



A Sony Group Company

AT Commands Interface Guide

Application Note

July 2018



A Sony Group Company

THE WORLD'S LTE LEADER

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Document Revision Control

Edition	Date	Description	R&D Revision (Standard / Proprietary)
Rev 1	August 2017	Preliminary Release	V2.28/V.5.98
Rev 2	November 2017	<ul style="list-style-type: none"> • Remove AT command AT+OTCMD from the document • Added AT AT+CUSATA command • Added ATD*99*** command • Add DRX_CAPABILITY_MODE parameter to AT%SETCFG/GETCFG • Extend FGI value range in AT%SETCFG/GETCFG • Modify 10dBm/2dBm units in AT%MEAS cell id parameter • Added "RICH_SCAN_EN" parameter to AT%SETCFG/GETCFG • Fix AT%STATUS for "USIM" • Added ATE AT command 	V2.29/V.6.20
Rev 3	January 2018	<ul style="list-style-type: none"> • Added ATS0 definition • Added AT&F0 AT command • Added AT+CNMI AT command • Added AT+CSCA AT command • Added AT+CSMP AT command • Added AT+CSMS AT command • Added AT+CPMS AT command • Added AT+CSDH command • Added AT+CGSMS command • Added AT+CPMSAT command • Added AT+CGSMS command • Added AT+CMGW command • Added AT+CMSS command • Added to setcg/getcfg the following parameters: <ul style="list-style-type: none"> ◆ PMP_LOG_SEV ◆ NA_ROAM_DIS • Fix publish date to January instead of November. 	V2.29/V.6.20

Edition	Date	Description	R&D Revision (Standard / Proprietary)
Rev 4	May 2018	<ul style="list-style-type: none"> • Modified AT%SCAN command definition • Modified AT%GETCFG command Description • Modified AT%SETCFG command Description • Modified AT%SETCFG - SIM_INIT_SELECT_POLICY param • Changed “DOP” to “MDOP” • Removed +CGSN limitations. Updated to Rev13 • Updated +CFUN Notes/Limitations • Removed +CSMS Notes/limitations. • Removed +CMGF Limitations • Updated +CNMI Notes/Limitations • Removed +CMGL Limitations • Removed +CMGR Limitations • Removed +CMGW Limitations • Updated +CPMS Notes/Limitations • Removed +CMT Limitations • Updated +CSMP Notes/Limitations • Added &K command • Added AT%EXE command • Added AT%NWOPER command • Added AT%LWM2MOPEV command • Added AT%RATIMGSEL command • Removed AT%setcfg="debug_imei" • Removed AT%getcfg="debug_imei" • Added AT%RESETCID command • Added AT%LTEINFO command • Added AT%COUNT command • Removed Auto option from AT%NWOPER command • Removed 1160/1210 references and obvious 1250 notes • Removed “pwr_breakdown” option from AT%count command 	V2.29/V6.57
Rev 5	July 2018	<ul style="list-style-type: none"> • Added AT%CMATT command • Added AT+CGACT command • Updated AT%TSTRF command (TX only) • Added AT+CGCONTRDP command 	V2.33/V6.60

Edition	Date	Description	R&D Revision (Standard / Proprietary)
		<ul style="list-style-type: none"> • Added AT+CGS CONTRDP command • Added AT%FLTSMS command • Added AT+CMGC command • Added AT+CMMS command • Removed AT+CSCS command • Removed AT+CUSATD command • Removed S0 command • Removed AT%GETCFG - USB_BUFF_CONFIG param • Removed AT%SETCFG - USB_BUFF_CONFIG param • Removed AT%GETCFG - RX_DIVERSITY_DIS param • Removed AT%SETCFG - RX_DIVERSITY_DIS param • Removed AT%GETCFG - RFIF_TO_GPIO_EN param • Removed AT%SETCFG - RFIF_TO_GPIO_EN param • Removed AT%SETCFG - WATCHDOG_EN param • Removed AT%SETCFG - WATCHDOG_TIMEOUT param • Removed AT%SETCFG - CRASH_EN param • Removed AT%SETCFG - CRASH_TIMEOUT param • Removed AT%GETCFG - HEATING_TC param • Removed AT%SETCFG - HEATING_TC param • Removed redundant AT%SETCFG DISABLE_RESET line • Removed AT%GETCFG - W_DISABLED_PRESENT param • Removed AT%SETCFG - W_DISABLED_PRESENT param • Removed AT%GETCFG - HEATING_SD_EN param • Removed AT%SETCFG - HEATING_SD_EN param • Removed AT%SETCFG - HD_BAND64_EN param 	

Edition	Date	Description	R&D Revision (Standard / Proprietary)
		<ul style="list-style-type: none"> • Removed AT%GETCFG - CEMODE_VAL param • Removed AT%SETCFG - CEMODE_VAL param • Removed AT%GETCFG - LTE_UE_CATEGORY param • Removed AT%SETCFG - LTE_UE_CATEGORY param • Removed AT%GETCFG - TDD_TM8_EN param • Removed AT%SETCFG - TDD_TM8_EN param • Removed AT%SETCFG - EXT_BAND_EN param • Removed AT%GETCFG - DPR_PRESENT param • Removed AT%SETCFG - DPR_PRESENT param • Removed AT%GETCFG - PMIC_PS_MODE param • Removed AT%SETCFG - PMIC_PS_MODE param • Removed AT%GETCFG - LTE_CAT_OVERRIDE_EN param • Removed AT%SETCFG - LTE_CAT_OVERRIDE_EN param • Updated AT%GETCFG LTE_DL_CATEGORY categories • Updated AT%SETCFG LTE_DL_CATEGORY categories • Updated AT%GETCFG LTE_UL_CATEGORY categories • Updated AT%SETCFG LTE_UL_CATEGORY categories • Removed AT%LWM2MOPEV command • Added AT%SETLOG command • Added AT%GETLOG command • Added AT%EARFCN command • Added AT%CEER command • Removed AT+CUSATA command • Removed AT+CUSATR command • Added AT%TSTEXT command • Added AT%GETACFG command • Added AT%SETACFG command 	

Edition	Date	Description	R&D Revision (Standard / Proprietary)
		<ul style="list-style-type: none"> • Edited AT+CPWD command • Added AT%OTPCMD command • Added AT+VZWAPNE command • Added AT%PDNACT command • Added AT%APNN command • Added AT%STATCM command • Added AT%SETURLIP command • Added AT%PDNSET command • Added AT%PDNRDP command • Added AT+CPSMS command • Added AT%DATACMD command • Added AT%CMGWC command • Added AT%CMGSC command • Added AT+CNMA command • Added AT+CMGS command • Added AT%D*99*** command • Added ATD*99*** command • Added ATDT*99*** command • Added ATS2 command • Added AT+CEDRXRD command • Added AT+CEDRXS command • Added AT+CEPPI command • Added AT+CESQ command • Added AT+CGAUTH command • Added ATV command • Added ATQ command • Added AT+CCIOTOPT command • Added AT+CGEQOS command • Added AT+CGEQOSRDP command • Added AT%CBCMD command • Added AT%CCLK command • Added AT%CLCMD command • Added AT%CLCMD command • Added AT+CPINR command • Added AT+CPNER command • Added AT+CPNET command • Added AT+CPNSTAT command 	

Edition	Date	Description	R&D Revision (Standard / Proprietary)
		<ul style="list-style-type: none"> • Added AT+CRLA command • Added AT+CRSM command • Added AT+CSCM command • Added AT+IPR command • Added AT+VZWRSRP command • Added AT+VZWRSRQ command • Added AT+WS46 command • Added AT%CMGWS command • Added AT%CSGCMD command • Added AT%DNSRSLV command • Added AT%GETPROP command • Added AT%SETPROP command • Added AT%GETSPN command • Added AT%LBSCMD command • Added AT%LTECMD command • Added AT%LTESYNC command • Added AT%MASTERKEY command • Added AT+CGTFTRDP command • Added AT%ALERT command • Added AT%CGINFO command • Added AT%NETSEL command • Added AT%NETUPD command • Added AT%NOTIFYEV command • Added AT%NOTIFYEV command • Added AT%PBCMD command • Added AT%PCONI command • Added AT%PINGCMD command • Added AT%PWRSVCMD command • Added AT%SCACHECMD command • Added AT%SCANCMD command • Added AT%SCANCFG command • Added AT%SMMA command • Added AT%SMSINFO command • Added AT%SOCKETCMD command • Added AT%SOCKETDATA command • Added AT%SOCKETEV command • Added AT%STATEV command 	

Edition	Date	Description	R&D Revision (Standard / Proprietary)
		<ul style="list-style-type: none">• Added AT%TIMEREV command• Added AT%TRSHCMD command• Added AT%BANDCAP command• Added AT%CUSTWA command• Added AT%LWM2MCMD command• Added AT%TSTCAT command• Added AT%USMSF command• Removed AT%PPPAUTH command• Removed AT%PPPCFG command• Updated AT%STATUS	

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1 Introduction

This document provides information about the AT command set supported by the ALT1250 system software releases.

The various AT commands are listed and associated with a particular ALT1250 Software Release.

The AT commands in this document are divided into the following sections:

- 3GPP standard AT commands
- Altair's proprietary AT commands

The error codes supported for the CMEE commands are provided for the SW developer's reference.

Notes:

- For detailed description of standard 3GPP AT commands please refer to spec (3GPP TS 27.007).
- This document aims to provide only high level overview of the AT command support in the various releases. For specific information about each release please refer to the appropriate release notes document.

2 Terminology

URC: Unsolicited Result Code

3 References

- [1]: 3GPP 27.007 AT command set for User Equipment (UE)
- [2]: T-REC-V.250-200307.pdf ITU-T V.250 Serial asynchronous automatic dialing and control.
- [3]: DC-E3100-17_Rev13_AT_Commands_Guide.doc
- [4]: 3GPP 27.005 SMS & CBS commands
- [5]: Verizon Wireless, Device requirements LTE 3GPP band 13 network access V15.0

4 3GPP AT Commands Supported

The table below details the standard 3GPP AT commands supported by the ALT1250 system software solution, per release.

Table 1. 3GPP AT Command Set Supported by ALT1250 Software

ID	AT Cmd / URC	Description	Notes / Limitations	3GPP Rev
1	+CGMI	Request manufacturer identification	None	Rev12
2	+GMI	Request TA manufacturer identification (equals to +CGMI)	None	ITU-T V.250
3	+CGMM	Request model identification	None	Rev12
4	+GMM	Request TA model identification (equals to +CGMM)	None	ITU-T V.250
5	+CGMR	Request revision identification	None	Rev12
6	+GMR	Request TA revision identification (equals to +CGMR)	None	ITU-T V.250
7	+CGSN	Request revision identification	None	Rev13
8	+GSN	Request TA serial number identification (may equal to +CGSN)	None	ITU-T V.250
9	+CIMI	Request international mobile subscriber identity (IMSI)	None	Rev12
10	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
11	I	Request manufacturer specific information about the TA.	None	ITU-T V.250

ID	AT Cmd / URC	Description	Notes / Limitations	3GPP Rev
12	+GCAP	Request overall capabilities of TA; the response code shall be CLTE3 or CLTE4 (based on configured LTE category)	None	ITU-T V.250
13	+CNUM	Subscriber number	None	Rev12
14	+CREG	Network registration	None	Rev12
15	+COPS	PLMN selection	<mode>=4 is not supported	Rev12
16	+CLCK	Facility lock	Supported facilities: <ul style="list-style-type: none">• “SC”• “P2”• “PN”• “PS”	Rev12
17	+CPWD	Change password	Supported facilities: <ul style="list-style-type: none">• “SC”, 8• “P2”, 8• “PN”, 16• “PU”, 16• “PS”, 16	Rev12
18	+CFUN	Set phone functionality	<ul style="list-style-type: none">• Mode 2 not supported.• Only mode 4 (flight mode) is stored in NV memory.• <fun>=2/3 are not supported.• <fun> 128/129 are not supported	Rev11

ID	AT Cmd / URC	Description	Notes / Limitations	3GPP Rev
19	+CPIN	Enter PIN	Supported Facilities: <ul style="list-style-type: none">• SIM PIN• SIM PUK• SIM PIN2• SIM PUK2• PH-SIM PIN• PH-NET PIN	Rev12
20	+CSQ	Signal quality	Instead of RSSI the modem returns RSRP	Rev12
21	+CPIN	Remaining PIN retries	None	Rev12
22	+CMEE	Report mobile termination error	None	Rev12
23	+CGDCONT	Define PDP Context	<ul style="list-style-type: none">• <PDP_addr>: Parameter omitted• <d_comp>: Data compression is not supported. Parameters omitted• <h_comp>: Header compression is not supported. Parameters omitted• <emergency indication>: Parameters omitted• <IM_CN_Signalling_Flag_Ind>: Parameters omitted <p>Note: Altair modem may automatically set the PDN context. Command shall be used with caution</p>	Rev12

ID	AT Cmd / URC	Description	Notes / Limitations	3GPP Rev
24	+CGDSCONT	Define Secondary PDP Context.	<ul style="list-style-type: none"> • <d_comp>: Data compression is not supported. Parameters omitted • <h_comp>: Header compression is not supported. Parameters omitted • <IM_CN_Signalling_Flag_Ind>: Parameters omitted 	Rev12
25	+CGTFT	Traffic Flow Template. Used to define a Traffic Flow Template for a PDP context or a Traffic Flow Aggregate for an EPS bearer resource.	Filtering of <local address and subnet mask> - not supported	Rev12
26	+CGATT	PS attach or detach	None	Rev12
27	+CGPADDR	Show PDP address +CGPADDR	None	Rev12
28	+CGEREP	Packet Domain event reporting	<p>The set command only serves as +CGEV enabler and disabler. The Buffer modes are ignored (no buffering).</p> <p>+CGEV has no support for:</p> <ul style="list-style-type: none"> • ME CLASS • NW CLASS • ME MODIFY • ME PDN ACT - doesn't return <reason> and <cid_other> 	Rev12
29	+CEREG	EPS network registration status	None	Rev12
30	+CEMODE	UE modes of operation for EPS	None	Rev12
31	+CCHO	Open Logical Channel	None	Rev12
32	+CCHC	Close Logical Channel	None	Rev12

ID	AT Cmd / URC	Description	Notes / Limitations	3GPP Rev
33	+CGCMOD	PDP Context Modify	None	Rev10
34	+CMGF	Message Format	None	Rev12
35	+CRSM	Restricted SIM access	None	Rev12
36	+CSIM	Generic SIM access	None	Rev12
37	+CPOL	Preferred PLMN list	The command accepts <oper> in numeric format only	Rev12
38	+CPLS	Selection of preferred PLMN list	None	Rev12
39	+CMGL	List Messages	None	Rev12
40	+CMGR	Read Messages	None	Rev12
41	+CMGD	Delete Messages	None	Rev12
42	+CPMS	Preferred Message Storage	Supports only "ME" or "SM" storage	Rev12
43	+CPAS	Phone activity status	Command currently reflect data connection status	Rev12
44	+CCLK	Set the Real Time clock	None	Rev12
45	+CMT	URC delivery of SMS to host	None	Rev12
46	+CTZR	Time Zone reporting	None	Rev12
47	+CTZU	Automatic Time Zone update	None	Rev12
48	+COPN	Read Operator Names	None	Rev12
49	+CPBS	Select phonebook memory storage	None	Rev12
50	+CPBR	Read phonebook entries	None	Rev12
51	+CPBF	Find phonebook entries	None	Rev12

ID	AT Cmd / URC	Description	Notes / Limitations	3GPP Rev
52	+CPBW	Write phonebook entry	None	Rev12
53	DT	Modem dial	<ul style="list-style-type: none"> • FAST UART only. • ATDT<number> launch PPP daemon and switch to binary mode. The <number> parameter is ignored. 	Rockwell Rev4
54	O	Returns the modem back to the normal connected state after being interrupted by the "+++ escape code	FAST UART only (PPP Port only).	Hayes command set
55	+++	Escape sequence	FAST UART only. (PPP Port only)	Hayes command set
56	E	Command Echo	PPP Port only	ETSI V.250
57	V	Response format	PPP Port only	ETSI V.250
58	Q	Result code suppression	PPP Port only	ETSI V.250
59	+CEER	Extended error report	None	Rev8
60	&FO	Set To Factory-Defined Configuration	None	ITU-T V.250
61	+CNMI	New Message Indications	<ul style="list-style-type: none"> • Currently supports (see AT+CNMI=? result): (1,2),(0-2),(0,2),(0-2),(0-1) • Use test command AT+CNMI=? to retrieve more updated limitations. Supported only in NP-enabled. 	Rev12
62	+CSCA	Service Centre Address	None	Rev12

ID	AT Cmd / URC	Description	Notes / Limitations	3GPP Rev
63	+CSMP	Set Text Mode Parameters	<ul style="list-style-type: none"> • Currently supports (see AT+CSMP=? result): (1,17,33,49,65,81,97,113),(0-255),(0),(0,4,8) • Use test command AT+CSMP=? to retrieve more updated limitations. 	Rev12
64	+CSMS	Select Message Service	<ul style="list-style-type: none"> • Support service=0 with MT and MO • Relevant for NP enabled only 	Rev12
65	+CPMS	Preferred Message Storage	Support UICC storage only	Rev12
66	+CGSMS	Switch MO SMS between IMS to SGs	None	Rev12
67	+CMGW	Write Message to Memory	Support only Text mode	Rev12
68	+CMSS	Send SMS from storage	None	Rev12
69	&K	Flow Control	<p>FAST UART only.</p> <p>Support only &K0 and &K3</p>	Rockwell Rev4
70	+CGACT	PDP context activate or deactivate	Altair modem which includes internal stack may automatically activate/deactivate PDN context. Command shall be used with caution (advised to use AT%CMATT instead)	Rev12
71	+CGCONTRDP	PDP Context Read Dynamic Parameters	<IM_CN_Signalling_Flag_Ind>: Parameters omitted	Rev11
72	+CGS CONTRD P	Secondary PDP Context Read Dynamic Parameters	<IM_CN_Signalling_Flag_Ind>: Parameters omitted	Rev10
73	+CMGC	Sends a command message (SMS-COMMAND)	None	Rev13
74	+CMMS	More messages to send	None	Rev12
75	+CPSMS	Power Saving Mode Setting	None	Rev12

ID	AT Cmd / URC	Description	Notes / Limitations	3GPP Rev
76	+CNMA	New Message Acknowledgement to ME/TA	None	Rev12
77	+CMGS	Send Message from host	None	Rev12
78	D*99***	End to end PPP over LTE connection establishment	Refer to 27.007, sec. 10.2.1.1: <ul style="list-style-type: none"> • GPRS_SC=99 (Packet Domain) • <called_address> - omitted • <L2P> - omitted, default PPP 	Rev13
79	DT*99***	End to end PPP over LTE connection establishment	Same as D*99*** for Win Host	Semi-standard
80	S2	Escape Character	FAST UART only	Rockwell Rev4
81	+CEDRXRDP	Retrieves eDRX parameters	None	Rev13
82	+CEDRXS	Controls the setting of eDRX parameters	None	Rev13
83	+CEPPI	Power Preference Indication for EPS	None	Rev13
84	+CESQ	Extended Signal Quality	None	Rev12
85	+CGAUTH	Define PDP context authentication parameters	None	Rev12
86	+CCIOTOPT	CloT EPS optimization	Only CP-CIoT is supported	Rev13
87	+CGEQOS	Define EPS Quality Of Service	None	Rev12
88	+CGEQOSRDP	EPS Quality Of Service Read Dynamic Parameters	None	Rev10
89	+CPNER	Enable +CPNERU URC indication	None	Rev11
90	+CPNET	Preferred network indication	None	Rev12

ID	AT Cmd / URC	Description	Notes / Limitations	3GPP Rev
91	+CPNSTAT	Preferred network status	<ul style="list-style-type: none"> • Only mode 4 (flight mode) is stored in NV memory. • <fun>=2/3 are not supported. • <fun> 128/129 are not supported 	Rev11
92	+CRLA	Restricted UICC Logical Channel access	None	Rev12
93	+CRSM	Restricted SIM access	None	Rev12
94	+CSCM	Session start and stop for smart congestion mitigation	None	Rev12
95	+CSDH	Show text mode parameters	None	Rev12
96	+IPR	Fixed DTE Interface Rate	<ul style="list-style-type: none"> • FAST UART only. • Automatic detection not supported • Default rate is 115200 	ITU-T V.250
97	+WS46	Select wireless network	<ul style="list-style-type: none"> • We support only EUTRAN • The modem returns "28" for the read and test command. • The set command accepts only 28 	Rev12
98	+CGTFRDP	Traffic Flow Template Read Dynamic	None	Rev10
99	+CSCS	Select TE (Terminal) character set	Affects only SMS AT commands. Support only: <ul style="list-style-type: none"> • "UCS2" • "8859-1" (Latin) • "IRA" • "PCCP437" 	Rev12

* See section 6.2 for additional information.

