit default alphabet is used: -if TE character set other than "HEX" (refer command +CSCS in 3GPP TS 27.007 [9]): ME/TA converts GSM alphabet into current TE character set according to rules of Annex A -if TE character set is "HEX": ME/TA converts each 7-bit character of the GSM 7 bit default alphabet into two IRA character long hexadecimal number -if <dcs> indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number
<length>	integer	integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> > (or <cdata>) in characters; or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)

Parameter	Type	Description
<dt>	string	"yy/MM/dd,hh:mm:ss±zz", 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"
<fo>	string	first octet of 3GPP TS 23.040 [3] SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format

2.19. Read message +CMGR

Syntax

Command	Possible Responses(s)
+CMGR=<index>	**if text mode (+CMGF=1), command successful and SMS-DELIVER:** +CMGR: <stat>,<oa>,[<alpha>],<scts>*[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>]*<CR><LF><data> **if text mode (+CMGF=1), command successful and SMS-SUBMIT:** +CMGR: <stat>,<da>,[<alpha>]*[,<toda>,<fo>,<pid>,<dcs>,[<vp>],<sca>,<tosca>,<length>]*<CR><LF><data> **if text mode (+CMGF=1), command successful and SMS-STATUS-REPORT:** +CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> **if text mode (+CMGF=1), command successful and SMS-COMMAND:** +CMGR: <stat>,<fo>,<ct>*[,<pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>]* **if text mode (+CMGF=1), command successful and CBM storage:** +CMGR: <stat>,<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> **if PDU mode (+CMGF=0) and command successful:** +CMGR: <stat>,[<alpha>],<length><CR><LF><pdu> **otherwise:** *+CMS ERROR: <err>*
+CMGR=?	

Description

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

Defined values

Parameter	Type	Description
<stat>	integer	indicates the status of message in memory; defined values: 0: "REC UNREAD" received unread message (i.e. new message) 1: "REC READ" received read message 2: "STO UNSENT" stored unsent message (only applicable to SMs) 3: "STO SENT" stored sent message (only applicable to SMs) 4: "ALL" all messages (only applicable to +CMGL command)
<index>	integer	value in the range of location numbers supported by the associated memory
<alpha>	string	implementation of this feature is manufacturer specific; used character set should be the one selected with command Select TE Character Set +CSCS (see definition of this command in 3GPP TS 27.007 [9])
<scts>	string	3GPP TS 23.040 [3] TP-Service-Centre-Time-Stamp in time-string format (refer <dt>)
<oa>	string	BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in TS 07.07); type of address given by <tooa>
<tora>	number	3GPP TS 24.011 [6] TP-Recipient-Address Type-of-Address octet in integer format (default refer <toda>)

Parameter	Type	Description
<data>	string	In the case of SMS: 3GPP TS 23.040 [3] TP-User-Data in text mode responses; format: -if <dcs> indicates that 3GPP TS 23.038 [2] GSM 7 bit default alphabet is used and <fo> indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is not set: -if TE character set other than "HEX" (refer command Select TE Character Set +CSCS in 3GPP TS 27.007 [9]): ME/TA converts GSM alphabet into current TE character set according to rules of Annex A -if TE character set is "HEX": ME/TA converts each 7-bit character of GSM 7 bit default alphabet into two IRA character long hexadecimal number (e.g. character Ψ (GSM 7 bit default alphabet decimal 23) is presented as 17 (IRA 49 and 55)) -if <dcs> indicates that 8-bit or UCS2 data coding scheme is used, or <fo> indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is set: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)) In the case of CBS: 3GPP TS 23.041 [4] CBM Content of Message in text mode responses; format: -if <dcs> indicates that 3GPP TS 23.038 [2] GSM 7 bit default alphabet is used: -if TE character set other than "HEX" (refer command +CSCS in 3GPP TS 27.007 [9]): ME/TA converts GSM alphabet into current TE character set according to rules of Annex A -if TE character set is "HEX": ME/TA converts each 7-bit character of the GSM 7 bit default alphabet into two IRA character long hexadecimal number -if <dcs> indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number
<length>	integer	integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> > (or <cdata>) in characters; or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)

Parameter	Type	Description
<dt>	string	"yy/MM/dd,hh:mm:ss□zz", 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"
<fo>	string	first octet of 3GPP TS 23.040 [3] SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format
<tooa>	string	3GPP TS 24.011 [6] TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>)
<toda>	string	3GPP TS 24.011 [6] TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129)
<da>	string	3GPP TS 23.040 [3] TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in3GPP TS 27.007 [9]); type of address given by <toda>

2.20. Write message to memory +CMGW

Syntax

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

Description

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

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

Defined values

Parameter	Type	Description
<stat>	integer	indicates the status of message in memory; defined values: 0: "REC UNREAD" : received unread message (i.e. new message) 1: "REC READ" : received read message 2: "STO UNSENT" : stored unsent message (only applicable to SMs) 3: "STO SENT" : stored sent message (only applicable to SMs) 4: "ALL" : all messages (only applicable to +CMGL command)
<index>	integer	value in the range of location numbers supported by the associated memory
<oa>	string	BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in TS 07.07); type of address given by <tooa>
<tooa>	string	3GPP TS 24.011 [6] TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>)

Parameter	Type	Description
<toda>	string	3GPP TS 24.011 [6] TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129)
<da>	string	3GPP TS 23.040 [3] TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in3GPP TS 27.007 [9]); type of address given by <toda>

2.21. Delete message +CMGD

Syntax

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

Description

Execution command deletes message from preferred message storage <mem1> location <index>. If <delflag> is present and not set to 0 then the ME shall ignore <index> and follow the rules for <delflag> shown below. If deleting fails, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for <err> values.
Test command shows the valid memory locations and optionally the supported values of <delflag>.

Defined values

Parameter	Type	Description
<delflag>	integer	indicating multiple message deletion request as follows: 0: Delete the message specified in <index> 1: Delete all read messages from preferred message storage, leaving unread messages and stored mobile originated messages (whether sent or not) untouched 2: Delete all read messages from preferred message storage and sent mobile originated messages, leaving unread messages and unsent mobile originated messages untouched 3: Delete all read messages from preferred message storage, sent and unsent mobile originated messages leaving unread messages untouched. 4: Delete all messages from preferred message storage including unread messages.
<index>	integer	value in the range of location numbers supported by the associated memory

2.22. Send message +CMGS

Syntax

Command	Possible Responses(s)
if text mode (+CMGF=1): +CMGS=<da>[,<toda>]<CR> *text is entered*<ctrl-Z/ESC>	**if text mode (+CMGF=1) and sending successful:** +CMGS: <mr>[,<scts>] **if sending fails:** *+CMS ERROR: <err>*
f PDU mode (+CMGF=0): +CMGS=<length><CR> PDU is given<ctrl-Z/ESC>	**if PDU mode (+CMGF=0) and sending successful:** +CMGS: <mr>[,<ackpdu>] **if sending fails:** *+CMS ERROR: <err>*
+CMGS=?	OK

Description

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

Execution command sends message from a TE to the network (SMS-SUBMIT). Message reference value <mr> is returned to the TE on successful message delivery. Value can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for a list of <err> values. This command should be abortable.