5 Altair Proprietary AT Commands Supported

5.1 AT-Commands Summary

The table below details the proprietary AT commands supported by the ALT1250 system software solution, per release.

Table 2. Proprietary AT Command Set Supported by ALT1250 Software

ID	AT Command / URC
AT%GETCFG	Get a configuration field from NV memory
AT%SETCFG	Set a configuration field in NV memory
AT%VER	Display all FW versions (SB/MAC/PHY/ASIPS)
AT%CSQ	Signal Quality (includes RSRQ)
AT%CPININFO	Returns the number of attempts left for PIN and PUK
AT%STATUS	Get entity status
AT%MEAS	Returns measurement for specified measurement type
AT%SCAN	Return the last RSSI scan results
AT%PPPLOC	Initiate local PPP session for modem management
AT%TSTRF	Simple RF test mode
AT%RATIMGSEL	Switch to other RAT FW image bank
AT%NWOPER	Set/query NW operator mode of the modem
AT%CCID	Read the ICCID from SIM EFICCID
AT%RESETCID	Clear entire cid table (whole or per cid)
AT%COUNT	Returns counters per LTE protocol layer
AT%LTEINFO	Get LTE protocol layer information
AT%FLTSMS	Handle special SMS features such as filtering, Antitheft etc...
AT%CMATT	Instruct eCM to attach or detach the LTE network
AT%D*99***	Open PPP session end to end
AT%SETLOG	Set run-time log severity (into RAM) per module
AT%GETLOG	Get run-time log severity (from RAM) per module
AT%EARFCN	Configure DL Frequency favorite list.
AT%CEER	Used for protocol error notification by enabling unsolicited reporting if needed
AT%SETACFG	Set configuration from OP file system
AT%GETACFG	Get a configuration filed in OP file system
AT%TSTEXT	External circuits test mode
AT%OTPCMD	Fills the content of OTP on eFuse
AT+VZWAPNE	Command defined by Verizon to configure APN table

ID	AT Command / URC
AT+VZWRSP	Return the RSRP values for all cells which the UE is measuring
AT+VZWRSRQ	Return the RSRQ values for all cells which the UE is measuring
AT%PDNACT	Start/stop any PDN connection
AT%APNN	Allow user to change the APN name of the PDN which is used by the host
AT%STATCM	Report eCM status to the host
AT%SETURLIP	Result of URL resolve
AT%PDNSET	Set run-time PDN parameters for data PDNs exposed to host
AT%PDNRDP	Return the relevant information for an active PDN identified by Session ID
AT%DATACMD	Block and unblock user data traffic in different conditions
AT%CMGWC	same as AT+CMGW but extended to allow the host to write large SMS to storage
AT%CMGSC	same as AT+CMGS but extended to allow the host to send large SMS to network
AT%CSGCMD	Search and select CSG cell
AT%CMGWS	Update SMS message status
AT%CBCMD	Configure blocked cells (Black List cells)
AT%CCLK	Similar to AT+CCLK with additional dst parameter
AT%CLCMD	Configure Cell Lock and WL parameters
AT%DNSRSLV	Resolve URL
AT%GETPROP	Get configuration from PROP file stored into NV memory
AT%SETPROP	Set configuration to PROP file stored into NV memory
AT%GETSPN	Retrieve service provider display policy and service provider name from SIM EFSPN file
AT%LBSCMD	Get LBS related information from the LTE modem
AT%LTECMD	Used for LTE protocol parameters query and override at run-time
AT%LTESYNC	Configure, start and stop the pulse issued by UE and synchronized with LTE sub-frames
AT%MASTERKEY	Verify the master key
AT%ALERT	Used for emergency or critical alert notifications
AT%CGINFO	Query info about packet domain parameters (extension for AT+CGxxx of 27.007)
AT%NETSEL	Select network architecture and parameters
AT%NETUPD	Enable/disable network override for specified LTE parameters
AT%NOTIFYEV	Notify Host about important events occurred in LTE device
AT%PBCMD	handle Phonebook commands

ID	AT Command / URC
AT%PCONI	Returns physical connectivity parameters info
AT%PINGCMD	Run PING service
AT%PWRSCVM	Manages user commanded power save mode
AT%SCACHECMD	SIM cache command
AT%SCANCFG	Configure for user-triggered scanning
AT%SMMA	SMS storage memory available message
AT%SCANCMD	Handle for user-triggered scanning
AT%SMSINFO	Get detailed SMS information
AT%SOCKETCMD	Enable socket service
AT%SOCKETDATA	DATA delivery for Socket service
AT%SOCKETEV	Used for socket event notifications
AT%TIMEREV	Notify sensitive internal or Host Apps about some LTE timers start/stop operations, which may impact LTE connectivity
AT%STATEV	Report events for different important state transitions and system occurrences
AT%TRSHCMD	Used for system troubleshooting at post-production, integration or field troubleshooting stage
AT%BANDCAP	Report supported band capabilities
AT%CUSTWA	Used for different customer one-shot workarounds or NW Operator/Vendor proprietary spec-incompliant changes in standard LTE behaviour
AT%LWM2MCMD	Control LWM2M client
AT%USMSF	Select the SMS format of outgoing SMS: 3GPP or 3GPP2. Applicable for text mode

5.2 AT-Commands

5.2.1 AT%GETCFG

Description

Get configuration from NV memory

Use

AT%GETCFG=<param1>,<param2>

Table 3. AT%GETCFG

Purpose	Param1	Param2	Returns
Read device's operation mode from NV	"OPER"		"SERV","NET"

Purpose	Param1	Param2	Returns
Read device's log module severity from NV <ul style="list-style-type: none">Reads device's log module severity from NV<ul style="list-style-type: none">ule severity from NV	"LOG"	<ul style="list-style-type: none"> • "SYS" • "L1A" • "MAC" • "RLC" • "PDCP" • "RRC" • "VL1" • "NAS" • "USIM" • "FRM" • "ROHC" • "PROFO" • "PROF1" • "PROF2" • "PROF4" • "PROF6" • "OSAL" • "SERV" 	<ul style="list-style-type: none"> • "DEBUG" • "INFO" • "NOTICE" • "WARN" • "ERROR" • "EMRG""
Read device's global log severity from NV	"LOG"	"ALL"	<ul style="list-style-type: none"> • "DEBUG" • "INFO" • "NOTICE" • "WARN" • "ERROR" • "EMRG"

Purpose	Param1	Param2	Returns
Read bands defined in MDOP file. These bands are the bands that the user can scan.	"BAND"		Bands: "X", "Y", "Z"
Read the Usim simulator status.	"USIM_SIMULATOR"		
Read stored cell status	"SC_STATE"		<ul style="list-style-type: none"> • 0: Disabled • 1: Enabled
Read the Customer ID from NV	"CUSTOMER_ID"		Customer ID written by manufacturer
Read the reset on assert status	"DISABLE_RESET"		<ul style="list-style-type: none"> • 0: Disabled • 1: Enabled
Read min pause interval between unsuccessful scanning	"REPOSE_MIN"		Time in seconds
Read max pause interval between unsuccessful scanning	"REPOSE_MAX"		Time in seconds
Read incremental step interval between unsuccessful scanning	"REPOSE_STEP"		<ul style="list-style-type: none"> • Time in seconds for linear mode. • -1 for exponent mode
Read power save mode for Idle/Connected RRC state. Read also power save mode for not in service states.	"PW_MODE"		<ul style="list-style-type: none"> • 0: SW default • 1: PHY only • 2: Shallow sleep • 3: Deep sleep • 4: Disabled <p>(for Idle, No Service and Connected states)</p>

Purpose	Param1	Param2	Returns
Read min interval to which shallow/deep sleep may be applied. Read also estimated entry/exit time to shallow/deep sleep	"PW_ATTR"		Time in microseconds (For all: <ul style="list-style-type: none">• ShallowMinDuration• ShallowEntryGurdTime• ShallowExitGurdTime• DeepMinDuration• DeepEntryGurdTime• DeepExitGurdTime)
Get 3GPP Rev. 9 enable flag – currently affects only CapabilityInformation reporting	"LTE_RELEASE_NUM"		<ul style="list-style-type: none">• SW default• Release 8• Release 9• Release 10• Release 11• Release12
Read heating power control enable flag	"HEATING_PWR_EN"		<ul style="list-style-type: none">• 0: Disabled• 1: Enabled
Read heating power control parameters	"HEATING_PWR_PRM"		
Read heating shutdown control parameters	"HEATING_SD_PRM"		
Read if band64 half-duplex mode is enabled	"HD_B64_ENABLE"		<ul style="list-style-type: none">• 0: Disabled• 1: Enabled

Purpose	Param1	Param2	Returns
Read Scan Plan feature enabled flag	"SCAN_PLAN_EN"	<ul style="list-style-type: none"> • 0: Disabled • 1: Enabled 	
Read Scan List row	"SCAN_LIST"	<ul style="list-style-type: none"> • [row_index] • (1-40) • If omitted, whole list is reported 	<ul style="list-style-type: none"> • Band • EARFCN start • EARFCN end • EARFCN step
Read log TimeStamp type	"LOG_TS_TYPE"		<ul style="list-style-type: none"> • 0: SW default • 1: HW TS • 2: DebugStreamer unique ID TS • 3: Both
Read customer product ID value	"CUSTOMER_ID"		0 – 255
Read if device IPv4 source filtering is disabled	"IPV4_SRC_FILTER_DIS"		<ul style="list-style-type: none"> • 0: Disabled • 1: Enabled
Read if device IPv6 source filtering is disabled	"IPV6_SRC_FILTER_DIS"		<ul style="list-style-type: none"> • 0: Disabled • 1: Enabled
Read if the device IO HW line for SIM_DET is present (enabled)	"SIM_DET_PRESENT"		<ul style="list-style-type: none"> • 0: False • 1: True
Read device stateless DHCPv6 configuration	"STATELESS_DHCPV6"		<ul style="list-style-type: none"> • 0: SW default • 1: Enabled in proxy mode • 2: Enabled in tunnel mode • 3: Disabled

Purpose	Param1	Param2	Returns
Read NW Operator Mode flag used to enable operator-specific features	"NW_OPER_MODE"		<ul style="list-style-type: none"> • 0: Standard 3GPP • 1: VZW • 2: CMCC • 3: RIL • 4: KDDI • 5: AT&T • 6: USCC • 7: DoCoMo • 8: SBM • 9: LGU+ • 10: KT • 11: T-Mobile • 12: SKT
Read if scan plan "Verify BW" feature is enabled	"SP_CELL_BW_EN"		<ul style="list-style-type: none"> • 0: False • 1: True
Read if 32KHz clock correction mechanism is enabled	"DS_32K_CORR_EN"		<ul style="list-style-type: none"> • 0: False • 1: True
Set Terminal Profile (TP) default download policy	"DL_TP_DEF"		<ul style="list-style-type: none"> • 0: SW default • 1: MT • 2: MT & TE • 3: Halt

Purpose	Param1	Param2	Returns
Set run-time Terminal Profile (TP) overridden download policy	"DL_TP_OVR"		<ul style="list-style-type: none"> • 0: Disabled • 1: MT • 2: MT & TE • 3: Halt
Read scan plan mode	"SP_MODE"		<ul style="list-style-type: none"> • 0: SW default • 1: Limited • 2: Mixed
Read scan plan scheduling scheme	"SP_SCHED_SCHEME"		<ul style="list-style-type: none"> • 0: Periodic regular • 1: Periodic triggered by max repose timer
Read scan plan scheduling scheme	"SP_SCHED_COUNTER"		0 – 255
Read SIM RX-TX delay	"SIM_RX_TX_DELAY"		<ul style="list-style-type: none"> • 0: SW default • 1-254: Delay in msec • 255: No delay
Set scan plan PLMN selection method	"SP_PLMN_SEL_MET"		<ul style="list-style-type: none"> • 0: Domestic PLMN only • 1: Any PLMN
Set MRU table disable flag for table update	"MRU_UPD_DIS"		<ul style="list-style-type: none"> • 0: Enable • 1: Disable
Set MRU table used entries number	"MRU_ENT_USED"		<ul style="list-style-type: none"> • 0: SW Default • 1 – 254 • 255: Unlimited

Purpose	Param1	Param2	Returns
Set MRU table disable flag for NBS usage	"MRU_NBS_DIS"		<ul style="list-style-type: none"> • 0: Enable • 1: Disable
Set MRU table disable flag for entry aging	"MRU_AGING_DIS"		<ul style="list-style-type: none"> • 0: Enable • 1: Disable
Reads ROHC profile status	"ROHC"	<ul style="list-style-type: none"> • "PROF0" • "PROF1" • "PROF2" • "PROF0101" • "PROF0102" 	<ul style="list-style-type: none"> • 0: Disabled • 1: Enabled
Reads NP tolerance timeout value	"NP_TOUT_TOLERANCE"		<ul style="list-style-type: none"> • 0: Param not in use • 3000: (232-1) (ms)
Reads LTE DL Category settings	"LTE_DL_CATEGORY"		<ul style="list-style-type: none"> • 0: CAT0 (SW Default) • 101: CAT-M1
Reads LTE UL Category settings	"LTE_UL_CATEGORY"		<ul style="list-style-type: none"> • 0: CAT0 (SW Default), • 101: CAT-M1
Reads PPI capability settings	"PPI_CAP_EN"		<ul style="list-style-type: none"> • 0: Disabled • 1: Enabled
Reads autonomous gap capability setting	"AUTO_GAP_CAP"		<ul style="list-style-type: none"> • 0: SW default • 1: Enabled • 2: Disabled
Reads reconnection recovery flag setting	"NW_RECONN_DIS"		<ul style="list-style-type: none"> • 0: Enabled • 1: Disabled

Purpose	Param1	Param2	Returns
Reads reconnection recovery delay value	"NW_RECONN_DELAY"		<ul style="list-style-type: none"> • 0: SW default • 1-10: Delay in sec • 255: Immediate reconnection
Reads the device VLSM mode	"IP_VLSM_MODE"		<ul style="list-style-type: none"> • 0: SW default • 1: Enabled • 2: Disabled
Reads reconnection recovery control flag setting	"NW_RECONN_MODE"		<ul style="list-style-type: none"> • 0: SW default • 1: Disabled • 2: Enabled
Reads max number of ROHC contexts	"ROHC_MAX_CT_NUM"		<ul style="list-style-type: none"> • 0: SW default • 2, 4, 8, 12, 16, 24, 32, 48, 64, 128, 256, 512, 1024
Reads MAC severity override value	"MAC_LOG_SEV"		<ul style="list-style-type: none"> • 0: SW default • 1-12
Reads power save debug and field trial parameters	"PS_DBG_PARM"		<ul style="list-style-type: none"> • 0: SW default • Binary value in quotes
Reads the device SIM pool suspend mode	"SIM_POLL_SUSP_MODE"		<ul style="list-style-type: none"> • 0: SW default • 1: Enabled • 2: Disabled
Reads FGI bit reporting filter	"FGI_REPORT_FILTER"		[b1[,b2[,...[b16]...]]]

Purpose	Param1	Param2	Returns
Reads dual SIM configuration	"SIM_DUAL_CONFIG"		<ul style="list-style-type: none"> • 0: SW default • 1: single SIM • 2: dual SIM
Reads wakeup SIM selection policy	"SIM_INIT_SELECT_POLICY" "		<ul style="list-style-type: none"> • 0: N/A -single SIM • 1: SIM1 only • 2: SIM2 only • 3: SIM1 with fallback to SIM2 • 4: SIM2 with fallback to SIM1 • 5: iUICC
Reads Connected mode DRX capability setting	"DRX_CAPABILITY_MODE"		<ul style="list-style-type: none"> • 0: SW default • 1: Disabled • 2: Long DRX • 3: Long and short DRX
Reads rich scan enable flag	"RICH_SCAN_EN"		<ul style="list-style-type: none"> • 0: Disabled • 1: Enabled
Read 32KHz clock correction mechanism enable flag	"DS_32K_CORR_EN"		<ul style="list-style-type: none"> • 0: False • 1: True

Purpose	Param1	Param2	Returns
Reads PMP severity override value	"PMP_LOG_SEV"		<ul style="list-style-type: none"> • 0: SW default • 1: Debug • 6: Informational • 7: Notice • 8: Warning • 9: Error • 12: Emergency • 255: Disable
Reads if normal attach in roaming is disabled	"NA_ROAM_DIS"		<ul style="list-style-type: none"> • 0: Enabled • 1: Disabled
Reads Idle mode DRX special paging cycle negotiated value	"DRX_SPEC_PAG_CYCLE"		<ul style="list-style-type: none"> • 0: Not applied • 1: 320 ms • 2: 640 ms • 3: 1280 ms • 4: 2560 ms

5.2.2 AT%SETCFG

Description

Set a configuration field in NV memory

Use

AT%SETCFG=<param1>,<param2>,<param3>

Table 4. AT%SETCFG

Purpose	Param1	Param2	Param3	Param4	Param5	Returns
Set device's operation mode in NV	"OPER"	<ul style="list-style-type: none">• "SERV"• "NET"				OK/ERROR

Purpose	Param1	Param2	Param3	Param4	Param5	Returns
Set device's log module severity in NV	"LOG"	<ul style="list-style-type: none"> • "SYS" • "L1A" • "MAC" • "RLC" • "PDCP" • "RRC" • "VL1" • "NAS" • "USIM" • "FRM" • "ROHC" • "PROF0" • "PROF1" • "PROF2" • "PROF4" • "PROF6" • "OSAL" • "SERV" 	<ul style="list-style-type: none"> • "DEBUG" • "INFO" • "NOTICE" • "WARN" • "ERROR" • "EMRG" 			OK/ERROR
Set device's global log severity in NV	"LOG"	"ALL"	<ul style="list-style-type: none"> • "DEBUG" • "INFO" • "NOTICE" • "WARN" • "ERROR" • "EMRG" 			OK/ERROR

Purpose	Param1	Param2	Param3	Param4	Param5	Returns
Set bands defined in MDOP file. These bands are the bands that the ue can scan.	"BAND"	Band1[,Band2[... [,BandN]...]]				OK/ERROR
Set device's USIM simulator enable/disable in NV	"USIM_SIMULATOR"	<ul style="list-style-type: none"> • "0": Disable • "1": Enable 				OK/ERROR
Set stored cell feature state	"SC_STATE"	<ul style="list-style-type: none"> • "0": Disable • "1": Enable 				OK/ERROR
Set if the device should disable the reset on assert feature	"DISABLE_RESET"	<ul style="list-style-type: none"> • "0": Disable • "1": Enable 				OK/ERROR
Set min pause interval between unsuccessful scanning	"REPOSE_MIN"	Time in seconds				OK/ERROR
Set max pause interval between unsuccessful scanning	"REPOSE_MAX"	Time in seconds				OK/ERROR
Set incremental step interval between unsuccessful scanning	"REPOSE_STEP"	<ul style="list-style-type: none"> • Time in seconds for linear mode • -1 for exponent mode 				OK/ERROR

Purpose	Param1	Param2	Param3	Param4	Param5	Returns
Set power save mode for Idle RRC state	"PW_IDLE"	<ul style="list-style-type: none"> • "DEFAULT": SW Default • "PHY": PHY only • "SHALLOW": Shallow sleep • "DEEP": Deep sleep • "NONE": Disable 				OK/ERROR
Set power save mode for Connected RRC state	"PW_CONN"	<ul style="list-style-type: none"> • "DEFAULT": SW Default • "PHY": PHY only • "SHALLOW": Shallow sleep • "DEEP": Deep sleep • "NONE": Disable 				OK/ERROR
Set power save mode for not in service states	"PW_NOSRVC"	<ul style="list-style-type: none"> • "DEFAULT": SW Default • "PHY": PHY only • "SHALLOW": Shallow sleep • "DEEP": Deep sleep • "NONE": Disable 				OK/ERROR
Set min interval to which shallow sleep may be applied	"PW_SS_MIN"	Time in microseconds				OK/ERROR

Purpose	Param1	Param2	Param3	Param4	Param5	Returns
3GPP Rev. 9 enable flag – currently affects only Capability Information reporting	"LTE_RELEASE_NUM"	<ul style="list-style-type: none"> • "Default" • "Release8" • "Release9" • "Release10" • "Release11" • "Release12" 				OK/ERROR
Set heating power control enable flag	"HEATING_PWR_EN"	<ul style="list-style-type: none"> • "0": Disable • "1": Enable 				OK/ERROR
Set heating power control parameters	"HEATING_PWR_PRM"	Reduce power temperature threshold	Reduce power rate			OK/ERROR
Set heating shutdown control parameters	"HEATING_SD_PRM"	UL shutdown threshold				OK/ERROR
Set if device will disable PHY logger mechanism at wakeup	"PHY_LOG_DISABLE"	<ul style="list-style-type: none"> • "0": Disable • "1": Enable 				OK/ERROR
Set Scan Plan feature enabled flag	"SCAN_PLAN_EN"	<ul style="list-style-type: none"> • "0": Disable • "1": Enable 				OK/ERROR

Purpose	Param1	Param2	Param3	Param4	Param5	Returns
Set Scan List Row	"SCAN_LIST"	row_index (1-40)	<ul style="list-style-type: none"> "0": Disable "1": Enable 	<ul style="list-style-type: none"> [band] (band to scan, optional for disable) 	[EARFCN step <ul style="list-style-type: none"> [,EARFCN start, EARFCN end]] • Optional for disable • If omitted for enable setting, standard band parameters are used)	OK/ERROR
Set log Time Stamp type	"LOG_TS_TYPE"		<ul style="list-style-type: none"> "0": SW default "1": HW TS "2": DebugStreamer unique ID TS "3": Both 			OK/ERROR
Set if device will disable IPv4 source filtering	"IPV4_SRC_FILTER_DIS"		<ul style="list-style-type: none"> "0": Disable "1": Enable 			
Set if device will disable IPv6 source filtering	"IPV6_SRC_FILTER_DIS"		<ul style="list-style-type: none"> "0": Disable "1": Enable 			

Purpose	Param1	Param2	Param3	Param4	Param5	Returns
Set if the device IO HW line for SIM_DET is present (enabled)	"SIM_DET_PRESENT"	<ul style="list-style-type: none"> • 0: False • 1: True 				
Set device stateless DHCPv6 configuration	"STATELESS_DHCPV6" "	<ul style="list-style-type: none"> • "0": SW default • "1": Enable in proxy mode • "2": Enable in tunnel mode • "3": Disable 				
Set NW Operator Mode flag used to enable operator-specific features	"NW_OPER_MODE"	<ul style="list-style-type: none"> • 0: Standard 3GPP • 1: VZW • 2: CMCC • 3: RIL • 4: KDDI • 5: AT&T • 6: USCC • 7: DoCoMo • 8: SBM • 9: LGU+ • 10: KT • 11: T-Mobile • 12: SKT 				

Purpose	Param1	Param2	Param3	Param4	Param5	Returns
Set scan plan “Verify BW” feature enable flag	“SP_CELL_BW_EN”	<ul style="list-style-type: none"> • “0”: Disable • “1”: Enable 				
Read if 32KHz clock correction mechanism is enabled	“DS_32K_CORR_EN”	<ul style="list-style-type: none"> • “0”: Disable • “1”: Enable 				
Set Terminal Profile (TP) default download policy	“DL_TP_DEF”	<ul style="list-style-type: none"> • “0”: SW default • “1”: MT • “2”: MT & TE • “3”: Halt 				
Read run-time Terminal Profile (TP) overridden download policy	“DL_TP_OVR”	<ul style="list-style-type: none"> • “0”: Disabled • “1”: MT • “2”: MT & TE • “3”: Halt 				
Set scan plan mode	“SP_MODE”	<ul style="list-style-type: none"> • “0”: SW default • “1”: Limited • “2”: Mixed 				OK/ERROR
Set scan plan scheduling scheme	“SP_SCHED_SCHEME”	<ul style="list-style-type: none"> • “0”: Periodic regular • “1”: Periodic triggered by max repose timer 				OK/ERROR
Set scan plan scheduling scheme	“SP_SCHED_COUNTE R”	“0” – “255”				OK/ERROR

Purpose	Param1	Param2	Param3	Param4	Param5	Returns
Set SIM RX-TX delay	"SIM_RX_TX_DELAY"	<ul style="list-style-type: none"> “0”: SW default “1”-“254”: Delay in msec “255”: No delay 				OK/ERROR
Sets ROHC profile status	"ROHC"	<ul style="list-style-type: none"> “PROF0” “PROF1” “PROF2” “PROF0101” “PROF0102” 	<ul style="list-style-type: none"> “0”: Disable “1”: Enable 			OK/ERROR
Sets NP tolerance override flag	"NP_TOUT_OVERRIDE_MODE"		<ul style="list-style-type: none"> “0”: SW default “1”: Enable “2”: Disable 			OK/ERROR
Sets NP tolerance timeout value	"NP_TOUT_TOLERANCE"		<ul style="list-style-type: none"> 0-param not in use, 3000 - (232-1) (ms) 			OK/ERROR
Sets specific LTE DL Category overridden value	"LTE_DL_CATEGORY"	<ul style="list-style-type: none"> “0”: CAT0 (sw default), “101”: CAT-M1 				
Sets specific LTE UL Category overridden value	"LTE_UL_CATEGORY"	<ul style="list-style-type: none"> “0”: CAT0 (sw default), “101”: CAT-M1 				

Purpose	Param1	Param2	Param3	Param4	Param5	Returns
Sets PPI capability enable flag	"PPI_CAP_EN"	<ul style="list-style-type: none"> • "0": Disable • "1": Enable 				
Sets autonomous gap capability flag	"AUTO_GAP_CAP"	<ul style="list-style-type: none"> • "0": SW default • "1": Enable • "2": Disable 				
Sets reconnection recovery flag	"NW_RECONN_DIS"	<ul style="list-style-type: none"> • "0": Disable • "1": Enable 				
Sets reconnection recovery delay value	"NW_RECONN_DELAY"	<ul style="list-style-type: none"> • "0": SW default • "1"-“10”: Delay in sec • “255”: Immediate reconnection 				
Sets the device VLSM mode	"IP_VLSM_MODE"	<ul style="list-style-type: none"> • "0": SW default • "1": Enable • "2": Disable 				
Sets reconnection recovery control flag	"NW_RECONN_MODE"	<ul style="list-style-type: none"> • "0": SW default • "1": Disable • "2": Enable 				
Sets max number of ROHC contexts	"ROHC_MAX_CT_NUM"	<ul style="list-style-type: none"> • "0": - SW default • "2", "4", "8", "12", "16", "24", "32", "48", "64", "128", "256", "512", "1024" 				

Purpose	Param1	Param2	Param3	Param4	Param5	Returns
Sets MAC severity override value	“MAC_LOG_SEV”	<ul style="list-style-type: none"> “0”: SW default “1”-“12” 				
Sets power save debug and field trial parameters	“PS_DBG_PARM”	<ul style="list-style-type: none"> “0”: SW default Binary value in quotes 				
Sets the device SIM pool suspend mode	“SIM_POLL_SUSP_MODE”	<ul style="list-style-type: none"> “0”: SW default “1”: Enable “2”: Disable 				
Sets FGI bit reporting filter	“FGI_REPORT_FILTER”	<ul style="list-style-type: none"> [“b1”, “b2”, ...[“b16” ...]] Bit values: <ul style="list-style-type: none"> 1: (max FGI#) Empty set erases all values. Max FGI# is LTE Release dependent 				
Sets dual SIM configuration	“SIM_DUAL_CONFIG”	<ul style="list-style-type: none"> “0”: SW default “1”: Single SIM “2”: Dual SIM 				

Purpose	Param1	Param2	Param3	Param4	Param5	Returns
Sets wakeup SIM selection policy	“SIM_INIT_SELECT_POLICY”	<ul style="list-style-type: none"> “0”: N/A, single SIM “1”: SIM1 only “2”: SIM2 only “3”: SIM1 with fallback to SIM2 “4”: SIM2 with fallback to SIM1 “5”: - iUICC 				
Sets Connected mode DRX capability setting	“DRX_CAPABILITY_MODE”	<ul style="list-style-type: none"> “0”: –SW Default “1”: Disabled “2”: Long DRX “3”: Long and short DRX 				
Sets rich scan enable flag	“RICH_SCAN_EN”	<ul style="list-style-type: none"> “0”: Disable “1”: Enable 				
Set if 32KHz clock correction mechanism is enabled	“DS_32K_CORR_EN”	<ul style="list-style-type: none"> “0”: Disable “1”: Enable 	Set if 32KHz clock correction mechanism is enabled			

Purpose	Param1	Param2	Param3	Param4	Param5	Returns
Sets PMP severity override value	"PMP_LOG_SEV"	<ul style="list-style-type: none"> “0”: SW default “1”: Debug “6”: Info “7”: Notice “8”: Warning “9”: Error “12”: Emergency “255”: Disable 				
Sets normal attach in roaming disabled flag	"NA_ROAM_DIS"	<ul style="list-style-type: none"> "0": Enable "1": Disable 				
Reads Idle mode DRX special paging cycle negotiated value	"DRX_SPEC_PAG_CYCLE"		<ul style="list-style-type: none"> 0: Not applied 1: 320 ms 2: 640 ms 3: 1280 ms 4: 2560 ms 			

5.2.3 AT%VER

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

Description

Display SW/FW version information. Optional SW components (such as GPS, etc.) may be retrieved using optional <component> parameter. For “ALL” <component> parameter modem will return full version information including optional components, if present.

Defined Values

<component> - SW component to return version info:

- “ALL”
- “GPS”
- “WIFI”

<ver_info> - version information

Example

Using APP processor - no SB or 3B versions

MAC Revision: REL_DRAGONFLY_01_00_00_REV_139902

MAC Package Version: ALT1250_01_00_00_00_01_FW

MAC Build Time: May_25_2017_17_54_16

PHY Revision: 12.10.139844

PHY Build Time: May_25_2017_14_51_10

PHY Build Info: release

PMP Revision: 0

PMP Version: Unknown yet

PMP build time:

DSP Revision: 2776

BB Product: 1250

BB HW Revision: 10

RFIC_6200 Revision: 00

OK

5.2.4 AT%CSQ

Command	Possible Response(s)
%CSQ	%CSQ: <rssi>,<ber>,<rsrq>-signal quality +CME ERROR: <err>
%CSQ?	ERROR (OPRATION_NOT_ALLOWED) Operation is not supported
%CSQ=?	%CSQ:(0-31,99),(0-7,99),(0-34,99) OK

Description

- Execution command returns received signal strength indication <rssi>, channel bit error rate <ber> and <rsrq> signal quality
- The TB (transport blocks) error rate will be used for the BER parameter.
- Read command is not supported.
- Test command returns the legend.

Defined Values

<rssi>:

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

<ber>(in percent):

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

<rsrq>-signal quality:

The reporting range of RSRQ is defined from -19.5 dB to -3 with 0.5 dB resolution.

- 0 less than -19.5 dB
- 1 -19.5 ... less than -19 dB
- 2 -19 ... less than -18.5 dB
-
- 32 -4 ... less than -3.5 dB
- 33 -3.5 ... less than -3 dB
- 34 -3 dB and greater
- 99 not known or not detectable

5.2.5 AT%CPININFO

Command	Possible Response(s)
%CPININFO	%CPININFO: <PIN attempts left>, <PUK attempts left>, <PIN2 attempts left>, <PUK2 attempts left> +CME ERROR: <err>
%CPININFO?	ERROR (OPRATION_NOT_ALLOWED) Operation is not supported
%CPININFO =?	OK

Description

Returns the number of attempts left for PIN and PUK

Use

AT%CPININFO

Returns

- +CPININFO: <PIN attempts left>, <PUK attempts left>, <PIN2 attempts left>, <PUK2 attempts left>
- PIN attempts left – number of failed tries to enter PIN, before it is blocked
- PUK attempts left – number of failed tries to enter PUK, before PUK is permanently blocked
- PIN2 attempts left – number of failed tries to enter PIN2, before it is blocked
- PUK2 attempts left – number of failed tries to enter PUK2, before PUK2 is permanently blocked

For more information on the SIM LOCK functionality please refer to Altair's 'SIM LOCK application note'.

5.2.6 AT%STATUS

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>s)

Description

Execution command retrieves current status of specified UE subsystem.

Read command is not supported.

Defined Values

<subsystem>:

- “INIT”
- “AMBR”
- “USIM”
- “RRC”
- “SEC”
- “ROAM”
- “IPS”
- “CSPS”
- “WDIS”
- “UICC”
- “PSM” – starting v6.2.5 and v1.2.0

<status>:

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 “AMBR”:

For each bearer with APN AMBR, it retrieves:

- EPS bearer ID,
- APN-AMBR downlink in kbps
- APN-AMBR uplink in kbps

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, flight mode, etc.)

For “IPS”:

- “IPS: 0” – UE IP stack works correctly.
- “IPS: 1” – UE IP stack failure

In case no APN AMBR are define, returns “No APN-AMBR is define”

For “SEC”:

The compound status value contains:

- SEC: AUTH: x NAS IALG: y1 NAS CALG: z1 AS IALG: y2 AS CALG: z2

Where the parameter range can be as following:

AUTH: <0-6>

- 0 - No authentication request sent yet
- 1 - Authentication success - stored context
- 2 - Authentication success – new context
- 3 - Authentication failure - MAC failure
- 4 - Authentication failure - Synch failure
- 5 - Authentication failure - non-EPS authentication unacceptable
- 6 - Authentication failure – error unspecified
- 7 - Authentication Reject

IALG: <0-3, 99>

- 0 - EIA0 (null integrity algorithm)
- 1 - EIA1 (SNOW 3G integrity algorithm)
- 2 - EIA2 (128-bit AES integrity algorithm)
- 3 - EIA3 (128-bit ZUC integrity algorithm)
- 99 - Invalid

CALG: <0-3, 99>

- 0 - EEA0 (null ciphering algorithm)
- 1 - EEA1 (SNOW 3G ciphering algorithm)
- 2 - EEA2 (128-bit AES ciphering algorithm)

3 - EEA3 (128-bit ZUC ciphering algorithm)

99 - Invalid

For "ROAM":

- "ROAM: 0" – not roaming (UE isn't camped at all or UE is camped on HPLMN/EHPLMN)
- "ROAM: 1" – meaning UE is camped on VPLMN

For "CSPS":

- "CSPS: 0" - not registered or EPS_ONLY (PS) mode
- "CSPS: 1" - EPS_COMBINED (CS/PS) mode

For "WDIS":

- "WDIS: 0" – enable signal detected
- "WDIS: 1" – disable signal detected

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.

For "PSM":

- "PSM: 0" – PSM is not active
- "PSM: 1" – PSM is active

<status_info>:

It is an arbitrary status information text, determined by the UE manufacturer and containing additional information about status

Example

AT%STATUS="RRC"

%STATUS: RRC: CONNECTED

OK

AT%STATUS="USIM"

%STATUS: USIM: REAL USIM, LTE

or:

%STATUS USIM: REAL USIM, non-LTE

OK

AT%STATUS="SEC"

%STATUS: SEC: AUTH: 1 NAS IALG: 1 NAS CALG: 1 AS IALG: 2 AS CALG: 2

OK

5.2.7 AT%MEAS

Command	Possible Response(s)
%MEAS <measurement type>	<p>For RSRP, RSRQ, SINR, RSSI:</p> <ul style="list-style-type: none"> • %MEAS: <measurement type>:Reported=<measurement value>, Rx0Tx0=<measurement value>, Rx0Tx1=<measurement value>, Rx1Tx0=<measurement value>, Rx1Tx1=<measurement value> <p>For Temperature, Path loss:</p> <ul style="list-style-type: none"> • %MEAS: <measurement type>:<measurement value> <p>For TX Power:</p> <ul style="list-style-type: none"> • %MEAS: <measurement type>:PUSCH=<measurement value>, PUCCH=<measurement value>, PRACH=<measurement value>, SRS=<measurement value> <p>For Signal Quality:</p> <ul style="list-style-type: none"> • %MEAS: Signal Quality:RSRP=<measurement value>, RSRQ=<measurement value>, SINR=<measurement value>, RSSI=<measurement value> <p>For Antenna relative phase:</p> <ul style="list-style-type: none"> • %MEAS: <measurement type>:TX0=<measurement value>, TX1=<measurement value>, TX2=<measurement value>, TX3=<measurement value>, Rx0RSSI=<measurement value>, Rx1RSSI=<measurement value> <p>For RS_SNR:</p> <ul style="list-style-type: none"> • %MEAS: RS_SNR=<measurement value> <p>For RS_SINR:</p> <ul style="list-style-type: none"> • %MEAS: RS_SINR=<measurement value> <p>For per-antenna RSRP, RSRQ, SINR, RSSI (20-23):</p> <ul style="list-style-type: none"> • %MEAS:<measurement type>: Reported=<value>,Ant0=<value>,Ant1=<value> <p>For all NBS RSRP and RSRQ:</p> <ul style="list-style-type: none"> • %MEAS: EARFCN=<EARFCN>,CellID=<cell ID>,<measurement type>=<measurement value> • [<CR><LF>%MEAS: EARFCN=<EARFCN>,CellID=<cell ID>,<measurement type>=<measurement value>]

Command	Possible Response(s)
	<ul style="list-style-type: none"> • [...] <p>For all neighboring NBS simultaneous RSRP and RSRQ reporting:</p> <ul style="list-style-type: none"> • %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>] • [...] <p>For NBS RSRP in compressed format:</p> <ul style="list-style-type: none"> • %MEAS: NBS RSRP:<EARFCN>,<cell ID>,<measurement value>[,<EARFCN>,<cell ID>,<measurement value>...]] <p>For E-CID (AT%MEAS="95") in compressed format:</p> <ul style="list-style-type: none"> • %MEAS: ECID:<gcid>,<TimeDifIndex>,<ta>,<MCC>,<MNC>,<TAC>,<EARFCN>,<cell ID>,<SFN>,<RSRP>,<RSRQ> • [,<EARFCN>,<cell ID>,<SFN>,<RSRP>,<RSRQ> [...]] <p>The Network Time correspond to SFN of serving cell(AT%MEAS="93")in compressed format:</p> <ul style="list-style-type: none"> • %MEAS: NWTIME:<networkTTI>,<networkUtcTime>
%MEAS?	<ul style="list-style-type: none"> • 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

<Measurement type>:

- "0" – RSRP
- "1" – RSRQ
- "2" – SINR
- "3" – RSSI
- "4" – TX Power
- "5" – Temperature
- "6" – Pathloss
- "7" – CQI
- "8" – Signal Quality (RSRP & RSRQ & SINR & RSSI)
- "9" – Antenna relative phase. Starting v4.5.1
- "10" – RSRP reported value only
- "11" – RSRQ reported value only
- "12" – SINR reported value only
- "13" – RS_SNR (reference signal signal-to-noise ratio). Starting late v4.5.6
- "14" – RS_SINR (reference signal signal-to-interference-plus-noise ratio). Starting late v4.5.6
- "15" – "92" Reserved
- "20" – per-antenna RSRP
- "21" – per-antenna RSRQ
- "22" – per-antenna SINR
- "23" – per-antenna RSSI
- "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

<EARFCN>:

Decimal EARFC value

<gcid>:

The Global cell ID hexadecimal value (See AT%PCONI)

<TimeDifIndex>:

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.