- entered text (3GPP TS 23.040 [3] TP-Data-Unit) is sent to address <da> and all current settings (refer Set Text Mode Parameters +CSMP and Service Centre Address +CSCA) are used to construct the actual PDU in ME/TA.
- the TA shall send a four character sequence <CR><LF><greater_than><space> (IRA 13, 10, 62, 32) after command line is terminated with <CR>; after that text can be entered from TE to ME/TA.
- the DCD signal shall be in ON state while text is entered.
- the echoing of entered characters back from the TA is controlled by V.25ter echo command E.
- the entered text should be formatted as follows:
  - if <dcs> (set with +CSMP) indicates that 3GPP TS 23.038 [2] GSM 7 bit default alphabet is

used and <fo> indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is not set:

- if TE character set other than "HEX" (refer command Select TE Character Set +CSCS in 3GPP TS 27.007 [9]): ME/TA converts the entered text into the GSM 7 bit default alphabet according to rules of Annex A; backspace can be used to delete last character and carriage returns can be used (previously mentioned four character sequence shall be sent to the TE after every carriage return entered by the user);
- if TE character set is "HEX": the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into the GSM 7 bit default alphabet characters. (e.g. 17 (IRA 49 and 55) will be converted to character ・ (GSM 7 bit default alphabet 23)).
- if <dcs> indicates that 8-bit or UCS2 data coding scheme is used or <fo> indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is set: the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. two characters 2A (IRA 50 and 65) will be converted to an octet with integer value 42).

- sending can be cancelled by giving <ESC> character (IRA 27).
- <ctrl-Z> (IRA 26) must be used to indicate the ending of the message body.

Defined values

Parameter	Type	Description
<scts>	string	3GPP TS 23.040 [3] TP-Service-Centre-Time-Stamp in time-string format (refer <dt>)
<mr>	number	3GPP TS 23.040 [3] TP-Message-Reference in integer format
<toda>	string	3GPP TS 24.011 [6] TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129)
<da>	string	3GPP TS 23.040 [3] TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in3GPP TS 27.007 [9]); type of address given by <toda>

2.23. Clock +CCLK

Syntax

Command	Possible Responses(s)
+CCLK=<time>	+CME ERROR: <err>
+CCLK?	+CCLK: <time> +CME ERROR: <err>
+CCLK=?	

Description

Set command sets the real-time clock of the MT. If setting fails in an MT error, +CME ERROR: <err> is returned.

Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

Read command returns the current setting of the clock.

Defined values

Parameter	Type	Description
<time>	string	format is "yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -96...+96). E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08" NOTE: If MT does not support time zone information then the three last characters of <time> are not returned by +CCLK?. The format of <time> is specified by use of the +CSDF command.

2.24. Send message from storage +CMSS

Syntax

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

Description

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

Defined values

Parameter	Type	Description
<index>	integer	value in the range of location numbers supported by the associated memory

2.25. Extended signal quality +CESQ

Syntax

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

Description

Execution command returns received signal quality parameters. If the current serving cell is not a GERAN cell, <rxlev> and <ber> are set to value 99. If the current serving cell is not a UTRA FDD or UTRA TDD cell, <rscp> is set to 255. If the current serving cell is not a UTRA FDD cell, <ecno> is set to 255. If the current serving cell is not an E-UTRA cell, <rsrq> and <rsrp> are set to 255. Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.
Test command returns values supported as compound values.

Defined values

Parameter	Type	Description
<rxlev>	integer	received signal strength level (see 3GPP TS 45.008 [20] subclause 8.1.4). 0: rssi < -110 dBm 1: -110 dBm ≦ rssi < -109 dBm 2: -109 dBm ≦ rssi < -108 dBm : : : : 61: -50 dBm ≦ rssi < -49 dBm 62: -49 dBm ≦ rssi < -48 dBm 63: -48 dBm ≦ rssi 99: not known or not detectable
<ber>	integer	channel bit error rate (in percent) 0...7: as RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4 99: not known or not detectable

Parameter	Type	Description
<rscp>	integer	received signal code power (see 3GPP TS 25.133 [95] subclause 9.1.1.3 and 3GPP TS 25.123 [96] subclause 9.1.1.1.3). 0: rscp < -120 dBm 1: -120 dBm ≦ rscp < -119 dBm 2: -119 dBm £ rscp < -118 dBm : : : : 94: -27 dBm £ rscp < -26 dBm 95: -26 dBm £ rscp < -25 dBm 96: -25 dBm £ rscp 255: not known or not detectable
<ecno>	integer	ratio of the received energy per PN chip to the total received power spectral density (see 3GPP TS 25.133 [95] subclause). 0: Ec/Io < -24 dB 1: -24 dB ≦ Ec/Io < -23.5 dB 2: -23.5 dB ≦ Ec/Io < -23 dB : : : : 47: -1 dB ≦ Ec/Io < -0.5 dB 48: -0.5 dB ≦ Ec/Io < 0 dB 49: 0 dB ≦ Ec/Io 255: not known or not detectable
<ber>	integer	channel bit error rate (in percent) 0...7: as RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4 99: not known or not detectable
<rscp>	integer	received signal code power (see 3GPP TS 25.133 [95] subclause 9.1.1.3 and 3GPP TS 25.123 [96] subclause 9.1.1.1.3). 0: rscp < -120 dBm 1: -120 dBm ≦ rscp < -119 dBm 2: -119 dBm ≦ rscp < -118 dBm : : : : 94: -27 dBm ≦ rscp < -26 dBm 95: -26 dBm ≦ rscp < -25 dBm 96: - 25 dBm ≦ rscp 255: not known or not detectable

Parameter	Type	Description
<ecno>	integer	ratio of the received energy per PN chip to the total received power spectral density (see 3GPP TS 25.133 [95] subclause). 0: Ec/Io < -24 dB 1: -24 dB ≦ Ec/Io < -23.5 dB 2: -23.5 dB ≦ Ec/Io < -23 dB : : : : 47: -1 dB ≦ Ec/Io < -0.5 dB 48: -0.5 dB ≦ Ec/Io < 0 dB 49: 0 dB ≦ Ec/Io 255: not known or not detectable
<rsrq>	integer	reference signal received quality (see 3GPP TS 36.133 [96] subclause 9.1.7). 0: rsrq < -19.5 dB 1: -19.5 dB ≦ rsrq < -19 dB 2: -19 dB ≦ rsrq < -18.5 dB : : : : 32: -4 dB ≦ rsrq < -3.5 dB 33: -3.5 dB ≦ rsrq < -3 dB 34: -3 dB ≦ rsrq 255: not known or not detectable
<rsrp>	integer	reference signal received power (see 3GPP TS 36.133 [96] subclause 9.1.4). 0: rsrp < -140 dBm 1: -140 dBm ≦ rsrp < -139 dBm 2: -139 dBm ≦ rsrp < -138 dBm : : : : 95: -46 dBm ≦ rsrp < -45 dBm 96: -45 dBm ≦ rsrp < -44 dBm 97: -44 dBm ≦ rsrp 255: not known or not detectable

2.26. Fixed DTE rate +IPR

Syntax

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

Description

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

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

Defined values

Parameter	Type	Description
<rate>	integer	1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 (default value), 230400, 460800, 921600, 3000000

2.27. Flow Control &K

Syntax

Command	Possible response(s)
&K[<value>]	OK

Description

This command defines the DTE/DCE (terminal/modem) flow control mechanism. The parameter value, if valid, is written to S39 bits 0, 1, and 2.

Defined values

Parameter	Type	Description
<value>	integer	0: Disables flow control. 3: Enables RTS/CTS flow control. (Default for data modem modes.) 4: Enables XON/XOFF flow control. 5: Enables transparent XON/XOFF flow control. 6: Enables both RTS/CTS and XON/XOFF flow control. (Default for fax modem and voice modes.)

2.28. Command echo E

Syntax

Command	Possible Responses(s)
E[<value>]	OK

Description

The setting of this parameter determines whether or not the DCE echoes characters received from the DTE during command state and online command state (see 5.2.3).

Defined values

Parameter	Type	Description
<value>	integer	0: DCE does not echo characters during command state and online command state. 1: DCE echoes characters during command state and online command state.

2.29. Dial DT

Syntax

Command	Possible Responses(s)
ATDT	OK

Description

pulse dial the numbers that follow until a "T" is encountered. Affects current and subsequent dialing. Some countries prevent changing dialing modes after the first digit is dialed.

2.30. eDRX setting +CEDRXS

Syntax

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

Description

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

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

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

Refer subclause 9.2 for possible <err> values.

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

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

Defined values

Parameter	Type	Description
<mode>	integer	indicates to disable or enable the use of eDRX in the UE. This parameter is applicable to all specified types of access technology, i.e. the most recent setting of <mode> will take effect for all specified values of <AcT>. 0: Disable the use of eDRX 1: Enable the use of eDRX 2: Enable the use of eDRX and enable the unsolicited result code +CEDRXP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]] 3: Disable the use of eDRX and discard all parameters for eDRX or, if available, reset to the manufacturer specific default values.
<AcT-type>	integer	indicates the type of access technology. This AT-command is used to specify the relationship between the type of access technology and the requested eDRX value. 4: E-UTRAN (WB-S1 mode)
<Requested_eDRX_value>	string	half a byte in a 4 bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008. The default value, if available, is manufacturer specific.
<NW-provided_eDRX_value>	string	half a byte in a 4 bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008.

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

2.31. eDRX read dynamic parameters +CEDRXRDP

Syntax

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

Description

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

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

Defined values

Parameter	Type	Description
<AcT-type>	integer	indicates the type of access technology. This AT-command is used to specify the relationship between the type of access technology and the requested eDRX value. 0: Access technology is not using eDRX 4: E-UTRAN (WB-S1 mode)
<Requested_eDRX_value>	string	half a byte in a 4 bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008.
<NW-provided_eDRX_value>	string	half a byte in a 4 bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]). For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008.

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

3. Altair proprietary AT commands description

3.1. Display all FW versions %VER

Syntax

Command	Possible response(s)
%VER	<ver_info> +CME ERROR: <err>
%VER?	ERROR (OPRATION_NOT_ALLOWED) Operation is not supported
%VER=?	OK

Description

Display SW/FW version information.

Defined values

Parameter	Type	Description
<ver_info>	string	version information

Example

AT%VER
NP Package: CM_02_00_00_11_10
Using APP processor - no SB or 3B versions
MAC Revision: REL_1160_02_00_00_10__REV_214441
MAC Package Version: ALT1160_02_00_00_10_07_FW
MAC Build Time: Jun_25_2019_11_14_01
PHY Revision: 11.61.174588
PHY Build Time: Feb_07_2018_16_11_30
PHY Build Info: release
PMP Revision: 0
PMP Version: 07_FW
PMP build time: Jun_25_2019_11_14_01
DSP Revision: 18324
BB Product: 1160
BB HW Revision: 10
RFIC_6401 Revision: 33
HLRD Revision: CM_02_00_00_11_10
NP Build Time: 2019.08.21_06:49:39
DTB:TY_hifc_dev_R2_WD.dtb
OK

3.2. Get entity status %STATUS

Syntax

Command	Possible response(s)
%STATUS <subsystem>	For all subsystems except of AMBR: %STATUS: <subsystem>: <status> [,<status_info>]
%STATUS?	ERROR (OPRATION_NOT_ALLOWED) Operation is not supported
%STATUS=?	%STATUS: (list of supported <subsystem>)

Description

Execution command retrieves current status of specified UE subsystem.

Read command is not supported.

Defined values

Parameter	Type	Description
<subsystem>	string	"INIT" "USIM" "RRC" "UICC"
<status>	string	**For "INIT":** "INIT: 0" UE init process ongoing (calibration in progress) "INIT: 1" UE init process has finished (calibration complete) "INIT: 2" UE init process has finished (calibration complete) but with critical errors. (SYS_CRITICAL) **For "USIM":** "USIM: REAL USIM, LTE" "USIM: REAL USIM, non-LTE" "USIM: USIM SIMULATOR" "USIM: NO USIM" "USIM: INACTIVE USIM" - USIM is inactive (i,e, deactivated) or it is still in initialization process "USIM: PERSONALIZATION ERROR" "USIM: REMOTE USIM" **For "RRC":** "RRC: IDLE" "RRC: CONNECTED" "RRC: UNKNOWN" Used for all other states (init, standby,