<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>:

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>:

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
 - dBm for TX Power (for example, 2.5 dBm = 25)
- Degrees (°C) for Temperature
- Degrees (phase) & 256*dBM (RSSI) units for Antenna relative phase
 - dB for RS_SNR, RS_SINR (for example, 2.5 dB = 25)

Measurement Range

- -140 <= RSRP <= 0
- -60 <= RSRQ <= 0
- -128 <= SINR <= 40
- -26 <= TX Power <= 40
- -128 <= Temperature <= 128

- 0 <= CQI <= 15
- -12.0 <= RS_SNR, RS_SINR <= 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.

<networkTTI>:

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>:

MBMS0042. 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

Implementation Notes

- Command may obsolete %CSQ command, which contains the same <ber> as standard "+CSQ" command. All other parameters are provided by this command. The RSSI value is calculated using RSRP and RSRQ values reported by PHY.
- MAC-PHY "Frame Ready" interface shall be extended for new 4 TX Power values and CQI.
- CQI returns last value of WBCQI of layer 0.
- Potentially a long list of neighbors is returned in a number of lines separated by end symbol (ordinary CR+LF). For intra measurements the EARFCN output parameter may be omitted as per [4] rules, but it is not recommended. Using "0" for current EARFCN as described above is preferable.

Example

```
AT%MEAS="0"
%MEAS: RSRP: Reported = -80, Rx0Tx0 = -80, Rx0Tx1 = -76, Rx1Tx0 = -92,
Rx1Tx1 = -82
OK
```

```
AT%MEAS="8"
%MEAS: Signal Quality: RSRP = -90, RSRQ = -8, SINR = 8, RSSI = -62
OK
```

```
AT%MEAS="98"
%MEAS: EARFCN=0, CellID=45, RSRP =76
%MEAS: EARFCN=0, CellID=75, RSRP =82
```

%MEAS: EARFCN=2620, CellID=40 RSRP =73

OK

AT%MEAS="96"

%MEAS: NBS RSRP: 40340,300,-92, 40340,171,-95

OK

AT%MEAS="95"

%MEAS:ECID: "09FBD146",3,234,35,"00C3",40340,15,-92,-8,40340,12,853,-95,-9

OK

AT%MEAS="94"

%MEAS: MBMS SINR: Areald = 1, Avg = -6, Rx0 = -8, Rx1 = -2

%MEAS: MBMS SINR: Areald = 2, Avg = -5, Rx0 = -7, Rx1 = -1

OK

5.2.8 AT%SCAN

Command	Possible Response(s)
%SCAN[=<cmd>[,<mode>]]	For <cmd>="QUERY" For <mode>=0 (short) or omitted %SCAN:<res>[,<EARFCN>,<PCI>,<RSRP>,<RSRQ> [,<EARFCN>,<PCI>,<RSRP>,<RSRQ>]...] For <mode>=1 (long) %SCAN:<res>[,<band>,<earfcn>,<pci>,<eci>,<mcc>,<mnc>,<RSRP>,<RSRQ>[,<eci>,<mcc>,<mnc>,<bw>,<tac>,<cstat>,<emg>,<oper1>[,<oper2>[...]]]] [<CR><LF>%SCAN:<band>,<earfcn>,<pci>,<eci>,<mcc>,<mnc>,<RSRP>,<RSRQ>[,<eci>,<mcc>,<mnc>,<bw>,<tac>,<cstat>,<emg>,<oper1>[,<oper2>[...]]]...]]
%SCAN?	%SCAN: for each cell: (<bw>, <eci>, <EARFCN>, <Physical_cell_ID>, <PLMN_ID>, <RSRP>)[]
%SCAN=?	OK

Description

Command returns the RSSI scan results. Result is displayed only for cells successfully acquired SIB1 from.

Execute and Test commands are not supported.

Defined Values

<cmd> - command, string:

- "QUERY" – ask for last scan results

<mode> - integer; result representation mode (starting LTESYS-19191):

- 0 – short
- 1 – long

<bw>:

- 0 – 1.4 MHz
- 1 – 3 MHz
- 2 – 5 MHz
- 3 – 10 MHz
- 4 – 15 MHz
- 5 – 20 MHz

<eci> - E-UTRAN Cell ID (28 low bits of EGCI):

- As per 3GPP encoding for cell ID.

<EARFCN>

- As per 3GPP encoding for EARFCN

<Physical cell ID> or <PCI>:

- PHY acquired cell ID.

<PLMN ID>

- As per 3GPP encoding for PLMN ID

<RSRP>

- RSRP measurements in dbm

<res> - scan result, integer:

- 0 – scan succeeded. Cell measurements will be provided too.
- 1 – scan failed: low power, no cell found
- 2 – scan failed: cell(s) found, but failed to acquire MIB/SIB1. Cell measurements will be provided too.

Next params are as per 3GPP definition:

<band>,<earfcn>,<pci>,<eci>,<mcc>,<mnc>,<RSRP>,<RSRQ>,<bw>,<tac>

<operN>: string type; similar to <oper> parameter of +COPS in decimal numeric format (see 27.007)

<cstat> - integer; cell status from SIB1:

- 0 – regular cell
- 1 – cell barred
- 2 – cell reserved for Operator use

<emg> - integer; as defined in SIB1 ims-EmergencySupport-r9 for cell:

- 0 – false (omitted)
- 1 – true

Implementation Notes:

1. The results are updated after every PLMN search, in case the UE doesn't perform PLMN search (stored cell), the command will return only OK.
2. The scan for measurements reporting during scan failure there is no need in new MAC-PHY API: the measurements are already provided by PHY to MAC during MIB/SIB1 acquisition.

For AT%SCAN="QUERY",1 use AT%SCANCMD as example. Note, that in AT%SCANCMD the next params are missed:

- <res>
- <band>
- <emg>

5.2.9 AT%PPPLOC

Command	Possible Response
AT%PPPLOC	OK or ERROR
AT%PPPLOC?	ERROR (not supported)
AT%PPPLOC=?	OK

Description

AT command to initiate local PPP session for modem management without LTE network PPP data connectivity. This command purpose is to provide user with management access to the modem, in a case when there is no active PDN available. To establish PPP data session with LTE network use the ATD*99***command.

5.2.10 AT%TSTRF

Command	Possible Response(s)
AT%TSTRF=<cmd>[,<earfcn>,<time>,<TX_type>[,<TX_power>,<TX_param>]]	OK or +CME ERROR: <error>
AT%TSTRF?	%TSTRF:<status> OK or +CME ERROR: <error>
AT%TSTRF=?	OK

Description

Test AT command is intended for RF TX test mode.

Command is not accepted in operational mode (AT+CFUN=1) and flight mode (CFUN=4). The modem shall be previously switched in non-operational mode by CFUN=0..

Defined Values

<cmd>:

- 3 – Start TX test

<earfcn>:

- EARFCN decimal value as per LTE spec

<time> - test execution time in ms:

- 0 – special value - continuous TX forever

<TX_type>:

- 1 – CW (continuous waveform)

<TX_power>:

- Absolute output power [dBm*100]

<TX_param>:

- offset to central frequency in Hz

<status> - status of test:

- 0 – busy
- 1 – ready

<error>

- As per 3GPP 27.007
- Invalid EARFCN

5.2.11 AT%RATIMGSEL

Command	Possible Response
AT%RATIMGSEL=<img_id>	OK or ERROR
AT%RATIMGSEL?	%RATIMGSEL:<img_id>
AT%RATIMGSEL=?	OK

Description

The command is intended to switch to FW image bank of other RAT. Once modified, new FW image for different RAT will be activated in following cold boot. Read command returns the image identifier currently in use. The newly settled identifier cannot be retrieved before boot.

Defined Values

<img_id> - integer type; image bank identifier on NV storage:

- 1
- 2

5.2.12 AT%NWOPER

Command	Possible Response
AT%NWOPER=<oper_name>	OK or ERROR
AT%NWOPER?	%NWOPER:<oper_name>
AT%NWOPER=?	%NWOPER:(list of supported <oper_name>s)

Description

This command is used to set/query NW operator mode of the modem. This mode setting is used to support NW Operator specific requirements defined on top of 3GPP requirements.

The <oper_name>="DEFAULT" means default 3GPP compliant behavior of the modem.

The list of operators is not limited, use test command (AT%NWOPER=?) to retrieve the list of currently supported operators.

Any attempt to set unknown operator name will return ERROR.

Defined Values

<oper_name> - string; the name of operator to select modem mode of operations. The name is Altair-proprietary string, not always the same as defined in GSM MoU SE.13:

- "DEFAULT" – default 3GPP compliant mode
- "VZW" – Verizon Wireless
- "ATT" - AT&T
- etc.

Example

```
AT%NWOPER=?
%NWOPER:
("DEFAULT","AUTO","VZW","CMCC","RJIL","KDDI","ATT","USCC","DOCOMO",
"SOFTBANK","LGU+","KT","T-MOBILE","SKT")
OK
```

5.2.13 AT%CCID

Command	Possible Response
AT%CCID	%CCID: <ccid> OK or ERROR
AT%CCID?	ERROR (not supported)
AT%CCID=?	OK

Description

Execution command reads the ICCID (card identification number) from SIM EFICCID. It is a unique identification number for the SIM.

If SIM is not inserted, the ERROR is returned by execution command.

Defined Values

<ccid> - string of 19 or 20 decimal digits, which reflects SIM ICCID value. The format of the ICCID is: MMCC IINN NNNN NNNN NN C x

- MM = Constant (ISO 7812 Major Industry Identifier)
- CC = Country Code
- II = Issuer Identifier
- N{12} = Account ID ("SIM number")
- C = Checksum calculated from the other 19 digits using the Luhn algorithm.
- x = An extra 20th digit, which may be returned by SIM, but it is not officially part of the ICCID.

Example

AT%CCID%CCID: "01234567890123456789"

OK

5.2.14 AT%RESETCID

Command	Possible Response
%RESETCID=[<cid>]	
%RESETCID?	ERROR
%RESETCID=?	OK

Description

The command is intended to clear entire cid table (whole or per cid) in LTE FW.

The set command specifies PDP context identified by <cid> (the local context identification parameter) to be reset. If optional <cid> parameter is missed, whole PDP context parameter table is erased and returns PDN table to the device boot up state.

The erase includes PDP context parameters removal for next settings:

- PDN connection parameters defined by AT+CGDCONT or by network
- PDN QOS parameters defined by AT+CGTFT or by network
- Additional PDN PCO parameters defined by AT%SETPCO

The read command is not supported.

Defined Values

<cid>: integer type, same as used in +CGDCONT/%SETPCO

5.2.15 AT%COUNT

Command	Possible Response
%COUNT <layer>[,<filter>][,<counter_type>][,<action>]]]	%COUNT: <stats string>
%COUNT?	ERROR (OPRATION_NOT_ALLOWED)
%COUNT=?	%COUNT: (list of supported <layer>s)

Description

Command returns counters per LTE protocol layer.

Read command is not supported.

Defined Values

<layer>:

- “PDM”
- “PDCP”
- “RLC”
- “MAC”
- “L1A”
- “RRC”
- “NAS”
- “TIMERS”
- “LOG”
- “CRITICALERR”
- “MEM”
- “L1AEXT”
- “ALL”
- “MBMS”
- “PWR”
- “USIM”
- “TIMER_INTERRUPT_LATENCY”

<filter> - used to reduce command output to the info defined by the filter:

- “TX”
- “RX”

<counter_type> - used to reduce command output to specific info defined by:

- “IPBYTES”

<action> - used to modify counter values:

- “CLEAR” - erase all counter values to zero.

<stats string>:

- String is defined in arbitrary format for specified layer counters reporting starting from “LAYER Stats:” textual prefix

Example

To clear counters:

AT%COUNT=“PDM”,,,”CLEAR”

OK

5.2.16 AT%LTEINFO

Command	Possible Response
AT%LTEINFO=<layer>,<type>[,<param1>]	[LTEINFO:<info1>[,<info2>...[,<infoN>]...]
AT%LTEINFO?	ERROR (not supported)
AT%LTEINFO=?	OK

Description

This command is used to get information about LTE protocol layer parameters.

If parameters are not acquired yet or already irrelevant for current LTE state, response string is omitted.

Some LTE parameters provided by eNB may be optional. A parameter, which is not specified, will be omitted and written as ",".

If all parameters are not specified, command will return only OK.

Defined Values

<layer>:

- “MAC”

<type>:

- “TA” – Timing Advance

<info1> - current TA:

- Timing advance value for RRC_CONNECTED mode
- N/A for other modes

<info2> - last received TA, omitted in RRC_CONNECTED mode:

- Last timing advance value received in RRC_CONNECTED mode before leaving it

<layer>:

- “PHY”

<type>:

- “TDDCONF” – TDD UL/DL configuration

<info1> - configuration as per 36.211, sec.4.2:

- 0-6 for TDD
- N/A for FDD

<info2> - special subframe configuration as per 36.211, sec.4.2:

- 0-8 for TDD
- N/A for FDD

<layer>:

- “MAC”

<type>:

- “CRSIB3” – SIB3 cell reselection parameters

<info1> - s-NonIntraSearch reselection threshold as per 36.331

<info2> - threshServingLow reselection threshold as per 36.331

<info3> - cellReselectionPriority as per 36.331

<info4> - s-IntraSearch reselection threshold as per 36.331

<info5> - q-RXLevMIN reselection parameter as per 36.331

<layer>:

- “MAC”

<type>:

- “CRSIB5” – SIB5 cell reselection parameters

<info1> - EARFCN

<info2> - threshX-High reselection threshold as per 36.331

<info3> - threshX-Low reselection threshold as per 36.331

<info4> - cellReselectionPriority as per 36.331

<layer>:

- “MAC”

<type>:

- “BARSIB1” – SIB1 barring parameters

<info1>:

- 0 – barred
- 1 – not barred

<layer>:

- “MAC”

<type>:

- “BARSIB2” – SIB2 barring parameters for Rel9/10

<info1> - ac-BarringFactor of ssac-BarringForMMTEL-Voice-r9 as per 36.331

<info2> - ac-BarringTime of ssac-BarringForMMTEL-Voice-r9 as per 36.331

<info3> - ac-BarringForSpecialAC (in quotes) of ssac-BarringForMMTEL-Voice-r9 as per 36.331

<info4> - ac-BarringFactor of ssac-BarringForMMTEL-Video-r9 as per 36.331

<info5> - ac-BarringTime of ssac-BarringForMMTEL-Video-r9 as per 36.331

<info6> - ac-BarringForSpecialAC (in quotes) ssac-BarringForMMTEL-Video-r9 as per 36.331

<info7> - ac-BarringFactor of ac-BarringForCSFB-r10 as per 36.331

<info8> - ac-BarringTime of ac-BarringForCSFB-r10 as per 36.331

<info9> - ac-BarringForSpecialAC (in quotes) of ac-BarringForCSFB-r10 as per 36.331
<info10> - ac-BarringForEmergency of ac-BarringInfo as per 36.331
<info11> - ac-BarringFactor of ac-BarringForMO-Signalling as per 36.331
<info12> - ac-BarringTime of ac-BarringForMO-Signalling as per 36.331
<info13> - ac-BarringForSpecialAC (in quotes) of ac-BarringForMO-Signalling as per 36.331
<info14> - ac-BarringFactor of ac-BarringForMO-Data as per 36.331
<info15> - ac-BarringTime of ac-BarringForMO-Data as per 36.331
<info16> - ac-BarringForSpecialAC (in quotes) of ac-BarringForMO-Data as per 36.331

<layer>:

- “NAS”

<type>:

- “T3396” – T3396 status and time to expiration

<param1>:

- 0 or missed – return timer for all PLMNs
- 1 – return timers for last selected PLMN

<info1> - timer status:

- 0 – stop
- 1 – run

<info2> - rest of the time to run. Zero or omitted, if timer is stopped.

<info3> - PLMN

<info4> - cid

<layer>:

- “NAS”

<type>:

- “OPERIMSI” – NW operator identifiers of IMSI

<info1> - integer type; Home MCC (from IMSI)

<info2> - integer type; Home MNC (from IMSI)

<info3> - string type (in quotes); short NW operator name converted from IMSI MCC/MNC, may be omitted if unknown

<layer>:

- “RRC”

<type>:

- “OPERSIB1” – NW operator identifiers provided in SIB1

<info1> - integer type; MCC (from SIB1)
<info2> - integer type; MNC (from SIB1)
<info3> - string type (in quotes); short NW operator name converted from SIB1
MCC/MNC, may be omitted if unknown

<layer>:
 ○ “SIM” – starting LTESYS-19191
<type>:
 ○ “EHPLMN” – retrieve EF_EHPLMN list in numeric format
<info1> - integer type; oper1, (see +COPS <oper> definition)
...
<infoN> - integer type; operN

<layer>:
 ○ “RRC”
<type>:
 ○ “CE” – Coverage Enhancement info, starting LTESYS-18601
<info1> - current CE mode:
 ○ 0 – normal – UE is not camped on cell or UE selected the serving cell in
 normal coverage mode
 ○ 1 – UE selected the serving cell in enhanced coverage mode
<info2> - current CE level that was used for accessing the cell during RACH,
optional parameter is omitted in RRC IDLE mode:
 ○ 0 – CE level 0
 ○ 1 – CE level 1
 ○ 2 – CE level 2
 ○ 3 – CE level 3
<info3> - current CE mode in connected state, optional parameter is omitted in
RRC IDLE mode (will be CE mode A, as long as CE mode B not supported)
 ○ 0 – CE mode A
 ○ 1 – CE mode B

<layer>:
 ○ “PHY”
<type>:
 ○ “MAXTXPWR” – max TX power actually used by PHY
<info1> - integer; current max TX power limit applied to all TX channels:
 ○ max TX power in 100*dBm units

<layer>:

- “RRC” – starting LTESYS-19670

<type>:

- “RPLMN” – retrieve RPLMN value numeric format

<info1> - integer type; see +COPS <oper> definition

<layer>:

- “NAS”

<type>:

- “CIOT”, starting LTESYS-20561

<info1> - integer type; same value as reported by +CCIOTOPTI URC in <supported_Network_opt> parameter. It indicates the negotiated with Network support for CloT EPS optimizations.

- 0 - No support.
- 1 - Support for control plane CloT EPS optimization.
- 2 - Support for user plane CloT EPS optimization.
- 3 - Support for both control plane CloT EPS optimization and user plane CloT EPS optimization.

5.2.17 AT%FLTSMS

Command	Possible Response
AT%FLTSMS=<cmd>[,<param1>[,<param2>]...]	[%FLTSMS: <result1>[,<result2>...]] OK or ERROR
AT%FLTSMS?	ERROR (OPRATION_NOT_ALLOWED) Operation is not supported
AT%FLTSMS=?	%FLTSMS: List of supported <cmd>
(unsolicited result code)	%FLTSMS: <event>[,<result1>[,<result2>...]]

Description

This command handle special SMS features such as filtering, Antitheft etc ..

The “GETSMS” sub-command will return ERROR if storage is empty.

Defined Values

<cmd>:

- “MTEVEN” – Command to enable unsolicited indication on new incoming SMS

<param1>: decimal

- 0 – Disable unsolicited indication
- 1 – Enable unsolicited indication

<event>:

- “MTEV” – unsolicited indication on new incoming SMS

<cmd>:

- “GETNUM” – Command to get the number of SMS placed in the dedicated storage.

<result1>: integer

- Number of filtered SMS in the dedicated storage.

<cmd>:

- “GETSMS” – Command to get the latest SMS stored in the dedicated storage

<param1>: decimal

- 0 – PDU mode
- 1 – Text mode

<param2>: decimal

- 0 – Keep SMS in storage
- 1 – Delete SMS from storage

<result1>-<resultN>: same format as returned by +CMGR (see 3GPP 27.005)

<cmd>:

- “SETFILTER” – Command to set a list of phone numbers for Incoming SMS filtering. The filtered incoming SMS shall be placed in dedicated location in NP file system. If “SETFILTER” is executed without parameters, the whole list is deleted.