Parameter	Type	Description
		flight mode, etc.) **For "UICC":** "UICC: 0" SIM is not inserted "UICC: 1" SIM inserted, init is in progress "UICC: 2" SIM init passed, wait for PIN unlock "UICC: 3" Personalization failed, wait for run-time depersonalization "UICC: 4" Activation completed. Reported when "Ready" state is reported by "AT+CPIN?" • "UICC: 5" Activation completed. RAM cache also ready except of conditional caches of ISIM files (for IMS) and Phone book. **Note:** The phone book (used on demand) is cached by first call of AT+CPBS execution command. Similarly, conditionally used IMS will trigger ISIM files caching by first call of AT%SCACHECMD execution command.
<status_info>	string	It is an arbitrary status information text, determined by the UE manufacturer and containing additional information about status

3.3. Returns measurement for specified measurement type %MEAS

Syntax

Command	Possible response(s)
%MEAS <measurement type>	**For RSRP, RSRQ, SINR, RSSI:** %MEAS: <measurement type>:Reported=<measurement value>, Rx0Tx0=<measurement value>,Rx0Tx1=<measurement value>, Rx1Tx0=<measurement value>,Rx1Tx1=<measurement value> **For TX Power:** %MEAS: <measurement type>:PUSCH=<measurement value>, PUCCH=<measurement value>, PRACH=<measurement value>, SRS=<measurement value> **For Signal Quality:** %MEAS: Signal Quality:RSRP=<measurement value>,RSRQ=<measurement value>, SINR=<measurement value>,RSSI=<measurement value> **For all NBS RSRP and RSRQ and RSSI :** %MEAS: EARFCN=<EARFCN>,CellID=<cell ID>,<measurement type>=<measurement value> [<CR><LF>%MEAS: EARFCN=<EARFCN>,CellID=<cell ID>,<measurement type>=<measurement value>] […] **For all neighboring NBS simultaneous RSRP and RSRQ reporting:** %MEAS: EARFCN=<EARFCN>,CellID=<cell ID>,RSRP=<measurement value>, RSRQ=<measurement value> [<CR><LF>%MEAS:EARFCN=<EARFCN>,CellID=<cell ID>,<RSRP>=<measurement value>, RSRQ=<measurement value>] […] **For NBS RSRP in compressed format:** %MEAS: NBS RSRP:<EARFCN>,<cell ID>,<measurement value>[, <EARFCN>,<cell ID>,<measurement value>[…]]

Command	Possible response(s)
	For E-CID (AT%MEAS="95") in compressed format: %MEAS: ECID:<gcid>,<TimeDifIndex>,<ta>,<MCC>,<MNC>,<TAC>, <EARFCN>,<cell ID>,<SFN>,<RSRP>,<RSRQ> [,<EARFCN>,<cell ID>,<SFN>,<RSRP>,<RSRQ> […]] **For SINR of all eMBMS areas (type 94):** %MEAS:MBMS SINR:AreaId=<areaId>,Avg=<measurement value>, Rx0=<measurement value>,Rx1=<measurement value> [<CR><LF>%MEAS:MBMS SINR:AreaId=<areaId>,Avg=<measurement value>, Rx0=<measurement value>,Rx1=<measurement value>] […] **The Network Time correspond to SFN of serving cell(AT%MEAS="93")in compressed format:** %MEAS: NWTIME:<networkTTI>,<networkUtcTime>
%MEAS?	ERROR (OPRATION_NOT_ALLOWED) Operation is not supported
%MEAS=?	%MEAS: <list of supported measurements>

Description

Command returns measurement for specified measurement type.

For RSRP and RSRQ "Reported" measurement value is the averaged narrow-band measurement executed for serving eNB as defined in the spec.

Note: The SINR is not reported over the air, its "reported" value contains combined value of all antennas' measurements.

Signal Quality measurement type (8) returns together last serving cell measurements of RSRP, RSRQ, SINR and RSSI. The AT command response contains only "reported" values.

For RSRP only the per antenna measurement value RXyTXz (y,z=0/1) is the result of last non-averaged wide-band measurement used for debugging purposes.

Only single "reported" value is supported for neighbor eNB measurements.

Antenna relative phase measurement type (9) returns for each eNB TX antenna, the relative phase between UE RX antennas. Command returns also related RSSI measurement as per UE RX antennas.

RS_SNR measurement type is implemented as per VZW Reqs-LTE_DataDevices.docx.

Read command is not supported.

Defined values

Parameter	Type	Description
<Measurement type>	string	"0": RSRP "1": RSRQ "2": SINR "3": RSSI "4": TX Power "8": Signal Quality (RSRP & RSRQ & SINR & RSSI) "10": RSRP reported value only "11": RSRQ reported value only "12": SINR reported value only "93": Network Time alignment with SFN "95": Measurements for E-CID "96": RSRP for all detected NBS (same as 98) in compressed format: - in single line - each eNB measurement data (<EARFCN>,<cell ID>,<measurement value>) is separated by additional space. "97": RSRP & RSRQ for all detected NBS "98": RSRP for all detected NBS "99": RSRQ for all detected NBS "100": RSSI for all detected NBS
<EARFCN>	integer	Decimal EARFC value
<gcid>	string	The Global cell ID hexadecimal value (See AT%PCONI)
<TimeDifIndex>	integer	RxTxTimeDiff decimal index (as defined in 9.1.9.2 of 3GPP 36.133) of the measured cell. The value shall be reported by MAC based on RxTxTimeDiff reported by PHY. Be aware that RxTxTimeDiff used by the PHY is different from the value received by MAC CE and has better Ts granularity and accuracy.
<ta>	integer	Currently used Timing Advance value (NTA) of the measured cell. The NTA value is represented by index values of TA = 0, 1, 2, ..., 1282, where an amount of the time alignment is given by NTA = TA □16 per [3GPP 36.213].
<mcc>	integer	A three-digit value indicating mobile country code as defined in ITU-T Recommendation E.212 Annex A.