<param1>: string

- phone number (can include digits 0-9, *, #, +)

<param2>: string

- phone number

.

.

.

<paramN>: string

- phone number

Examples

Define filter list:

```
AT%FLTSMS="SETFILTER","6045629341","7789182026","567#89","123456  
", "*1130","#90"  
%FLTSMS  
OK
```

Clear filter list:

```
AT%FLTSMS="SETFILTER"  
%FLTSMS  
OK
```

Get SMS text Base64:

```
AT%FLTSMS="GETSMS",1,1  
%FLTSMS: "REC" UNREAD", "+358507654321", "Mr.  
Jones", "95/07/03,17:38:15+04"  
TWFuIGlzIGRpC3Rpbd1aXNoZWQsIG5vdCBvbmx5I  
OK
```

5.2.18 AT%CMATT

Command	Possible Response
%CMATT <param>	OK or ERROR
%CMATT?	%CMATT: <param>
%CMATT=?	%CMATT: (list of supported <modules>)

Description

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

Defined Values

<param>: Integer type; instruct the device to attach or detach the LTE network.

- 0 - detach
- 1 - attach

5.2.19 AT%D*99***

Command	Possible Response(s)
AT%D*99***<ext_sessionID>#	OK/ERROR

Description

AT command to initiate end to end PPP session with the LTE network on specific PDN which is set by the <ext_sessionID> parameter.

Defined Values

<ext_sessionID>

- See definition in AT%PDNSET

5.2.20 AT%SETLOG

Purpose	Param1	Param2	Returns
Sets module log severity in RAM	"SYS", "L1A", "MAC", "MACGN", "MACUL", "MACDL", "RLC", "RLCGN", "RLCUL", "RLCGL", "PDCP", "PDCPGN", "PDCPUL", "PDCPD", "RRC", "VL1", "NAS", "USIM", "FRM", "ROHC", "PROFO", "PROF1", "PROF2", "PROF4", "PROF6", "OSAL", "SERV", "PACKET_CLASS", "EXCEPTION_MANAGER", "SIMLOCK", "DT", "SMS", "AT", "AMA"	"DEBUG", "INFO", "NOTICE", "WARN", "ERROR", "EMRG"	OK/ERROR
Sets log severity for all modules in RAM	"ALL"	"DEBUG", "INFO", "NOTICE", "WARN", "ERROR", "EMRG"	OK/ERROR

Description

Command to set log severity for run-time (into RAM) per module. This setting will be lost after reboot.

Note: Next shortened module names: “MAC”, “RLC” and “PDCP” works similar to wildcard and will have effect on all related to each layer logs:

- “MAC”: “MACGN”, “MACUL”, “MACDL”
- “RLC”: “RLCGN”, “RLCUL”, “RLCDL”
- “PDCP”: “PDCPGN”, “PDCPUL”, “PDCPD”

Usage

AT%GETLOG=<param1>,<param2>

5.2.21 AT%GETLOG

Purpose	Param1	Param2	Returns
Reads device's log module severity from RAM	"SYS", "L1A", "MACGN", "MACUL", "MACDL", "RLCGN", "RLCUL", "RLCGL", "PDCPGN", "PDCPUL", "PDCPDL", "RRC", "VL1", "NAS", "USIM", "FRM", "ROHC", "PROFO", "PROF1", "PROF2", "PROF4", "PROF6", "OSAL", "SERV", "PACKET_CLASS", "EXCEPTION_MANAGER", "SIMLOCK", "DT", "SMS", "AT", "AMA"	"DEBUG", "INFO", "NOTICE", "WARN", "ERROR", "EMRG"	Reads device's log module severity from RAM
Reads device's log severity of all modules from RAM	"ALL"	"DEBUG", "INFO", "NOTICE", "WARN", "ERROR", "EMRG"	Reads device's log severity of all modules from RAM

Description

Command to get log severity for currently running SW per module.

Note: Next shortened module names: “MAC”, “RLC” and “PDCP” works similar to wildcard and does not have their own severity to report and will report all related to each layer logs:

- “MAC”: “MACGN”, “MACUL”, “MACDL”
- “RLC”: “RLCGN”, “RLCUL”, “RLCDL”
- “PDCP”: “PDCPGN”, “PDCPUL”, “PDCPDL”

Usage

AT%GETLOG=<param1>

5.2.22 AT%EARFCN

Command	Possible Response(s)
%EARFCN=[<EARFCN>[,<EARFCN>...]] (up to 8)	In case the earfcn not in range, return ERROR. Shall return "operation not allowed" in verbose mode (CMEE).
%EARFCN?	%EARFCN: <earfcn>
%EARFCN=?	%EARFCN: (list of <earfcn>s found in scan)

Description

Command is intended to create, update and delete EARFCN favorite list.

The preferred EARFCNs may be added to favorite list. This means that during the first scanning step of “PLMN Search” procedure these EARFCNs will be preferred over closest neighbor EARFCNs, which detected Xcorr value may be occasionally higher than for actual LTE EARFCN.

The favorite list accelerates the following MIB and SIB acquisition step of “PLMN Search” procedure. It does not have any impact on following “PLMN Selection” and “Cell Search and Selection” procedures (see 3GPP 23.122 and 36.304).

Note: in case of AT%EARFCN=0, it will erase favorite list and disable EARFCN preference mechanism on all bands.

5.2.23 AT%CEER

Command	Possible Response(s)
%CEER=<mode>[,,<clear_err>][,<rep_type>]	OK or ERROR
%CEER?	%CEER: <mode> [,<module>, <procedure>, <failure> [,<reject cause>][,<error info>][,<EARFCN>,<pci>,<oper>,<tac>]]] +CME ERROR: <err>
%CEER=?	%CEER: (list of supported <modes>)

Description

The set command enables or disables the presentation of unsolicited result response about system failure in form:

%CEER: <module>,<procedure>,<failure>[,<reject cause>][,<error info>][,<EARFCN>,<pci>,<oper>,<tac>]]]

If <rep_type>=1 (extended) is used, optional <error info> and <reject cause> parameters may be omitted.

The read command returns the last failure report added with selected <mode>.

The test command returns list of supported modes.

Defined Values

<mode>: status of unsolicited result response presentation

- 0 – disabled (default)
- 1 – enabled

<clear_err>: clear last stored failure report

- 0 – keep last stored failure report (default)
- 1 – clear last stored failure report

<rep_type>: optional reporting type to enable report extensions. If missed, default=0 (regular). Regular reporting is truncated after <error info> parameter:

- 0 – regular
- 1 – extended with failure cell identity (EARFCN, PCI, PLMN, TAC)

<module>: protocol layer or protocol entity

- “NAS-EMM”
- “NAS-ESM”
- “PDM”
- “RRC”
- “PDCP”
- “RLC”

- "MAC"
- "L1A"

<procedure>: protocol defined procedure

For NAS-EMM:

- "ATTACH"
- "DETACH"
- "TAU"
- "SERREQ" - service request
- "AUTH"

For NAS-ESM:

- "PDN_CONN"
- "PDP_ACT"
- "PDP_DEACT"

For PDM:

- "IPV6_RA"

For RRC:

- "CONN_EST"

For PDCP:

- TBD

For RLC:

- TBD

For MAC:

- TBD

For L1A:

- TBD

<failure>:

- "REJECT"
- "MAXRETRY"
- "BARRING"
- "UNEXPECTED"

<reject cause>: as per protocol definition

For NAS-EMM and NAS-ESM:

- #X – numeric value of reject code prefixed with “#”

For RRC:

- 1 - Access class barring
- 99 - Other

<error info>:

It is an arbitrary error information text, determined by the UE manufacturer and containing additional information about failure. For reject it may contain textual definition of reject code.

<earfcn> - cell EARFCN

<pci> - cell PCI

<oper> - string format; cell PLMN encoded as defined for AT+COPS (in quotes)

<tac> - hexadecimal value; as defined to AT+CEREG (in quotes)

5.2.24 AT%SETACFG

Command	Possible Response(s)
AT%SETACFG=<param file name>.<param section>.<param name>	OK/ERROR
AT%SETACFG?	ERROR (OPRATION_NOT_ALLOWED)
AT%SETACFG=?	%SETACFG: (list of supported <param>)

Description

Set a configuration field to Open Platform Configuration manager. This command uses the linux UCI engine, meaning each parameter from one of the configuration files (located in “/etc/config/”) can be overridden using this command. Command parameters (separated by '.') define the path to the parameter as described above.

5.2.25 AT%GETACFG

Command	Possible Response(s)
AT%GETACFG=<param file name>.<param section>.<param name>	%GETACFG: <param_value>
AT%GETACFG?	ERROR (OPRATION_NOT_ALLOWED)
AT%GETACFG=?	%GETACFG: (list of supported <param>)

Description

Get configuration from Open Platform Configuration Manager. This command uses the linux UCI engine, meaning each parameter from one of the configuration files (located in “/etc/config/”) can be read using this command. Command parameters (separated by '.') define the path to the parameter as described above.

5.2.26 AT%TSTEXT

Command	Possible Response(s)
AT%TSTEXT=<cmd>[,<param>]	For <cmd>="CLOCK32": %TSTEXT: <freq_error>
AT%TSTEXT?	ERROR (not supported)
AT%TSTEXT=?	OK

Description

Test AT command is intended for external circuits test mode.

Command is not accepted in operational mode (AT+CFUN=1) and flight mode (CFUN=4) and returns ERROR. The modem shall be previously switched in non-operational mode by CFUN=0.

Read command is not supported.

Defined Values

<cmd>:

- "CLOCK32" – measures frequency error for 32kHz crystal

<param> - test duration in ms:

- 20-10,000

<freq_error>- frequency error in ppm (parts per million) related to the default frequency of 32.768kHz

Implementation Notes:

The formula for <freq_error>:

- A - expected freq
- X - measured freq
- freq_error= $((X-A)*1000000)/A$

5.2.27 AT%OTPCMD

Command	Possible response
AT%OTPCMD=<cmd> [<otp_object>[,<value>]]	For <cmd>="RD" (query): %OTPCMD:<otp_object>,<value> For <cmd>="GETLOCK": %OTPCMD:<otp_object>,<lock_state> OK or ERROR
AT%OTPCMD?	%OTPCMD: error=<error>
AT% OTPCMD=?	%OTPCMD: (list of supported <cmd>s), (list of supported <otp_object>s)

Description

This command is used for OTP parameters filling at Production time.

The query command ("RD") is supported for declared <otp_object>s not only at Production time.

For secured data the query command may return ERROR for some parameters at Production time too (for Master Key, for example).

If OTP memory is not locked at Production time, the OTP data may be filled into OTP memory at later stages (post-production, pre-sales).

Since improper OTP handling may cause OTP memory corruption and chip lost, the command is considered as very risky. For more protection from arbitrary OTP parameters write, the separate command to enable OTP modification shall be entered as pre-condition. This enabling command forces customer to send a sequence of 2 AT commands to initiate first OTP parameter write.

Any OTP parameter Shall be written only once.

The write command ("WR") for some joined parameters has restricted order of writing to protect further device stuck at wakeup with partially filled joined parameters.

The lock operation shall specify <otp_object> of the locked block, i.e.:

AT%OTPCMD= "LOCK", "IMEI"

The multi-locking state cannot be reflected in "AT%OTPCMD?" response.

To retrieve locking status of specified block the AT%OTPCMD="GETLOCK", <otp_object> shall be used instead.

Defined Values

<cmd>:

- "EN" – Enable OTP writing. Once enabled, one or more OTP parameters may be written to non-locked OTP area.
- "WR" – Write new OTP parameter value
- "RD" – Query current OTP parameter value
- "LOCK" – Locks and disables further write operations. The <otp_object> parameter shall be always specified to select block to be locked:

- “IMEI”
- “MK”
- “ODM3” – “ODM7”
- “LOCKMCU” – Locks and disables MCU OEM area of OTP writing.
- “GETLOCK” – Retrieves lock status for blocks identified by their favorite object:
 - “IMEI”
 - “MK”
 - “ODM3” – “ODM7”

<otp_object> - string name of the field:

- “IMEI” – IMEI value (15 bytes).
- “MK” – Master Key value. (16 bytes)
- “CHIPID”- chip ID, read only. Size: 40 bits.
- “ODM3” – “ODM6” - Module ODM customer data (up to 128 bytes)
- “ODM7” - Module ODM customer data (up to 127 bytes)

<value> :

- hexadecimal format for byte memory blocks in quotes
- binary bit(s) value in quotes

<lock_state>:

- 0 – unlocked
- 1 – locked

<error> - error of last execute command (last write or lock operation):

- 0 – no errors
- 1 – OTP access errors
- 2 – attempt to lock already locked OTP
- 3 – missed mandatory IMEI, returned on attempt to lock “IMEI” object
- 4 – missed mandatory Master key, returned on attempt to lock “MK” object
- 5 – attempt to write already written <otp_object>
- 6 – illegal write order
- 7 – illegal value

Examples

This will be typical OTP filling flow (if Master Key is not used):

1. Enable OTP write access first:

AT%OTPCMD=”EN”

OK

2. Check Failure:

AT%OTPCMD?

AT%OTPCMD: error=5

OK

3. Lock SW OTP:

%OTPCMD="LOCK","IMEI"

OK

%OTPCMD="LOCK","MK"

OK

4. Check Locking Status:

AT%OTPCMD?

AT%OTPCMD: error=0

OK

AT%OTPCMD="GETLOCK","IMEI"

%OTPCMD:"IMEI",1

OK

AT%OTPCMD="GETLOCK","MK"

%OTPCMD:"MK",1

OK

5.2.28 AT+VZWAPNE

Command	Possible response
AT+VZWAPNE=<wapn>,<apncl>,<apnni>,<apnype>,<apnb>,<apned>	+CME ERROR: <err>
AT+VZWAPNE?	+VZWAPNE: <apncl>1,<apnni>1,<apnype>1,<apnb>1,<apned>1, <apncl>2,<apnni>2,<apnype>2,<apnb>2,<apned>2,..., <apncl>n,<apnni>n,<apnype>n,<apnb>n,<apned>n +CME ERROR: <err>
AT+VZWAPNE=?	+VZWAPNE: (list of supported <wapn>s), (list of supported <apncl>s), (list of supported <apnni>s), (list of supported <apnype>s), (list of supported <apnb>s), (list of supported <apned>s) +CME ERROR: <err>

Description

Write command causes the APN table on the CFGM to be overwritten. One write command must be issued for each APN edit. If command fails, +CME ERROR: <err> is returned. Refer to 3GPP TS 27.007 subclause 9.2 for <err> values.

The command is applicable only when operator=VZW and in “Lab mode” (config/modem_apps=>Mode.LabMode = “true”).

Usage

Read command queries the APN table that is currently on the DUT, starting from the first entry to the last. The numbers following each value (for example the numbers “1”, “2”, & “n” in the following cases: “<apncl>1”, “<apncl>2”, “<apncl>n”) indicate from which of the available APNs the entry is from. The maximum number of APNs being “n”.

If command fails, +CME ERROR: <err> is returned. Refer to 3GPP TS 27.007 subclause 9.2 for <err> values.

Test command returns the supported entry values. If command fails, +CME ERROR: <err> is returned. Refer to 3GPP TS 27.007 subclause 9.2 for <err> values.

See the APN’s section of the Verizon Wireless document “Device Requirements – LTE 3GPP Band 13 Network Access” for more information on the APN table.

Defined Values

<wapn>: Integer type; Indicates which APN entry to edit. The maximum number of APNs being “n”:

- 0 - Take no action
- 1 - Edit APN entry #1
- 2 - Edit APN entry #2
- 3 - Edit APN entry #3
- 4 - Edit APN entry #4
- n - Edit APN entry # n

<apncl> : Integer type; Indicates the APN Class. The maximum number of APNs being “n”:

- 1 - APN Class #1
- 2 - APN Class #2
- 3 - APN Class #3
- 4 - APN Class #4
- n - APN Class # n

<apnni> : String type; Indicates the Network Identifier

- VZWIMS - Verizon Wireless IMS PDN
- VZWADMIN - Verizon Wireless Administrative PDN
- VZWINTERNET - Verizon Wireless Internet PDN
- VZWAPP - Verizon Wireless Application PDN

<apntype> : String type; APN type

- IPv6 - IPv6 type
- IPv4v6 - IPv4 and IPv6 type

<apnb> : String type; APN Bearer

- LTE - LTE bearer used

<apned> : String type; Enable/Disable the APN

- Enabled - The APN is enabled
- Disabled - The APN is disabled

5.2.29 AT+VZWRSRP

Command	Possible response
AT+VZWRSRP=	ERROR
AT+VZWRSRP?	+VZWRSRP: <cellID>1,<EARFCN>1,<RSRP>1,<cellID>2, <EARFCN>2,<RSRP>2,...,<cellID>n, <EARFCN>n,<RSRP>n OK or +CME ERROR: <err>
AT+VZWRSRP=?	OK

Description

Execution command is not supported.

Read command returns the RSRP values for all cells which the UE is measuring.

The device shall support this command in both RRC_IDLE and RRC_CONNECTED modes.

If command fails, +CME ERROR: <err> is returned. If device is not in RRC_IDLE or RRC_CONNECTED mode, the “+CME ERROR: operation not allowed” is reported as per 3GPP TS 27.007 subclause 9.2 for <err> values.

Defined Values

<cellID>:

- Integer type; Cell ID where the format is XXX

<EARFCN>:

- Integer type; EARFCN for given cell where EARFCN is per 3GPP TS 36.101

<RSRP>:

- String type; RSRP value where the format is -XXX.XX dBm/15kHz (also supported –XX.XX format and –X.XX format)

5.2.30 AT+VZWRSRQ

Command	Possible response
AT+VZWRSRP=	ERROR
AT+VZWRSRQ?	+VZWRSRQ: <cellID>1,<EARFCN>1,<RSRQ>1,<cellID>2, <EARFCN>2,<RSRQ>2,...,<cellID>n, <EARFCN>n,<RSRQ>n OK or +CME ERROR: <err>
AT+VZWRSRQ=?	OK

Description

Execution command is not supported.

Read command returns the RSRQ values for all cells which the UE is measuring.

The device shall support this command in both RRC_IDLE and RRC_CONNECTED modes.

If command fails, +CME ERROR: <err> is returned. If device is not in RRC_IDLE or RRC_CONNECTED mode, the “+CME ERROR: operation not allowed” is reported as per 3GPP TS 27.007 subclause 9.2 for <err> values.

Defined Values

<cellID>:

- Integer type; Cell ID where the format is XXX

<EARFCN>:

- Integer type; EARFCN for given cell where EARFCN is per 3GPP TS 36.101

<RSRP>:

- String type; RSRQ value where the format is -XX.XX dBm/15k

5.2.31 AT%PDNACT

Command	Possible Response(s)
AT%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

<act> : Numeric value, indicates the required action

- 0 – deactivate
- 1 – activate

<sessionID> - numeric value of session identifier defined in NP config file

<apnname> : String type; indicates the APN name configured for PDN.

<stat> : Numeric value, indicates the actual PDN state

- 0 – non-active
- 1 – active

5.2.32 AT%APNN

Command	Possible Response(s)
%APNN=<apnname>	OK/ERROR
%APNN?	%APNN: <apnname>
%APNN=?	OK

Description

Allow user to change the APN name of the PDN which is used by the host (usually the Internet PDN). This command doesn't allow the user to change APN name of the other PDNs which are in the control of the operator.

An APN consists of two parts:

- Network Identifier: Defines the external network. This part of the APN is mandatory
- Operator Identifier: Defines the specific operator's packet domain network. This part of the APN is optional.

Verizon require that the APN name will include only the APN Network Identifier part (APNNI) and not the Operator Identifier. Other operator can request to use also the Operator Identifier.

Defined Values

- <apnname>: String type; Indicates the APN name. For Verizon the default APN name is Network identifier: VZWINTERNET

5.2.33 AT%STATCM

Command	Possible Response(s)
AT%STATCM=<mode>	OK or ERROR
AT%STATCM?	%STATCM: <mode>
AT%STATCM=?	%STATCM: (list of supported < mode>s)
(unsolicited report)	%STATCM: <event>[,<param>]

Description

The command is used to report state changes in the eCM to the host. The reported states changes are currently limited to registration state and the state of external PDNs (i.e. those PDNs which are not terminated in the device).

The reporting is disabled by default at wakeup time.

Defined Values

<mode> - status of unsolicited result response presentation:

- 0 – disabled (default)
- 1 – enabled

<event>:

- 0 – LTE deregistered
- 1 – LTE registered (In case of internal IMS client, this indicates also the completion of IMS registration)
- 3 – PDN connected (<param> is used as <sessionID>)
- 4 – PDN disconnected (<param> is used as SessionID)
- 5 – PDN configuration changed (<param> is used as <SessionID>)
- 6-99 – Reserved

<param>:

For <event> values 3,4,5 the <param> is used as <sessionID>. The <sessionID> is used for numbering of external PDNs exposed to the user. See also in command AT%PDNSET.

5.2.34 AT%SETURLIP

Command	Possible Response(s)
AT%SETURLIP =<URL>,<iptype>,<ipaddr>	OK/ERROR
AT%SETURLIP?	ERROR (not supported)
AT%SETURLIP=?	%SETURLIP:<URL>,<iptype>,<ipaddr>

Description

The command is used to configure the resolved IP address (V6 or V4) of specific URL. The command is used as an helper to NP whenever it is not able to resolve it by itself but still has to access the URI (e.g. when LTE is disabled and host connectivity is over WiFi).

Defined Values

<ipaddr>: string

IP address of host for transferring log via socat or NFS. If no secondary <rpath> parameter is supplied, then socat is used. If secondary <rpath> parameter is supplied, then NFS is used

<iptype>: string

- IPv6 - IPv6 type
- IPv4 - IPv4 type

<URL>: string

Known as web address

Example

AT%SETURLIP="4g.dmserver.operator_name.com", "IPV4", "212.35.345.32"

5.2.35 AT%PDNSET

Command	Possible Response(s)
AT%PDNSET=<ext_sessionID>,<apnname>,<ip_type>,<ppp_auth>,<user>,<passw>,<host_name>,<IPv4AddrAlloc>,<pcscf_disc overy>,<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>]
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:

1. In both command and response, a parameter which is not specified will be written as ","
2. 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

<ext_sessionID> - numeric value of the session identifier which is configured and used by external application or host and defined in NP config file

<apnname> - string type; indicates the APN name configured for PDN.

<ip_type> - string type:

- “IP”
- “IPv6”
- “IPv4v6”

<ppp_auth> - string type; PPP authentication type:

- “NONE”
- “PAP”
- “CHAP”

<user>- string type; username used for authentication.

<passw> - string type; password used for authentication.

<host_name> - string type. Optional, the name of the Authentication server.

<pcscf_discovery>: decimal

- 0 – disable
- 1 – Enable

<IPv4AddrAlloc>: integer type; controls how the host requests to get the IPv4 address information (same as defined in AT+CGDCONT)

- 0 - IPv4 address allocation through NAS signalling
- 1 - IPv4 address allocated through DHCP

<NSLPI>: integer type; indicates the NAS signalling priority requested for this PDP context as defined in AT+CGDCONT in 3GPP 27.007

5.2.36 AT%PDNRDP

Command	Possible Response(s)
AT%PDNRDP=<ext_sessionID>	[%PDNRDP: <ext_sessionID>,<bearer_id>,<apn>[,<local_addr and subnet_mask>[,<gw_addr>[,<DNS_prim_addr>[,<DNS_sec_addr>[,<P-CSCF_prim_addr>[,<PCSCF_sec_addr>]]]]]]]
AT%PDNRDP?	ERROR (not supported)
AT%PDNRDP=?	OK

Description

The execution command returns the relevant information for an active PDN identified by <ext_sessionID>. The format of the command is aligned with the standard command AT+CGCONTRDP per release 10.

Defined Values

<ext_sessionID>: Integer

A numeric value of the session identifier which is configured and used by external application or host and defined in NP config file

All other parameters are defined in AT+CGCONTRDP in 3GPP TS27.007 release 10.

5.2.37 AT%DATACMD

Command	Possible Response(s)
AT%DATACMD=<cmd>	OK or ERROR
AT%DATACMD?	%DATACMD: <general_flag>, <roaming_flag>
AT%DATACMD=?	%DATACMD: (list of supported <cmd>s)

Description

The command is used to block and unblock user data traffic in different conditions.

By default, all user data traffic is enabled.

Note that general user data transfer flag (toggled by “DISABLE”/ “ENABLE”) and data transfer at roaming flag (toggled by “DISABLEROAM”/ “ENABLEROAM”) may be independently enabled/disabled. Internally the flags will be applied together to data transfer as per next rules:

	“DISABLE”	“ENABLE”	“DISABLEROAM”	“ENABLEROAM”	Data Transfer
Home	0	1	0	1	Yes
	0	1	1	0	Yes
	1	0	0	1	No
	1	0	1	0	No
Roaming	0	1	0	1	Yes
	0	1	1	0	No
	1	0	0	1	No
	1	0	1	0	No

Defined Values

<cmd>:

- “DISABLE” – disable all user data
- “DISABLEROAM” – disable all user data at roaming
- “ENABLE” – enable all user data
- “ENABLEROAM” – enable all user data at roaming

<general_flag>:

- “DISABLE” – disable IMS connectivity
- “ENABLE” – enable IMS connectivity

<roaming_flag>

- “DISABLEROAM” – disable IMS connectivity at roaming
- “ENABLEROAM” – enable IMS connectivity at roaming

5.2.38 AT%CMGWC

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

Description

The standard AT+CMGW command, defined in 3GPP 27.00, return single storage location index and assume that concatenation is handled by the host, therefore only small SMS segments are used by the standard AT+CMGW command.

The AT%CMGWC command is the same as AT+CMGW but extended to allow the host to write large SMS to storage. In case that concatenation is required, it is fully handled by the device which return list of indexes represents the storage location of each SMS fragment.

In order to send the SMS from storage, the host is required to send each of the returned indexes by using the standard command AT+CMSS.

Defined Values

Please refer to section 3.5.3 of 3GPP 27.005.

5.2.39 AT%CMGSC

Command	Possible Response(s)
if text mode (+CMGF=1): +CMGSC=<da>[,<toda>]<CR> text is entered<ctrl-Z/ESC>	if text mode (+CMGF=1) and sending successful: +CMGSC: <mr>[,<mr> ...] if sending fails: +CMS ERROR: <err>
%CMGSC=?	

Description

The standard AT+CMGS command, defined in 3GPP 27.00, return single message reference index and assume that concatenation is handled by the host, therefore only small SMS segments are used by the standard AT+CMGS command.

The AT+CMGSC command is the same as AT+CMGS but extended to allow the host to send large SMS to network. In case that concatenation is required, it is fully handled by the device which returns a list of message-references, each is a reference of a single SMS fragment.

If delivery report has been requested by the sender, then it should be received for each SMS fragment. Each delivery report confirms reception of single <mr>. The host shall assume reception of SMS by the peer only if it received delivery report for all the <mr> of the SMS

Defined Values

Please refer to section 3.5.1 of 3GPP 27.005.

5.2.40 AT%CSGCMD

Command	Possible Response(s)
AT%CSGCMD=<cmd> [,<mode>[,<csg_id>,<oper>]]	For "SEARCH": [%CSGCMD: <oper>,<csg_id>[,<hnb_name>] [<CR><LF> %CSGCMD: <oper>,<csg_id>[,<hnb_name>]] ...]
AT%CSGCMD?	ERROR (not supported)
AT%CSGCMD=?	OK

Description

This AT command provides opportunity to search and select CSG cell.

The "SEARCH" is blocking command and will return only after whole scanning will be executed. If no CSG cells were found, command will return empty list followed by OK.

The "SELECT" is also blocking command. If cell selection procedure is failed, command returns ERROR.

Defined Values

<cmd>:

- "SEARCH" – perform search for available CSGs.
- "SELECT" – perform manual CSG selection.

<mode>:

- 0 – automatic CSG selection - currently not supported, FFU.
- 1 – manual CSG selection.

<csg_id> - decimal, CSG Identity

<oper> - string format, cell PLMN encoded as defined for AT+COPS.

<hnb_name> – string format, Home eNB name encoded in SIB9 (string size up to 48 symbols)

1. Search:

```
AT%CSGCMD="SEARCH"
%CSGCMD: "00101",10,"3gppTest CSG4"
%CSGCMD: "00102", 4
OK
```

2. Select:

```
AT%CSGCMD="SELECT",1,10,"00101"
```

OK

5.2.41 AT%CMGWS

Command	Possible Response(s)
AT%CMGWS=<index>,<stat>	OK or ERROR
AT%CMGWS?	ERROR (not supported)
AT%CMGWS=?	OK

Description

Execution command updates the status of entry <index>.

Defined Values

<index>: integer value of SMS index

- Range: 1 – total1, where total1 may be retrieved by AT+CPMS

<stat>: integer type in PDU mode (default 0), indicates the status of message in memory; Defined Values

- 0 - received unread message (i.e. new message)
- 1 - received read message
- 2 - stored unsent message
- 3 - stored sent message

5.2.42 AT%CBCMD

Command	Possible Response(s)
AT%CBCMD=<cmd>[,<mode[,<earfcn>,<pci>[,<earfcn>,<pci>]...]]]	OK or ERROR
AT%CBCMD?	ERROR (Not supported)
AT%CBCMD=?	OK

Description

The command configures blocked cell (or Black List – BL) parameters. Command is accepted only in detached (unregistered) state. If device is in operational mode (CFUN=1) and deregistered state, the command also triggers LTE procedures, which shall be finished in camping on one of the cells other than BL?

Once BL cell info parameters are settled, they will be kept forever up to next reboot. This means that for next AT command call to enable Cell Block the cell info parameters (<earfcn>, <pci>) may be omitted, while <mode> shall be always defined

Defined Values

<cmd>:

- 0 – Disable cell block (default)
- 1 – Enable cell block

<mode>:

- 0 – Cell block for any scan procedure applied in unregistered state only. Once registered, device will follow all 3GPP rules for any mobility procedure (scan for PLMN re-selection, cell reselection, cell redirection, measurements, RLF triggered scan, etc.).
- 1 – Cell block for scan and mobility. All 3GPP mobility procedures (see above) will be executed only for cells, which are not in BL.

<earfcn> - cell EARFCN

<pci> - cell PCI

5.2.43 AT%CCLK

Command	Possible Response(s)
AT%CCLK=[<time>][,[<dst>][,<lattermode>]]	OK/ERROR
AT%CCLK?	%CCLK: <time>[,<dst>[,<utc>[,<leap>]]]
AT%CCLK=?	OK

Description

The command is used to extend standard AT+CCLK command for DST (Daylight Saving time) parameter.

The optional <dst> parameter is reported only if provided in NAS message.

The rules to update system time from different sources are controlled by <lattermode> parameter. The NAS system time applicability is also controlled by standard AT+CTZU. To modify only the rule this AT command may be called in reduced format:

AT%CCLK=,,<lattermode>

Defined Values

<time>: as encoded in +CCLK response defined in 27.007
(yy/mm/dd,hh:mm:ss±zz)

<dst>: integer type value indicating whether <time> includes daylight savings adjustment;

- 0 <time> includes no adjustment for Daylight Saving Time
- 1 <time> includes +1 hour adjustment for daylight saving time
- 2 <time> includes +2 hours adjustment for daylight saving time

<lattermode> - integer; modifies the default system time update policy (0) and run-time switch between modes:

- 0 – Fixed order of system timer settings (default); system timer settings are applied in fixed priority order: lower priority source never update last higher priority setting:
 - CCLK (highest priority – user set)
 - SIB16 (since it is more accurate than EMM)
 - EMM information (lowest priority)
- 1 – Enable latter mode, which means last setting is always applied

<utc>: The timeInfoUTC as encoded in SIB16 (UTC time in 10msec units counted since 00:00:00 on 1 January, 1900).

<leap>: The leap seconds offset between GPS Time and UTC

5.2.44 AT%CLCMD

Command	Possible Response(s)
AT%CLCMD=<cmd>[,<mode[,<earfcn>,<pci>,[<oper>] [,<earfcn>,<pci>,[<oper>]]...]]]	OK or ERROR
AT%CLCMD?	ERROR (not supported)
AT%CLCMD=?	OK

Description

The command configures Cell Lock and WL parameters. Command is accepted only in detached (unregistered) state. If device is in operational mode (CFUN=1) and deregistered state, the command also triggers LTE procedures, which shall be finished in camping on one of the cells from WL.

Once WL cell info parameters are settled, they will be kept forever up to next reboot. This means that for next AT command call to enable Cell Lock the cell info parameters (<earfcn>, <pci>, <oper>) may be omitted, while <mode> shall be always defined.

Defined Values

<cmd>:

- 0 – disable cell lock (default)
- 1 – enable cell lock

<mode>:

- 0 – cell lock for any scan procedure applied in unregistered state only. Once registered, device will follow all 3GPP rules for any mobility procedure (scan for PLMN re-selection, cell reselection, cell redirection, measurements, RLF triggered scan, etc.).
- 1 – cell lock for scan and mobility. All 3GPP mobility procedures (see above) will be executed within White List cells only.

<earfcn> - cell EARFCN

<pci> - cell PCI

<oper> - string format, cell PLMN encoded as defined for AT+COPS

Example

1. Trigger first scan with cell lock:

AT%CLCMD=1,0,1500,32,"42502"

OK

2. Disable cell lock:

AT%CLCMD=0

OK

3. Repeat cell lock scanning using already defined cell list:

AT%CLCMD=1,0

OK

5.2.45 AT%DNSRSLV

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

<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

<ip_type>: decimal

- 0 – IPv4
- 1 – IPv6

<ip_addr>: string

- IPv4 or IPv6 resolved address

5.2.46 AT%GETPROP

Description

Get configuration from PROP file stored into NV memory.

Usage

AT%GETCFG=<fname>[,<param1>[...]]

<fname> - string; PROP file field name

Implementation Notes:

Command is intended to provide a way to get a single parameter of PROP file only. The PROP RW parameters are supported by pair of symmetric parameters in AT%SETPROP and AT%GETPROP.

It is not recommended to compose more than one parameter into single get operation if it is not an array.

It is also recommended to show the returned value exactly in the same form, as it is stored in PROP file except of special cases (i.e. IMEI). The digital values meaning may be added to specific set <paramx> description.

Returned IMEI is always read from PROP. The IMEI in use (PROP or OTP) is available by AT%GETID.

Purpose	<fname>	<param1>...	Returns
Reads SVN stored value	"SVN"		0 - 98
Reads IMEI stored value	"IMEI"		String (15 digits) in quotes

5.2.47 AT%SETPROP

Description

Set configuration to PROP file stored into NV memory.

Usage

AT%SETCFG=<fname>[,<param1>[...]]

<fname> - string; PROP file field name

Implementation Notes:

Command is intended to provide a way to set a single parameter of PROP file only.

It is not recommended to compose more than one parameter into a single set operation if it is not an array.

It is also recommended to encode the parameter value exactly in the same form, as it is stored in PROP file (digital values, ordinary). The digital values meaning may be added to specific setter <paramx> description.

There is no need to encode all decimal values in quotes as we keep in AT%SETCGG for backward compatibility.

Purpose	Param1	Param2	Param3	Param4	Param5
Sets SVN value	"SVN"	0 - 98			
Set IMEI value	"IMEI"	String (15 digits) in quotes			

5.2.48 AT%GETSPN

Command	Possible Response(s)
AT%GETSPN	%GETSPN:<displayPolicy>[,<SPN>,<PLMN>] OK or ERROR
AT%GETSPN?	ERROR Not supported
AT%GETSPN=?	OK

Description

The command is intended to retrieve service provider display policy and service provider name from SIM EFSPN file. The display condition in SIM file depends on the type of RPLMN (HPLMN or VPLMN). The AT%GETSPN command output reflects resulting display policy for current RPLMN, and not a “Display Condition” binary value from EFSPN, which may be retrieved by AT+CSIM/CRSM, if needed.

If device is not registered, the “Unknown” (0) policy is returned.

Defined Values

<displayPolicy>:

integer type; it returns value for display policy as defined in TS 31.102 for specific RPLMN type. “Optional” policy reflects preferred choice between PLMN and SPL, but selection of this option is not mandated in TS31.102.

- 0 - Unknown
- 1 - Show PLMN mandatory
- 2 - Show PLMN optionally
- 3 - Show SPN mandatory
- 4 - Show SPN optionally

<SPN>:

- string type; it reflects the SPN value from SIM EFSPN file. For missed or improperly encoded SPN string in SIM the empty string ("") will be shown. For “Unknown” policy (0) the <SPN> parameter may be omitted.

<PLMN>:

- string type; PLMN name in long alphanumeric format up to 16 characters long (refer GSM MoU SE.13 [9]). For “Unknown” policy (0) the <PLMN> parameter may be omitted.

5.2.49 AT%LBSCMD

Command	Possible Response(s)
AT%LBSCMD=<cmd>	For "MLIDS" command: %LBSCMD:<status>,<relTimeStamp>,<ServCellFlag>,<numNeighMeas>,<gcid>,<TimeDifIndex>,<ta>,<mcc>,<mnc>,<tac>,<earfcn>,<cellID>,<sfn>,<rsrp>,<rsrq>[,<earfcn>,<cellID>,<sfn>,<rsrp>,<rsrq>[,...]] [<CR><LF> %LBSCMD: . . .] For "NWTIME" command: %LBSCMD: <sib8present>,<sib16present>
AT%LBSCMD?	ERROR (Not supported)
AT%LBSCMD=?	%LBSCMD: (list of supported <cmd>s)
unsolicited	%LBSCMDU:<ev_type>[,<param1>[,<param2>]]

Description

The command allows client (e.g. SUPL client) to get LBS related information from the LTE modem.

Note:

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

Defined Values

<cmd>: string

"MLIDS" – Reads multiple location IDs from the LTE modem in multiline format. Each line describes single "location ID" which is represented by serving cells and its neighbors on specific timestamp.

<status>: integer

- 0 – stale
- 1 – current
- 2 – unknown

<relTimeStamp>: integer

Time stamp of measured location Id relative to "current Location ID" in units of 0.01 sec. Range from 0 to 65535*0.01 sec. The timestamp for current Location Id if present is 0.

<ServCellFlag>: integer

- 1 – The location ID represents LTE serving cell and its neighbors
- Other values reserved FFU

<gcid>: integer

- The Global cell ID hexadecimal value (See AT%PCONI) of the serving cell

<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.

<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

<earfcn>: integer

- Decimal EARFCN value

<cellID>: integer

- Decimal Physical Cell ID value

<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)

<rsrp>: integer

- RSRP measurements in dbm units

<rsrq>: integer

- RSRQ measurements in 0.5 dB (Q1) units (for example, 2.5 dB = 5)

<numNeighMeas>: integer

- The number of neighbor cell measurements reported within the current "Location ID" (response line)

<cmd> - string:

- "NWTIME" – Enables one-shot NW time notification from SIB8/SIB16. Indicates if these SIBs are expected to be acquired.

<sib8present> - integer:

- 0 – False
- 1 – True

<sib16present> - integer:

- 0 – False
- 1 – True

For <event>:"NWTIME"

<param1> - integer:

- GPS time is a decimal counter of 1msec units counted since 00:00:00 on 6 January, 1980. Since GPS time is not corrected by leap seconds, it is now ahead of UTC by 18 seconds and this difference is not a static value.

<param2> - integer:

- TTI (Transmission Time Interval) – sub-frame counter of the serving cell corresponding to the <param1> GPS time:
- 0 – 10239

5.2.50 AT%LTECMD

Command	Possible Response(s)
AT%LTECMD=<cmd>,<lte_object> [,<param1>...]	For <cmd>=2 (query): %LTECMD: <lte_object>[,<param1>...]
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:

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

Read command is not supported.