Parameter	Type	Description
<mnc>	integer	A three-digit or two-digit value indicating the mobile network code as defined in ITU-T Recommendation E.212 Annex A.
<TAC>	String	Two byte tracking area code in hexadecimal format
<SFN>	integer	The decimal system frame number (SFN) of the measured cell during which the measurement have been performed. Since there is averaging over multiple SFN, it is advised to supply the latest SFN. If value is not available at the time of the query, command returns N/A (without quotes)
<cell ID>	integer	Decimal Physical Cell ID value<measurement value> **The measurement results are returned in native for each measurement units:** dBm for RSRP, RSSI, Pathloss, SINR dB for RSRQ 0.1dBm for TX Power (for example, 2.5 dBm = 25) Degrees (°C) for Temperature Degrees (phase) & 256*dBM (RSSI) units for Antenna relative phase 0.1dB for RS_SNR, RS_SINR, PHR (for example, 2.5 dB = 25) **Measurement range:** -140 <= RSRP <= 0 -64 <= RSRQ <=0 -12 <= SINR <= 40 -26 <= TX Power <= 40 -128 <= Temperature <= 128 0 <= CQI <= 15 -120 <= RS_SNR, RS_SINR <= 40.0 -23.0 <= PHR <= 40.0 If RSRP/RSRQ measurement value for some antenna is not supported, command returns "N/S" - not supported indication for this specific antenna in the returned string. If measurement value is not available at the time of the query (if the UE is not connected, for example), command returns N/A (without quotes) - not available indication for this specific antenna in the returned string. If measurement value is not available at the time of the query (if the UE is not connected, for example), command returns N/A (without quotes) - not available indication for this specific

Parameter	Type	Description
		antenna in the returned string. The reported range is wider than the range defined for Measurement Reporting in 3GPP spec. It is intended to report weak and abnormal measurements, especially for neighboring cells, for jamming detection. More weak cells may be retrieved on ALT3100 and ALT3800 after usage of AT%SPMMODE.
<networkTTI>	integer	The subframe counter of the serving cell corresponds to the network UTC time. The subframe counter is a decimal running from 0 to 10239 (i.e. rollover at 10240) also known as TTI (Transmission Time Interval) counter.
<networkUtcTime>	integer	This field specifies the network UTC time which correspond to the specified TTI counter. The UTC time is a decimal counter of 1msec units counted since 00:00:00 on 1 January, 1900

Example

AT%MEAS="0"
RSRP: Reported = -117, Rx0Tx0 = -120, Rx0Tx1 = -117, Rx0Tx2 = -140, Rx0Tx3 = -140, Rx1Tx0 = -128, Rx1Tx1 = -124, Rx1Tx2 = -140, Rx1Tx3 = -140
OK

AT%MEAS="8"
Signal Quality: RSRP = -119, RSRQ = -16, SINR = 5, RSSI = -96
OK

AT%MEAS="98"
EARFCN=475, CellID=94, RSRP=-119
OK

AT%MEAS="96"
MEAS: NBS RSRP: 475,94,-122
OK

AT%MEAS="95
%MEAS:ECID:"008ADE01",N/A,0,"440","20","1071",475,94,N/A,-122,-36
OK

AT%MEAS="94"
MBMS SINR: AreaId = 1, Avg = -6, Rx0 = -8, Rx1 = -2
OK

3.4. Command to Instruct eCM to attach or detach the LTE network %CMATT

Syntax

Command	Possible response(s)
%CMATT=<param>	OK/ERROR
%CMATT?	%CMATT: <param>
%CMATT=?	%CMATT: (list of supported <modules>)

Description

AT command sent from external Host, which instructs LTE module (eCM application) ~~to~~ attach or detach the LTE network.

Defined values

Parameter	Type	Description
<param>	integer	instruct the device to attach or detach the LTE network. 0: detach 1: attach

3.5. Command to start/stop any PDN connection %PDNACT

Syntax

Command	Possible response(s)
PDNACT=<act>,[<sessionID>][,<apnname>]	OK/ERROR
AT%PDNACT?	Returns all active sessions: %PDNACT:<sessionID>,<stat>,<APN>,<cid>] [<CR><LF>%PDNACT:<sessionID>,<stat>,<APN>,<cid>] [...]]
AT%PDNACT=?	OK

Description

This command is used by external Host to instruct eCM to expose and connect (disconnect) specific PDN to the Host. There may be more than one PDN exposed to Host.
There may be more than one PDN exposed to Host.
Session ID is Altair proprietary session identifier, which is defined for each session established over-the-air in NP config file named '/etc/config/ecm'.
User can use <apnname> or <sessionID> or both to identify PDN. If both are defined, PDN is identified by <apnname>.
The PDNs terminated in modem cannot be exposed to Host and any attempt to activate them from host will return ERROR. PDN sharing between Host and modem is not supported yet.

Defined values

Parameter	Type	Description
<act>	integer	Numeric value, indicates the required action 0: deactivate 1: activate
<sessionID>	integer	numeric value of session identifier defined in NP config file
<apnname>	string	indicates the APN name configured for PDN.
<stat>	integer	Numeric value, indicates the actual PDN state 0: non-active 1: active

3.6. Command to set log storage %COLLECTLOGS

Syntax

Command	Possible response(s)
AT%COLLECTLOGS	OK/ERROR
AT%COLLECTLOGS?	ERROR (not supported)
AT%COLLECTLOGS=?	OK

Description

The command is used to configure delivery/storage of NP logs. If no parameter is supplied, then loges are placed to '/nvm/Logs'. Alternative options are to send log as a package to host via socket or to save the logs to NFS remote directory.

3.7. Set run-time PDN parameters %PDNSET

Syntax

Command	Possible response(s)
AT%PDNSET=<ext_sessionID>,<apnname>,<ip_type>,<ppp_auth>,<user>,<passw>,<host_name>,<IPv4AddrAlloc>,<pcscf_discovery>,<NSLPI>	OK or ERROR
AT%PDNSET?	[%PDNSET:<ext_sessionID>,<apnname>,<ip_type>,<ppp_auth>,<user>,<passw>,<host_name>,<IPv4AddrAlloc>,<pcscf_discovery>,<NSLPI> [<CR><LF>%PDNSET:<ext_sessionID>,<apnname>,<ip_type>,<ppp_auth>,<user>,<passw>,<host_name>,<IPv4AddrAlloc>,<pcscf_discovery>,<NSLPI> OK
AT%PDNSET=?	OK

Description

The command is intended to set run-time PDN parameters for data PDNs exposed to host.
In addition, the APN name and IP type provided in the command will override default PDN settings from embedded APN table stored into UE NV. The PPP security parameters are run-time only and are not stored into non-volatile memory.
The command will be effective immediately, which means that if parameters are different from those already in use, the PDN will be deactivated, updated locally and on server (via LTE messages) and then reactivated.
If <ip_type> parameter is missed, the IPv4v6 will be applied.
Missed PPP security parameters remove previous PPP security setting completely.
Command is intended to substitute previous %PPPAUTH command, which is not synced with other PDN parameters definition.

Notes:

• In both command and response, a parameter which is not specified will be written as ",,"

• Last parameters of the command which are not specified may not include the ",," notation. e.g. AT%PDNSET=<ext_sessionID>,<apnname>,<ip_type>

Defined values

Parameter	Type	Description
<ext_sessionID>	string	numeric value of session identifier which is configured and used by external application or host and defined in NP configuration file
<apnname>	string	indicates the APN name configured for PDN.
<ip_type>	string	"IP" "IPv6" "IPv4v6"
<ppp_auth>	string	PPP authentication type: "NONE" "PAP" "CHAP"
<user>	string	username used for authentication.
<passw>	string	password used for authentication.
<host_name>	string	Optional, the name of the Authentication server.
<pcscf_discovery>	decimal	0: disable 1: Enable
<IPv4AddrAlloc>	integer	controls how the host requests to get the IPv4 address information (same as defined in AT+CGDCONT) 0: IPv4 address allocation through NAS signaling 1: IPv4 address allocated through DHCP
<NSLPI>	integer	indicates the NAS signaling priority requested for this PDP context as defined in AT+CGDCONT in 3GPP 27.007

3.8. LTE protocol pram's query override and toggle at run-time %LTECMD

Syntax

Command	Possible response(s)
AT%LTECMD=<cmd>,<lte_object>[,<param1>…]	**For <cmd>=2 (query):** %LTECMD: <lte_object>[,<param1>…] OK or ERROR
AT%LTECMD?	ERROR (not supported)
AT%LTECMD=?	LTECMD: (list of supported <cmd>s), (list of supported <lte_object>s)

Description

This command is used for LTE protocol parameters query and override at run-time.
The command is compound, which means that <param#> parameters are <lte_object> specific.
The query command (2) is supported for all declared <lte_object>s. It may return ERROR for Network provided parameters in LTE disconnected state.
The override command (1) may be unsupported for some LTE protocol <lte_object>s especially for those defined by Network or negotiated with Network. In such a case the override command (1) returns ERROR. Missed override support is declared on per-object base.
Some LTE parameters provided by eNB may be optional. A parameter, which is not specified, will be omitted and written as ",," in query (2) AT command response.

Notes:

• If overridden parameter is part of capability negotiation with Network, it will be applied after next re-attach only.
• All settings are applied only during run-time (not NV stored) and will be lost after reboot.
Read command is not supported.

Defined values

Parameter	Type	Description
<cmd>	integer	1: override/toggle current LTE parameter value or negotiate with network new LTE capability/parameter value 2: query current LTE parameter value in use

Parameter	Type	Description
<lte_object>	string	"INACTTMR" - Inactivity Timer for RRC state mismatch recovery (LTESYS-18210)
<param1>	integer	timeout in sec 0: disable inactivity timer. Default value is 0. 1: and more enable inactivity timer for <param1> seconds. Modem restarts inactivity timer on every UL/DL activity in RLC. Once the timer has been expired, modem will initiate RRC connection re -establishment procedure.

Parameter	Type	Description
<lte_object>	string	"PTW" - LTE-specific paging transmission window (eDRX parameter missed in AT+CEDRXRDP)
<param1>	integer	0: 1,28 seconds 1: 2,56 seconds 2: 3,84 seconds 3: 5,12 seconds 4: 6,4 seconds 5: 7,68 seconds 6: 8,96 seconds 7: 10,24 seconds 8: 11,52 seconds 9: 12,8 seconds 10: 14,08 seconds 11: 15,36 seconds 12: 16,64 seconds 13: 17,92 seconds 14: 19,20 seconds 15: 20,48 seconds

3.9. AT command to enable socket service %SOCKETCMD

Syntax

Command	Possible response(s)
AT%SOCKETCMD=<cmd>[,<param1>[,<param2>[,<param3>…]]]	**For "INFO" command:** [%SOCKETCMD:<socket_stat>,<socket_type>,<src_ip>,<dst_ip>,<src_port>,<dst_port>[,<socket_dir>,<socket_to>]] OK **For "SSLINFO" command:** [%SOCKETCMD:<SSL_mode>,<ClientCerId>] OK **For "ALLOCATE" command:** %SOCKETCMD:<socket_id> OK **For other commands:** OK/ERROR
AT%SOCKETCMD?	Return the list of created sockets and their status: [%SOCKETCMD:<socket_id>,<socket_stat>[<CR><LF> %SOCKETCMD:<socket_id>,<socket_stat> […]]] OK
AT%SOCKETCMD=?	%SOCKETCMD: (list of supported <cmd>s)
(unsolicited)	%SOCKETEV:<event>,<socket_id>[,<connected_socket_id>]

Description

AT command to create and maintain socket by the device.

IP address formatting for using in this command:

- IPv4 format shall use the format (xxx.xxx.xxx.xxx). Where xxx is a decimal number from 0-255 and when the leading digits in each segment are 0, the number of digits is adjusted accordingly and output. Example: 192.0.2.1, 127.0.0.1 etc …
- IPv6 format (xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx) where x is in hexadecimal notation. Example: 2001:0db8:bd05:01d2:288a:1fc0:0001:10ee

When socket is opened (using "OPEN" or "LISTEN" command) the unsolicited %SOCKETEV is automatically enabled. The unsolicited is sent with <event> is sent in 4 cases:

- Rx buffer has more Bytes to read.

- Socket termination due to Idle timer expiration.
- Socket terminated by peer.
- New connected socket is accepted/spawned from listening socket.

There are 2 types of listener socket: "synchronous" and "asynchronous":

- Synchronous: The connection had been established once "OK" is responded. The maximum waiting time for the connection establishment is deterministic.
- Asynchronous: The connection is not yet established even "OK" is responded. User must wait for URC, which can be happened at any time (or never).

Asynchronous listening socket is also called Parent Listening socket below. Parent listening socket and spawned from it connected sockets will have different IDs.
After activating of parent listening socket, %SOCKETEV=4 unsolicited response will be used to notify "accept incoming connection". This URC provides both listening and spawned from it connected sockets IDs.
Parent listening socket cannot be used for fast send operation. The ERROR will be returned on "FASTSEND" call for such socket.
If connected socket has been spawned from parent listening socket, the connected socket deactivation will close this connected socket completely.

Important Notes

- AT%SOCKETCMD command is blocking. This may cause blocking of the AT channel for long time in case of "OPEN" and "LISTEN" command. The "CLOSE" command is also blocking and can take time (The socket implementation may take about 8 sec to close the connection due to internal TCP FIN timer)
- The "CLOSE" command may be ordered while data is still retained inside the module. In such cases, the module activates the "close" process only after it has sent the internally-retained data to its destination. However, the module may still drop the internally-retained data in case of connection loss and in case of PDN closure.
- Local IP address cannot be configurable by the AT%SOCKETCMD command (It is assigned by the network)
- Local IP port can be configured by the AT%SOCKETCMD command or can be set automaticly by the socket.
- Number of supported sockets is operators/OEM specific configured with AT%SETACFG. It can be ranged from 1 socket to several ones.