Defined Values

<cmd>:

- 1 – Override/toggle current LTE parameter value or negotiate with network new LTE capability/parameter value
- 2 – Query current LTE parameter value in use

<lte_object>:

- “PGCYCLE” – UE individual time interval between monitoring Paging Occasions, used to set UE specific DRX parameter for paging cycle (see 24.008). Actual DRX cycle is determined by the shortest of this UE specific DRX value and a default DRX value broadcast in system information (see 36.304).

<param1>:

- 0 – Return to eNB setting
- 1 – 320 ms
- 2 – 640 ms
- 3 – 1280 ms
- 4 – 2560 ms

<lte_object>:

- “AGAPCAP” – UE Autonomous Gap capability; override command is not supported.

<param1>:

- 0 – Disabled
- 1 – Enabled

<lte_object>:

- “LPP” – enable LPP capability

<param1>:

- 0 – Disabled
- 1 – Enabled

<lte_object>:

- “LCS” – enable LCS capability

<param1>:

- 0 – Disabled
- 1 – Enabled

<lte_object>:

- “NSLPI” – NAS signaling low priority

<param1>:

- 0 – Low priority disabled
- 1 – Low priority enabled

<lte_object>:

- “DHCP” – DHCP assigned parameters. Starting version TBD.

<param1> - cid, same format as defined for <cid> parameter in +CGCONTRDP of TS 27.007.

- This parameter is mandatory for query (2) subcommand.

<param2> - string; address and subnet assigned by DHCP server; same format as defined for <local_addr and subnet_mask> in AT+CGCONTRDP of TS 27.007.

<param3> - string; optional parameter; gateway address provided by DHCP server; same

- format as defined for <gw_addr> in AT+CGCONTRDP of TS 27.007.

<lte_object>:

- “BARSIB1” – Cell Barred restrictions of SIB1.

<param1>:

- 0 – disabled; no override, use network setting
- 1 – enabled; ignore network barring restrictions

<lte_object>:

- “BARSIB2” – Access Class barring restrictions of SIB2.

<param1>:

- 0 – disabled; no override, use network setting
- 1 – enabled; ignore network barring restrictions

<lte_object>:

- “UTC” – Coordinated Universal Time, starting LTESYS-17328

<param1> - integer:

- UTC value defined as the number of milliseconds that have elapsed since 00:00:00, Thursday, 1 January 1970.

<param2> - integer:

- Time Zone value, indicates the difference, expressed in quarters of an hour, between the local time and UTC

<param3> - integer; Daylight Savings adjustment:

- 0 - UTC needs no adjustment for daylight saving time
- 1 - UTC needs +1 hour adjustment for daylight saving time
- 2 - UTC needs +2 hours adjustment for daylight saving time

<param4> - integer:

- Number of leap seconds offset between GPS Time and UTC. UTC and GPS time are related i.e. GPS time - leapSeconds = UTC time

<param5> - integer; indicates UTC source, used only in response of <cmd>=2(query):

- 0 – no UTC acquired from any source
- 1 – user/host setting via AT+CCLK, AT%CCLK or AT%LTECMD="UTC"
- 2 – SIB16 message as per 3GPP 36.331
- 3 – NAS message as per 3GPP 24.008

<param6> - integer; current TTI value, used only in response of <cmd>=2(query).

<lte_object>:

- "PTW" – LTE-specific paging transmission window (eDRX parameter missed in AT+CEDRXRDP), starting LTESYS-17540

<param1>:

- 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

<lte_object>:

- "TXFAILPARAMS" – the object supports retry mechanism defined in txFailParams from SIB2, starting LTESYS-17881

<param1> - integer; retry number, which fits connEstFailCount of txFailParams, if present in SIB2

- 0 – settled value; use SIB2 value or use SW Default (100 retries), if connEstFailCount is missed in SIB2
- 1-300

<param2> - integer; timeout, which fits connEstFailOffsetValidity of txFailParams, if present in SIB2

- 0 – settled value; use SIB2 value or use SW Default (30 sec), if connEstFailOffsetValidity is missed in SIB2
- 1-1000 in sec

<param3> - integer; offset, which fits connEstFailOffset of txFailParams. If omitted, infinity value shall be used for “Qoffsettemp” from 36.304 (see 36.331)

- 0 – 255 dB

<lte_object>:

- “INACTTMR” – Inactivity Timer for RRC state mismatch recovery (LTESYS-18210)

<param1> - 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.

<lte_object>:

- “NWCAPLEN” – limit NW capability encoding length to communicate with new 3GPP Releases forward incompatible eNB/NW. Starting LTESYS-20514.

<param1>:

- 0 – disabled
- 1 – enabled

<param2> - TLV length, mandatory for <param1>=1:

- 1-max 3GPP value from latest releases

<lte_object>:

- “BAND4LAYER” – Indicates whether the UE shall report four layer support for TM3-TM4 capability per band and per-CA, in which the band is involved. Starting LTESYS-21578.

<param1> - band number:

<param2> - four layer support for TM3-TM4:

- 0 – disabled
- 1 – enabled (default)

<param3>, <param5>... - same as <param1>

<param4>, <param6>... - same as <param2>

5.2.51 AT%LTESYNC

Command	Possible Response(s)
AT%LTESYNC=<cmd>[,<config_source>[,<start_tti>,<repetition>[,<interval>[,<pulse_size>[,<alignment>[,<offset>,<offset_condition>]]]]]]]	OK or ERROR
AT%LTESYNC?	ERROR (not supported)
AT%LTESYNC=?	OK

Description

Command is intended to configure, start and stop the pulse issued by UE and synchronized with LTE sub-frames. The HW output pin configuration is assumed as configured in BSP files.

Read command is not supported.

Defined Values

<cmd>:

- “START” – configure and start pulse
- “STOP”

<config_source> - integer:

- 1 – use BSP configuration
- 2 – use AT command config, if this parameter is selected, following 2 parameters are mandatory

<start_tti> - integer; TTI value to start first pulse

<repetition> - integer; pulse repetition value:

- 0 – forever
- 1 or more for final burst of pulses

<interval> - integer; interval in number of TTIs:

- 1 - 10240

<pulse_size> - integer; pulse duration in us (default: 200us, if parameter is omitted):

- 1-200

<alignment> - integer; pulse alignment to RX or TX (takes in account propagation delay):

- 0 – TX
- 1 – RX

<offset> - signed integer; pulse alignment to any additional relative network timing offset from LTE TTI boundary (in usec units). If parameter is omitted, no any additional offset is applied:

- -50 – 50 usec

<offset_condition> - integer; offset adjustment condition:

- 0 – TDD
- 1 – FDD
- 2 – both TDD and FDD

5.2.52 AT%MASTERKEY

Command	Possible Response(s)
AT%MASTERKEY=<masterkey>	OK (always)
AT%MASTERKEY?	ERROR (OPERATION_NOT_ALLOWED) Operation is not supported
AT%MASTERKEY=?	ERROR (OPERATION_NOT_ALLOWED) Operation is not supported

Description

%MASTERKEY was added due to customer request, for the purpose of recovery process without the need for production tool. This command is used to verify the master key when the UE is blocked due to personalization counters overflowed or missing / unauthenticated PRSNP file.

Upon successful verification of the master key – the PRSNP file is automatically re-created with default values. The master key can be entered only one time per boot, following verifications (after the first) will be ignored.

The response for execution command always OK, no matter of the verification real result.

Note: During production, the master key was not burned into OTP, then no verification of any master key will be successful, and recovery process is no possible.

The master key can be only digits, and always 16 digits long..

5.2.53 AT%ALERT

Command	Possible Response(s)
AT%ALERT=<ev_type>,<mode>[,<ev_id>,<cond>[,<val1>[,<val2>]]]	OK or ERROR
AT%ALERT?	ERROR (not supported)
AT%ALERT=?	%ALERT: (list of supported <ev_type>s), (list of <mode>s)
(unsolicited report)	%ALERTU:<ev_type>[,<ev_id>[,<param1>...]]

Description

This command is used for different (emergency or critical) alert notifications from LTE modem to NP/MAP.

For multi-instantiated <ev_type> (more than one <ev_id> within same <ev_type>):

- Last <mode> param setting will be applicable to ALL events of the same <ev_type>.
- Specified instance of such event may be removed by:
AT%ALERT=<ev_type>,<mode>,<ev_id>,0

For repetitive hysteresis type events, the URC will not be sent if the value will oscillate within the interval limited by hysteresis boundaries.

For threshold type events it is recommended to use one-shot URC (followed by polling) to prevent repetitive URCs.

Defined Values

<ev_type>:

- "TEMP" – temperature threshold/hysteresis notification. At least single <cond1> & <val1> setting is mandatory for this alert type.

<mode> - status of unsolicited result response presentation:

- 0 – disabled (default)
- 1 – enabled URC on each occurrence of condition
- 2 – enable one-shot URC. To receive next URC the URC shall be re-enabled again.

<ev_id> - integer type; event ID unique within same <ev_type>:

- 1-3

<cond> - integer type; URC condition. Used also to remove some specific <ev_id> within multi-instantiated <ev_type>:

For any multi-instantiated <ev_type>:

- 0 – remove specified <ev_id> within same <ev_type>

For “TEMP”:

- 1 – hysteresis
- 2 – overflow threshold
- 3 – underflow threshold

<val1> - integer type:

- For “BANDCAP TEMP” - temperature in degrees (°C):
- Single threshold or low hysteresis value

<val2> - integer type:

- For “TEMP” - temperature in degrees (°C):
- High hysteresis value

<param1> - integer type:

- For “TEMP”
 - Current temperature in degrees (°C)

Example

Enable temperature hysteresis URC event #2 with boundaries: low: 55°; high: 65°:

AT%ALERT=“TEMP”,1,2,1,55,65

OK

URC Arrival:

%ALERTU:“TEMP”,2,67

...

%ALERTU:“TEMP”,2,55

5.2.54 AT%CGINFO

Command	Possible Response(s)
AT%CGINFO= <type>,<sessionID>	%CGINFO:<info1> OK/ERROR
AT%CGINFO?	Returns all mapping table rows: [%CGINFO:<sessionID>,<cid>] [<CR><LF>%CGINFO:<sessionID>,<cid>] [...]]
AT%CGINFO=?	OK

Description

Command is intended to query different info about packet domain parameters (extension for AT+CGxxx of 27.007).

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'

If "cid" is queried, the command returns the cid value assigned by modem to the specified session.

The "cid" value may be then used with any of packet domain commands defined in section 10 of 27.007.

Defined Values

<type>:

- "cid"

<sessionID> - numeric value of session identifier defined in NP config file

<info1>:

- For "cid" – numeric cid value

Example

AT%CGINFO="cid",1

%CGINFO: 3

OK

5.2.55 AT%NETSEL

Command	Possible Response(s)
AT%NETSEL=<arch>,<apn_table>	OK or ERROR
AT%NETSEL?	Current APN table
AT%NETSEL=?	<arch [0-99]>,<apn_table_file_name>

Description

Set command forces network architecture selection. In addition, this command selects network specific APN table. The command is accepted only at CFUN=0/4 mode. If UE is in any other mode, the command is discarded and the ERROR is returned.

Defined Values

<arch> - network architecture:

- 0 – default LTE 3GPP-compliant architecture
- 1 – VZW compliant architecture
- 2-99 – Reserved for future use

<apn_table> - APN table file name in textual format

5.2.56 AT%NETUPD

Command	Possible Response(s)
AT%NETUPD=<cmd>,<param>	OK or ERROR
AT%NETUPD?	ERROR (not supported)
AT%NETUPD=?	%NETUPD: (list of supported <cmd>s)

Description

This AT command is intended to enable/disable network override for specified LTE parameters (i.e by EMM messages)..

Defined Values

<cmd>: string

- "NWNAME" – Set the behavior of Network name supplied by AT+COPS.

<param>:

- For "NWNAME": decimal
 - 0 - "AT+COPS?" shows the most updated full network name as required by the 27.007 standard
 - 1 - Prohibit override of network name by EMM message (i.e shown in "AT+COPS?", etc.) even if the EMM information message indicates another Full network name.

5.2.57 AT%NOTIFYEV

Command	Possible Response(s)
AT%NOTIFYEV=<ev_type>,<mode>[,<ev_type>,<mode>[,<ev_type>,<mode>...]]	OK or ERROR
AT%NOTIFYEV?	ERROR (not supported)
AT%NOTIFYEV=?	%NOTIFYEV: (list of supported < ev_type>s), (list of supported < mode>s)
(unsolicited report)	%NOTIFYEV:<ev_type>[,<param1>[,<param2>] ...]

Description

The command is intended to notify Host about important events occurred in LTE device. The reporting may be enabled/disabled per event type. Multiple events may be enabled/disabled by same command call.

The command is compound, which means that <paramN> parameters are <ev_type> specific.

The reporting for all event types is disabled by default at wakeup time.

Read command is not supported.

Note: "LTIME" indication for time change in the "FW" is based on "time-priority" as follows:

- CCLK (highest priority – user set)
- SIB16 (since it is more accurate than EMM)
- EMM information (Lowest priority)

Example 1

If time was set with "CCLK", then there will be no time change and no "LTIME" indication in case of later SIB16 or EMM information reception of time change

Example 2

If time was set with SIB16 there will be no time change and no "LTIME" indication in case of later reception of EMM information

Example 3

If time was set with SIB16 there and later User set the time with CCLK. Time will be changed according to CCLK and "LTIME" indication will be sent.

Defined Values

<ev_type>:

- o "LTIME" –Time change in FW. Could be a result of SIB16 change, EMM-information (NITZ) or user change with +CCLK command or %CCLK command.

- “SIMREFRESH” – SIM refresh occurred. The event is sent in addition to AT%SIMREFRESH response. It is used to notify other than refresh issuer (CAT ordinary) NP applications (IMS, etc.) or/and external Host (such as Android) about SIM refresh event.
- “WDIS” – W_DISABLE signal state change, starting v4.5.6.10
- “SIMD” – SIM inserted/removed state change, starting v5.0.2
- “SIMREADY” – SIM ready event, which is sent once “Ready” state reported by “AT+CPIN?”, but only if PIN unlock was required and succeeded.
- “ROAM” – current PLMN camping/connection state was changed between HPLMN/EHPLMN and VPLMN
- “CSPS” – enable notification on switches between PS and CS/PS modes in the modem
- “SIMSTATE” - reports that the UICC entered a new state during start-up or that the UICC ended startup and entered active state.
- “MANSTUCK” - reports about repetitive attach attempt rejections for user selected PLMN in Manual mode.
- “RRCSTATE” – reports about any RRC layer state change
- “SIB1” – reports any SIB1 arrival and processing in MAC.
- “SIB2” – reports any SIB2 arrival and processing in MAC.
- “ALL” – enables/disables all event types. This event type cannot be sent in unsolicited reporting.

<mode> - status of unsolicited result response presentation:

- 0 - disabled (default)
- 1 – enabled

<param1>:

For “LTIME”: <time> as encoded in +CCLK response defined in 27.007 (yy/mm/dd,hh:mm:ss±zz)

For “SIMREFRESH”: <isRestart> as encoded in %SIMREFRESH command

For “WDIS”: W_DISABLE line changed status:

- 0 – false (enable signal detected)
- 1 – true (disable signal detected)

For “SIMD”: changed status:

- 0 – removal signal detected
- 1 – insertion signal detected

For "ROAM": changed status:

- 0 – moved to Home PLMN (HPLMN/EHPLMN)
- 1 – moved to roaming PLMN (VPLMN)

For "CSPS":

- 0 - moved to PS mode
- 1 - moved to CS/PS mode

For "SIMSTATE":

- 1 – SIM init passed, wait for PIN unlock
- 2 – Personalization failed, wait for run-time depersonalization
- 3 – Activation completed. Event is sent once "Ready" state reported by "AT+CPIN?" is achieved. Event is sent always at any SIM activation completion.

For "RRCSTATE":

- 0 – RRC Idle
- 1 – RRC Connected
- 2 – RRC Unknown. Applicable for all LTE-disabled device states (init, standby, flight mode, etc.)

<param2>:

For "SIMREFRESH": <RefreshType> as encoded in 102.223 sec.8.6:

- 0 = NAA Initialization and Full File Change Notification;
- 1 = File Change Notification;
- 2 = NAA Initialization and File Change Notification;
- 3 = NAA Initialization;
- 4 = UICC Reset;
- 5 = NAA Application Reset;
- 6 = NAA Session Reset;
- 7 = Steering of Roaming

For "LTIME": <dst> as encoded in %CCLK response defined in current document.

<param3>:

For "SIMREFRESH": <AID> as encoded in %SIMREFRESH command, starting v5.0.2:

For "LTIME": <netname> as long alphanumeric format (up to 16 characters long as defined in 10.5.3.5a in 3GPP TS 24.008) which received in NITZ IE as a part of EMM INFORMATION message. The "LTIME" notification will arrive without network name parameter whenever it is not supplied by network EMM information message"

Implementation Notes:

Command is proposed for future extensions with different events sent by different LTE subsystems.

Example

```
%NOTIFYEV:"LTIME","12/05/06,22:10:00+02",0,"Verzion"  
%NOTIFYEV:"SIMREFRESH",1
```

5.2.58 AT%PBCMD

Command	Possible Response(s)
AT%PBCMD=<cmd> [,<param1> [,<param2>]]	<p>For "DELALL": OK or ERROR</p> <p>For "GASR": AT%PBCMD:<cmd>,<index1>,<text>[<CR><LF>%PBCMD: <index2>,<text>[...]]</p> <p>For "GASW": AT%PBCMD:<cmd>,<Windex>,<Wtext></p> <p>For "STATUS": %PBCMD: <adn_num>,<sne_size>,<sne_free>,<gas_size>,<gas_free>,<grp_size>,<grp_free>,<iap_size>,<iap_free>,<aas_size>,<aas_free>,<pbc_size>,<pbc_free>,<ext1_free>,<mail_size>,<mail_free>,<mail_len>,<sec_name_len>,<anr_size>,<anr_free>[,<anr_size>,<anr_free>]] [<CR><LF>%PBCMD: <adn_num>,<sne_size>,<sne_free>,<gas_size>,<gas_free>,<grp_size>,<grp_free>,<iap_size>,<iap_free>,<aas_size>,<aas_free>,<pbc_size>,<pbc_free>,<ext1_free>,<mail_size>,<mail_free>,<mail_len>,<sec_name_len>,<anr_size>,<anr_free>[,<anr_size>,<anr_free>]]]</p>
AT%PBCMD?	%PBCMD:<cachestat>
AT%PBCMD=?	%PBCMD:(<RminIndex> - <RmaxIndex>), (list of supported <Windex>s),<tlength>

Description

The following AT command handle Phonebook commands.

Defined Values

<cmd>: string

- "DELALL" – Execution command deletes all phonebook entries in the current phonebook memory storage selected with +CPBS.
- "GASR" - returns grouping information Alpha String (GAS) USIM file Entries in location number range [Sindex,Eindex]. If Eindex is not specified, only location Eindex is returned.
- "GASW" - writes grouping information Alpha String (GAS) USIM file entry in location number Index.
- "STATUS" – retrieves structure and current status of Phone Book. The second EF_AN will be reported if present on SIM.

<param1>:

For "GASR":

- Sindex - integer type, Start index value of the location number range of GAS.

For "GASW":

- Windex - integer type, index value of the write location of GAS.

<param2>:

For "GASR":

- Eindex- integer type, End index value of the location number range of GAS.

For "GASW":

- Wtext- string type, the text associated to the GAS write entry.