Important Notes Related to SSL

- The network allocated SSL session ID is kept and maintained internally by the device per connection allocated "Session ID". The SSL session ID is kept even when the TCP connection is closed to allow reuse of the SSL session on new opened TCP connection.
- Upon "ACTIVATE" command, if SSL session ID is allocated by the network, then device will try

first to recover the existing SSL session ID. If failed to recover SSL connection, then will open new one.

• "SSLALLOC" command will delete previously allocated SSL session-id.

Defined values

Parameter	Type	Description
<cmd>	string	"ALLOCATE": Allocate socket session with the following parameters
<param1>	decimal	The "Session ID": a numerical numeric value defined in NP configuration file which point to the PDN on which the socket should be opened. "Session ID" is defined in AT%CGINFO
<param2>	string	"TCP": for creation of TCP socket (TLS mode when security is enabled) "UDP": for creation of UDP socket (DTLS mode when security is enabled)
<param3>	string	"OPEN": The socket open TCP/UDP connection with the peer "LISTEN": The socket create TCP/UDP listener "LISTENP": The socket create TCP parent listener socket. Once activated, multiple connected sockets could be spawned from it.
<param4>	string	Destination IPv4 or IPv6 address
<param5>	decimal	Destination UDP/TCP port number in the range 1-65535
<param6>	string	Source (local) UDP/TCP port number in the range 0-65535 (0 - means auto port selection by the socket and it is also used as the default value)
<param7>	decimal	Packet size to be used by the TCP/UDP/IP stack for data sending. 0: select automatically default value (MTU based). 1-1500: packet size in bytes.
<param8>	decimal	TCP Connection setup timeout. If timer expires, then command return ERROR. Parameter range is 30-360sec (Default is 60 sec). Parameter is irrelevant for parent listening socket; it will be ignored if present. In case that connection type is "OPEN" the timeout event is: No SYN-ACK reply from the peer. In case that connection type is "LISTEN" the timeout event is: No SYN request from the peer.

Parameter	Type	Description
<cmd>	string	"SSLALLOC": Add SSL for specific socket session id with the following SSL parameters.
<param1>	decimal	The previously allocated socket id
<param2>	decimal	SSL mode. See definition in <SSL_mode>
<param3>	decimal	Client certificate ID. See definition in <ClientCerId>

Parameter	Type	Description
<cmd>	string	"ACTIVATE": Activate the predefined socket
<param1>	decimal	The socket ID (identifier) of the specified socket

Parameter	Type	Description
<cmd>	string	"INFO": return the details of specific socket ID
<param1>	decimal	The socket ID (identifier) for which info is requested

Parameter	Type	Description
<cmd>	string	"SSLINFO": return the SSL details of specific socket ID
<param1>	decimal	The socket ID (identifier) for which info is requested

Parameter	Type	Description
<cmd>	string	"DEACTIVATE": Request to deactivate specific socket ID and release its resources
<param1>	decimal	The socket ID (identifier) to be closed

Parameter	Type	Description
<cmd>	string	"DELETE": Request to delete specific socket ID allocation (including SSL session context if exist)
<param1>	decimal	The socket ID (identifier) to be closed

Parameter	Type	Description
<cmd>	string	"SETOPT": Set Socket options for specific socket ID
<param1>	decimal	The socket ID (identifier) for which the option is set
<param2>	decimal	TCP/UDP aggregation timer in msec (1-36000, default: 5000). This timer allows improved data transmission efficiency by aggregating several transmissions to single packet.

Parameter	Type	Description
<param3>	decimal	TCP/UDP TX buffer aggregation size in Bytes (1-2048, default: 1500). This aggregation allows improved data transmission efficiency by aggregating several transmissions to single packet.
<param4>	decimal	TCP idle timer in seconds (0-300, default: 60). When there is no client/server activity over the predefined time, the socket is deactivated (Socket option TCP_KEEPINTVL)

Parameter	Type	Description
<socket_id>	decimal	The socket ID (identifier) of the specified socket
<socket_stat>	string	"DEACTIVATED": The socket is not active "ACTIVATED": The socket is active "LISTENING": The socket is listening
<socket_type>	string	"TCP": for creation of TCP socket (TLS mode when security is enabled) "UDP": for creation of UDP socket (DTLS mode when security is enabled)
<src_ip>	string	Source IPv4 or IPv6 address
<dst_ip>	string	Destination IPv4 or IPv6 address
<src_port>	string	Source UDP/TCP port number in the range 1-65535
<dst_port>	string	Destination UDP/TCP port number in the range 1-65535
<socket_dir>	integer	the direction of the TCP socket 0: no set 1: dialer 2: Listener
<socket_to>	decimal	TCP connection setup timeout as specified in "OPEN" command
<socket_err>	decimal	Error values as defined by 3GPP TS 27.007 subclause 9.2 for <err> values with extension. The following extensions are proposed (TBD): – TCP connection setup failure. – Tx Buffer Full – TCP connection closed by peer – TCP connection closed due to idle timer expiration – Can't execute command because PDN disconnected – etc…

Parameter	Type	Description
<SSL_mode>	decimal	0: mutual authentication (default) 1: authenticate client side only 2: authenticate server side only
<ClientCerId>	decimal	Client certificate ID (default is: 0). The ID of client certificate which should be sent by the client to the server to authenticate the client. The referenced certificate must be provisioned on the device file system and identified with ID
<event>	decimal	1: Rx buffer has more Bytes to read 2: Socket deactivate due to idle timer expiry. 3: Socket terminated by peer 4: New connected socket is accepted/spawned from parent listening socket
<connected socket id>	decimal	The socket ID (identifier) of connected socket spawned from specified parent listening socket
<wlength>	decimal	The actual length in Bytes of data written to the socket in "FASTSEND" command.

3.10. DATA delivery for Socket service %SOCKETDATA

Syntax

Command	Possible response(s)
AT%SOCKETDATA=<cmd>[,<param1>[,<param2>[,<param3>…]]]	**For "RECEIVE" command:** [%SOCKETDATA:<socket_id>[,<rlength>,<moreData> [,<rdata>]]] OK/ERROR **For "SEND" command:** [%SOCKETDATA:<socket_id>[,<wlength>]] OK/ERROR
AT%SOCKETDATA?	ERROR (not supported)
AT%SOCKETDATA=?	%SOCKETDATA: (list of supported <cmd>s)

Description

AT command for to send/receive to/from the socket.

Note: When operation returns with ERROR this can be evidence that the TCP socket was closed (by user or by socket idle timer or by peer). There is unsolicited indication for socket closure by idle timer or by peer.

Also note that "SEND" command return "OK" after the actual transmission of the data, but before "ACK" reception from the peer. This can result with TX buffer fill-up and therefore further "SEND" command may result with ERROR.

The application can issue AT%SOCKET="LASTERROR" to get the reason for the last failure.

Defined values

Parameter	Type	Description
<cmd>	string	"SEND": Write to the socket
<param1>	decimal	The socket ID (identifier) of the socket
<param2>	decimal	The length in Bytes of the data which need to be written; range is 1 to 3000 and represent the length of the "HEX" string.
<param3>	decimal	The data, in HEX format (in quotes), which will be written to the specified socket.

Parameter	Type	Description
<cmd>	string	"RECEIVE": Read from the socket
<param1>	decimal	The socket ID (identifier) of the socket
<param2>	decimal	The maximal length of data buffer to be read from the socket; the range is 1 to 3000 and represent the length of the "HEX" string.

Parameter	Type	Description
<socket_id>	decimal	The socket ID (identifier) of the specified socket
<rlength>	decimal	The actual length in Bytes of the data which was actually read.
<moreData>	decimal	The length on bytes of the data left in the RX buffer
<rdata>	string	The read data, in HEX format (in quotes).
<wlength>	decimal	The actual length in Bytes of data written to the socket.

3.11. Convert domain name to IP address %DNSRSLV

Syntax

Command	Possible response(s)
AT%DNSRSLV=<SessionID>,<domain_name>	%DNSRSLV:<ip_type>,<ip_addr> [%DNSRSLV: <ip_type>,<ip_addr>[…]] OK
AT%DNSRSLV?	ERROR (not supported)
AT%DNSRSLV=?	OK

Description

A request from the device to resolve specific domain name.The IP address formatting for using in this command is as described in AT%SOCKETCMD command.

Defined values

Parameter	Type	Description
<SessionID>	decimal	A numerical numeric value defined in NP configuration file which point to the PDN on which the IP address should be resolved. "Session ID" is defined in AT%CGINFO
<domain_name>	string	Domain name to resolve

Parameter	Type	Description
<ip_type>	decimal	0: IPv4 1: IPv6
<ip_addr>	string	IPv4 or IPv6 resolved address

3.12. Open file transfer session between host and device %FILECMD

Syntax

Command	Possible response(s)
AT%FILECMD=<cmd>[,<param1>[,<param2>]]	OK/ERROR
AT%FILECMD?	ERROR (not supported)
AT%FILECMD=?	%FILECMD: (list of supported <cmd>s)
(unsolicited)	%FILECMDU:<event>

Description

AT command to read/write a file to the device (NP) storage. The file will be stored on preconfigured path. Upon execution, the command return OK/ERROR immediately.
Command provide opportunity for "out-of-band" binary file transfer, which invokes file transfer protocol (implementation specific) and deliver file between host and the device.
Once "out-of-band" file delivery is started, the AT command path is not accessible by the host. Furthermore, the delivery process can't be aborted. The AT command path become available only after completion of file delivery (with success or failure) which is notified by %FILECMDU:<event>.
The "inband" (using AT%FILEDATA) file transfer is executed chunk-by-chunk. File transfer validity check is in user responsibility. This type of data transfer does not imply URC notification by %FILECMDU.

Defined values

Parameter	Type	Description
<cmd>	string	"PUT": Initiate file transfer protocol between host and device and write a file to the device "GET": Initiate file transfer protocol between host and device and read a file from the device
<param1>	string	The name of the file to be transferred
<param2>	integer	0: "out-of-band" default value, if omitted 1: "inband", usage of AT%FILEDATA is expected

Parameter	Type	Description
<cmd>	string	"NOTIFY": command to enable/Disable notification from the file transfer protocol
<param1>	integer	0: notification disabled (default) 1: notification enabled

Parameter	Type	Description
<event>	integer	0: File transferred successfully 1: File transfer failure

3.13. Download file locally chunk-by-chunk %FILEDATA

Syntax

Command	Possible response(s)
AT%FILEDATA=<cmd>[,<param1>[,<param2>[,<param3>…]]]	**For "READ" command:** [%FILEDATA:<more2read>[,<rlength>[,rdata>]]] OK/ERROR **For "WRITE" command:** [%FILEDATA:<wlength>] OK/ERROR
AT%FILEDATA?	ERROR (not supported)
AT%FILEDATA=?	%FILEDATA: (list of supported <cmd>s)

Description

AT command for simple file chunk-by-chunk read/write operation via local interface.

Defined values

Parameter	Type	Description
<cmd>	string	"WRITE": Write to the data to NV
<param1>	integer	0: This is the last "Write" transaction 1: More pending "Write" transactions
<param2>	integer	The length of data in Bytes written by this command; range is 1 to 3000 and represent the length of the "HEX" string.
<param3>	hexadecimal	The file chunk data, in HEX format (in quotes)

Parameter	Type	Description
<cmd>	string	"READ": Read the data from NV
<param1>	integer	The maximal length of data in Bytes which requested to be read in this transaction; range is 1 to 3000 and represent the length of the "HEX" string.

Parameter	Type	Description
<rlength>	integer	The actual length in Bytes of the data which was actually read.
<rdata>	hexadecimal	The read data, in HEX format (in quotes).
<wlength>	integer	The actual length in Bytes of data written to the socket; Range is 1 to 3000 and represent the length of the "HEX" string.
<more2read>	integer	0: No more data to read 1: More data to read

3.14. Run PING service %PINGCMD

Syntax

Command	Possible response(s)
AT%PINGCMD=<ip_type>,<dst_ip>[,<count>[,<packetsize>,<timeout>]]	%PINGCMD:<id>,<dest_ip>,<rtt>,<ttl> [%PINGCMD:<id>,<dest_ip>,<rtt>,<ttl>[…]] OK
AT%PINGCMD?	ERROR (not supported)
AT%PINGCMD?	OK

Description

AT command for executing PING service. The IP address formatting for using in this command is as described in AT%SOCKETCMD command.

Defined values

Parameter	Type	Description
<ip_type>	decimal	0: IPv4 1: IPv6
<dst_ip>	string	Destination (remote machine) IPv4 or IPv6 address
<count>	decimal	The number of ping request retries (default is 1)
<packetsize>	decimal	Specifies the number of data bytes to be sent. The default is 56, which translates into 64 ICMP data bytes when combined with the 8 bytes of ICMP header data.
<timeout>	decimal	Time to wait for a response, in seconds. (max: 60seconds)

Parameter	Type	Description
<id>	decimal	The identifier of each individual reply of the ping request (can be 1 to <count>)
<ttl>	decimal	The time to leave within the PING reply. TTL specify how long to hold or use the packet or any of its included data before expiring and discarding it.
<rtt>	decimal	The round trip time of the PING