<index1>, <index2> ...<indexN>: integer

- The returned location number of each returned GAS entry

<text>: string

- The alphanumeric text associated to the entry

<RminIndex>: decimal

- The minimum index number to read GAS

<RmaxIndex>: decimal

- The maximum index number to read GAS

<Windex>: decimal

- The Write index entry for GAS

<tlength>: decimal

- The maximum text field length

<cachestat>: decimal

- 0 – unknown
- 1 - busy by PB caching
- 2 – cache ready

5.2.59 AT%PCONI

Command	Possible Response(s)
AT%PCONI[=<format>[,<cell_type>]]	<p>AT%PCONI <CR><LF>duplexing mode: <duplexing mode> <CR><LF>Transmission mode: <antenna/TX mode> <CR><LF>Bandwidth: <bw> <CR><LF>EARFCN: <EARFCN> <CR><LF>Global Cell ID: <Global cell ID> <CR><LF>Physical Cell ID: <Physical cell ID> <CR><LF>HNBN: <HNBN></p> <p>For secondary cells: %PCONI <CR><LF>Secondary cell index: <cell_index> <CR><LF>duplexing mode: <duplexing mode> <CR><LF>Transmission mode: <antenna/TX mode> <CR><LF>Bandwidth: <bw> <CR><LF>EARFCN: <EARFCN> <CR><LF>Global Cell ID: <Global cell ID> <CR><LF>Physical Cell ID: <Physical cell ID> <CR><LF>Band: <band></p> <p>For “COMPR”: %PCONI: <duplexing mode>, <tm>, <bw>, <EARFCN>, <Global cell ID>, <Physical cell ID>, <HNBN>, <band>[,<nwo_femtocell_ind>[,<cell_index>]]</p>
AT%PCONI?	ERROR (OPRATION_NOT_ALLOWED) Operation is not supported
AT%PCONI=?	%PCONI: (list of supported <duplexing mode>s), (list of supported <antenna mode>s), (list of supported <bw>s)

Description

- Command returns physical connectivity and eNB parameters info.
- Command return ERROR if connection to eNB is not established yet.
- Command returns OK if secondary cell(s) are queried, but not in use.
- To read primary cell only the <cell_type> parameter shall be omitted.

- When <cell_type>=0 parameter is used, list will contain all cells in use: primary and all secondaries.
- Read command is not supported.
- Optional <format>=“COMPR” parameter provides opportunity to report all parameters in single line.
- If parameter <format> is omitted the cell parameters are reported in textual uncompressed format.

Note: For uncompressed format all following string and hexadecimal parameters are returned without quotes.

Defined Values

<format> - string:

- “COMPR” – compressed format
- “TEXT” – text prepended parameter report

<cell_type> – integer format; all cells indication or cell index to identify the requested secondary cell

- 0 – list of all cells: primary and secondary
- 1-7 – secondary cell index

<cell_index> – integer format; if <cell_type>=0 parameter value is used in AT command call for compressed format, the <cell_index> parameter presence in AT response is mandatory.

- 0 – primary cell
- 1-7 – secondary cell index

<duplexing mode> - string:

- “TDD”
- “FDD”

<antenna/TX mode> - string:

- “SISO” - (tm1)
- “Tx diversity” - (tm2)
- “Open loop MIMO” - (tm3)
- “Closed loop MIMO” - (tm4)
- “tmX” – for tm5 and more

Antenna mode report is based on currently used Transmission Mode (TMx).

<tm> - transmission mode, string:

- “tmX”

<bw>:

- 0 – 1.4 MHz
- 1 – 3 MHz
- 2 – 5 MHz
- 3 – 10 MHz
- 4 – 15 MHz
- 5 – 20 MHz

<EARFCN> - decimal

- As per 3GPP encoding for EARFCN.

<Global cell ID> - hexadecimal:

- As per 3GPP encoding for cell ID.

<Physical cell ID> - decimal:

- Physical cell Id acquired by cell search.

<HNBN> - string:

- Home eNB name encoded in SIB9 (string size up to 48 symbols).

<band> - decimal

- As per 3GPP encoding for band.

<nwo_femtocell_ind>- decimal; NW Operator specific femtocell indication:

For NW operators which support proprietary femtocell indication, this parameter indicates if cell is regular cell or femtocell. For NW operators, which don't support this indication, this parameter is omitted.

- 0 – regular cell
- 1 – femtocell
- 2-99 – Reserved FFU

Example

1. Uncompressed Format:
 - a. Without CA:
 - AT%PCONI
 - duplexing mode: TDD
 - Transmission mode: tm7

- Bandwidth: 5
- EARFCN: 40340
- Global Cell ID: 09FBD146
- Physical Cell ID: 300
- HNBN: N/A
- OK

b. With CA:

Example 1 – Secondary Only:

- AT%PCONI="TEXT",1
- Secondary cell index: 1
- duplexing mode: TDD
- Transmission mode: tm7
- Bandwidth: 5
- EARFCN: 40341
- Global Cell ID: 09FBD147
- Physical Cell ID: 50
- OK

Example 2 – All Cells:

- AT%PCONI="TEXT",0
- duplexing mode: TDD
- Transmission mode: tm7
- Bandwidth: 5
- EARFCN: 40340
- Global Cell ID: 09FBD146
- Physical Cell ID: 30
- HNBN: N/A
- Secondary cell index: 1
- duplexing mode: TDD
- Transmission mode: tm7
- Bandwidth: 5
- EARFCN: 40341
- Global Cell ID: 09FBD147
- Physical Cell ID: 50
- OK

2. Compressed format:

c. Without CA:

- AT%PCONI
- %PCONI: "TDD", "tm7", 5, 40340, "09FBD146", 300, "N/A", 41
- OK

d. With CA:

Example 1 – secondary only:

- AT%PCONI="COMPR",1
- %PCONI: "TDD","tm7",5,40341, "09FBD147",50,"N/A",41
- OK

Example 2 – all cells:

- AT%PCONI="COMPR",0
- %PCONI: "TDD","tm7",5,40340,"09FBD146",30,"N/A",41,,0
- %PCONI:"TDD","tm7",5,40341, "09FBD147",50,"N/A",41,,1
- OK

Implementation Note:

Note that AT%PCONI in “TEXT” format is very old command, which does not follow 27.007 requirements:

- Its response is not prefixed by %PCONI
- Textual and hexadecimal values are not quoted

Please, use quotes ("") for AT response in <format>="COMPR".

This command partially duplicate %EARFCN and %SETBW read commands. It may substitute these commands in the future, when both of them will be removed because of unsupported set commands.

The TDD/FDD is completely defined by the band used. Band could be known from EARFCN. Some parameter duplication is placed into this command intentionally for usage simplicity.

5.2.60 AT%PINGCMD

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

<id>: decimal

- The identifier of each individual reply of the ping request (can be 1 to <count>)

<IP type>: decimal

- 0 – Ipv4
- 1 – IPv6

<dst_ip>: string

- Destination (remote machine) IPv4 or IPv6 address

<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.

<count>: decimal

- The number of ping request retries (default is 1)

<timeout>: decimal

- Time to wait for a response, in seconds.

<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

5.2.61 AT%PWRSCMD

Command	Possible Response(s)
AT%PWRSCMD=<cmd>[,<mode> [,<timeout>[,<wakeup_mask>]]]	For "WAKECAUSE: %PWRSCMD: <cause> OK or ERROR
AT%PWRSCMD?	ERROR (not supported)
AT%PWRSCMD=?	%PWRSCMD: (list of supported <cmd>s), (list of supported <mode>s)

Description

The command is intended to manage user commanded power save mode. Some <cmd> and <mode> combination are prohibited (see permitted combinations below). The call for such prohibited parameter pairs will return ERROR.

Optional timeout parameter defines the delta time to wakeup in seconds. If parameter is omitted, forever timeout will be applied. If non-zero <timeout> value is specified, it will be ignored, module will always stay forever in these modes.

Defined Values

<cmd>:

- "FORCE" – force specified power save mode.

<mode> - PS mode:

- 1 – standby mode. Exit from this mode is executed by modem booting always

<timeout> - sleep time before wakeup in sec:

- 0 – forever
- 1 – 4294967295 sec

<wakeup_mask> - hexadecimal (in quotes); to mask 1 or more (up to 4) HW pins as wakeup source of standby (DHO) mode.

- "0" – unmasked (default)
- "1"-“F” – masked sources (bits enumerated from right to left):
 - 1st bit - Shutdown
 - 2nd bit - Wakeup
 - 3rd bit - Power button
 - 4th bit - ATIN (once the anti-tamper will be enabled)

5.2.62 AT%SCACHECMD

Command	Possible Response(s)
AT%SCACHECMD= <cmd>,<app>, <file_id> [,<record_num>]	%SCACHECMD: <file_id>,[<record_num>],<value> [<CR><LF>%SCACHECMD:<file_id>,[<record_num>],<value>] [...]
AT%SCACHECMD?	ERROR (not supported)
AT%SCACHECMD=?	OK

Description

This AT command provides opportunity to get SIM files from FW SIM cache in RAM.

If <record_num> parameter is omitted, "RD" command returns all cached records per same file.

If record number is not applicable to some file, its value is omitted in command response, but points are kept in the string.

If required file is missed in cache (not supported), command returns ERROR.

Defined Values

<cmd>:

- "RD"

<app>:

- "USIM" – reserved FFU
- "ISIM"

<file_id> - hex value (in quotes) as per 31.102 and 31.103

<record_num> - decimal value, requested record number

<value> - hex value (in quotes) as per 31.102 and 31.103

5.2.63 AT%SCANCFG

Command	Possible Response(s)
AT%SCANCFG=<rs_cfg>[,<sl_cfg>,<start>,<estop>,<estep> [,<estart>,<estop>,<estep>]]...]	OK or ERROR
AT%SCANCFG?	ERROR (not supported)
AT%SCANCFG=?	OK

Description

The command is intended to configure changes in regular scan procedure for following user-triggered scan.

Rich Scan is a scan, which provides not only strongest cell on each mandated frequency, but also all intra cells, which can be acquired on same EARFCN.

Next configurations may be configured for user-triggered scan procedure:

- Regular scan over regular DOP scan settings (default)
- Regular scan over run-time scan list (RTSL)
- Rich scan over regular DOP scan settings
- Rich scan over run-time scan list (RTSL)

The EARFCN values of RTSL shall be a subset of bands defined in BSP (DOP) file and used for device calibration at wakeup time

Defined Values

<rs_cfg> - Rich scan configuration:

- 0 – disable Rich scan (default)
- 1 – enable Rich scan for AT%SCANCMD
- 2 – enable Rich scan for any regular scan procedure

<sl_cfg> - run-time scan list (RTSL) configuration:

- 0 – disable RTSL (default)
- 1 – enable RTSL for AT%SCANCMD
- 2 – enable RTSL for any regular scan procedure

<start> - Start EARFCN

<estop> - Stop EARFCN

<estep> - EARFCN step

Examples

1. If only Rich scan over default bands/scan list (defined in BSP) is required, configure rich scan once at wakeup:
 - AT%SCANCFG=1
2. If list of scanned frequencies is changed dynamically, configure rich scan and RTSL before each single rich scan, for example:
 - AT%SCANCFG=1,1,2620,2625,1

5.2.64 AT%SMMA

Command	Possible Response(s)
AT%SMMA	OK/ERROR
AT%SMMA?	ERROR (not supported)
AT%SMMA=?	OK

Description

This command is used by host SMS application to signal the LTE network that SMS storage has available memory and it is able to receive new incoming SMS.

Upon receive of this AT command the device will send to the network RL_SMMA message as defined in section 7.3.2 of 3GPP TS 24.011

Defined Values

The command doesn't take or return any value.

5.2.65 AT%SCANCMD

Command	Possible Response(s)
AT%SCANCMD=<cmd>[,<mode>]	OK or ERROR
AT%SCANCMD?	[%SCANCMD: <earfcn>,<pci>,<eci>,<plmnId>,<RSRP>,<RSRQ>,<bw>,<tac>,<cstat><CR><LF>%SCANCMD:<earfcn>,<pci>,<eci>,<plmnId>,<RSRP>,<RSRQ>,<bw>,<tac>,<cstat>...]]
AT%SCANCMD=?	OK
(unsolicited report)	%SCANEND: <stat>

Description

The command is intended to handle for user-triggered scan procedure. Command is accepted only in detached (unregistered) mode.

The after-scan behavior may be different based on previous configuration defined by AT%SCANCFG:

- If run-time scan list is not defined (<sl_cfg>=0), no any additional scan is applied. Modem is already camped on legal cell after user-triggered scan procedure.
- If run-time scan list is defined and overrides default settings (<sl_cfg>=1), the scan of original band table/scan list is triggered automatically at the end of user scanning to camp on legal cell.

The read command is used to query last user-triggered scan results. It will be different from AT%SCAN results, which return last regular scanning results.

Any attempt to read user-triggered scan results before such scanning will return only OK.

Defined Values

<cmd>:

- 0 - set unsolicited result response presentation in accordance with <mode>

<mode> - status of unsolicited result response presentation of %SCANEND:

- 0 - disabled (default)
- 1 – enabled

<cmd>:

- 1 – start scan as predefined in AT%SCANCFG

<stat>:

- 0 - no cells to report

- 1 – scan succeeded to acquire one or more cells

Next params are as per 3GPP definition:

- <earfcn>,<pci>,<eci>,<RSRP>,<RSRQ>,<bw>,<tac>

<plmnId> - integer type; similar to <oper> parameter of +COPS in decimal numeric format (se 27.007), but reported without quotes.

<cstat> - cell status from SIB1:

- 0 – regular cell
- 1 – cell barred
- 2 – cell reserved for Operator use

5.2.66 AT%SMSINFO

Command	Possible Response(s)
%SMSINFO=<type>	For “LAST_UNREAD” return the index of last received unread SMS: %SMSINFO: <index> OK/ERROR
%SMSINFO?	ERROR (OPRATION_NOT_ALLOWED) Operation is not supported
%SMSINFO=?	%SMSINFO: List of supported <type>

Description

AT command to get detailed SMS information.

Defined Values

<type>: string

- “LAST_UNREAD” – return the last unread received SMS

<index>: Integer

- The storage index of the last unread received SMS. In case that requested SMS can't be found in storage, the AT command return ERROR.

5.2.67 AT%SOCKETCMD

Command	Possible Response(s)
AT%SOCKETCMD=<cmd>[,<param1>[,<param2>[,<param3>...]]]	<p>For "INFO" command: [%SOCKETCMD:<socket_stat>,<socket_type>,<src_ip>,<dst_ip>,<src_port>,<dst_port>[,<socket_dir>,<socket_to>]]</p> <p>OK</p> <p>For "LASTERROR" command: [%SOCKETCMD:<socket_err>]</p> <p>OK</p> <p>For "ALLOCATE" command %SOCKETCMD:<socket_id></p> <p>OK</p> <p>For "FASTSEND" command: %SOCKETCMD:<wlengt></p> <p>OK</p> <p>For other commands: OK/ERROR</p>
AT%SOCKETCMD?	<p>Return the list of created sockets and their status:</p> <p>[%SOCKETCMD:<socket_id>,<socket_stat>[<CR><LF>%SOCKETCMD:<socket_id>,<socket_stat>[...]]]</p> <p>OK</p>
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 ...

When socket is opened the unsolicited %SOCKETEV is automatically enabled. The unsolicited is sent with <event> is sent in two cases:

1. Rx buffer has more Bytes to read.
2. Socket terminated by peer.

Important Note:

- AT%SOCKETCMD command is blocking. This may cause blocking of the AT channel for long time in case of "OPEN" 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 configured 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 automatically by the socket.

Defined Values

<cmd>

- "ALLOCATE" –Allocate socket session with the following parameters

<param1>: string

- "TCP" – for creation of TCP socket
- "UDP" – for creation of UDP socket

<param2>: string

- "OPEN" – The socket open TCP/UDP connection with the peer

<param3>: string

- Destination IPv4

<param4>: decimal

- Destination UDP/TCP port number in the range 1-65535

<param5>: 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)

<param6>: 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.

<cmd>

- “ACTIVATE” – Activate the predefined socket

<param1>: decimal

- The socket ID (identifier) of the specified socket

<cmd>

- “INFO” – return the details of specific socket ID

<param1>: decimal

- The socket ID (identifier) for which info is requested

<cmd>: string

- “DEACTIVATE” – Request to deactivate specific socket ID and release its resources

<param1>: decimal

- The socket ID (identifier) to be closed

<cmd>

- “FASTSEND” –This command activate the predefined socket, write to the socket and then deactivate it.

<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>: string

- The data, in HEX format (in quotes)., which will be written to the specified socket.

<cmd>: string

- “DELETE” – Request to delete specific socket ID allocation

<param1>: decimal

- The socket ID (identifier) to be closed

<cmd>: string

- “LASTERROR” – Request to get the last Socket error code

<param1>: decimal

- The socket ID (identifier)

<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

<socket_type>: string

- “TCP” – for creation of TCP socket
- “UDP” – for creation of UDP socket

<src_ip>: string

- Source IP address

<dst_ip>: string

- Destination IP 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>: decimal, the direction of the TCP socket

- 0 – no set
- 1 – dialer

<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...

<event>: decimal

- 1 – Rx buffer has more Bytes to read
- 2 – Socket deactivate due to idle timer expiry.
- 3 – Socket terminated by peer

<wlength>: decimal

- The actual length in Bytes of data written to the socket in "FASTSEND" command.

5.2.68 AT%SOCKETDATA

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: That 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

<cmd>

- "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>: string

- The data, in HEX format (in quotes),, which will be written to the specified socket.

<cmd>

- “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.

<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).

<wlenth>: decimal

- The actual length in Bytes of data written to the socket.

5.2.69 AT%SOCKETEV

Command	Possible Response(s)
AT%SOCKETEV=<event_id>,<mode>	OK/ERROR
AT%SOCKETEV?	ERROR (not supported)
AT%SOCKETEV=?	%SOCKETEV: (list of supported <event_id>s), (list of supported <mode>s)
(unsolicited)	%SOCKETEV:<event_id>,<socket_id> [,<connected_socket_id>]

Description

The command is intended to notify about socket events. The reporting may be enabled/disabled per event type.

When socket is opened (using "OPEN" or "LISTEN" sub-commands of AT%SOCKETCMD) the unsolicited %SOCKETEV is automatically enabled for all event types.

The unsolicited 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". For asynchronous socket 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.

Defined Values

<event_id>: integer:

- 0 – All events, used only in execution command
- 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

<mode>: integer; unsolicited result response presentation:

- 0 - disabled

- 1 – enabled

<socket_id>: integer; the socket ID (identifier) of the socket (parent for async)

<connected_socket_id>: integer; the socket ID (identifier) of connected socket spawned from specified parent listening socket

5.2.70 AT%TIMEREV

Command	Possible Response(s)
AT%TIMEREV=<ev_type>,<mode>	OK or ERROR
AT%TIMEREV?	ERROR (not supported)
AT%TIMEREV=?	OK
(unsolicited report)	% TIMEREV:<ev_type>,<status>[,<param1>[,<param2>]]

Description

The command is intended to notify sensitive internal or Host Apps about some LTE timers start/stop operations, which may impact LTE connectivity. The reporting may be enabled/disabled per event type.

The reporting for all event types is disabled by default at wakeup time.

Read command is not supported.

Defined Values

<ev_type>:

- “T3402” – T3402 timer status
- “ALL” – enables/disables all event types. This event type cannot be sent in unsolicited reporting.

<mode> - status of unsolicited result response presentation:

- 0 - disabled (default)
- 1 – enabled

<status> - timer status change:

- 0 – stop
- 1 – start

For “T3402”:

<param1> - string format; PLMN encoded as <oper> parameter in numeric format as defined in AT+COPS

5.2.71 AT%STATEV

Command	Possible Response(s)
AT%STATEV=<mode>	OK or ERROR
AT% STATEV?	ERROR (not supported)
AT% STATEV=?	%STATEV: (list of supported < mode>s)
(unsolicited report)	% STATEV: <event>

Description

The command is intended to report events for different important state transitions and system occurrences.

The reporting is disabled by default at wakeup time.

Defined Values

<mode> - status of unsolicited result response presentation:

- 0 - disabled (default)
- 1 – enabled

<event>:

- 0 - Start Scan
- 1 - Fail Scan
- 2 - Enter Camped
- 3 - Connection Establishment
- 4 - Start Rescan
- 5 – Connected
- 6-99 – Reserved

5.2.72 AT%TRSHCMD

Command	Possible Response(s)
%TRSHCMD=<module>,<cmd>[,<param>]	OK ERROR
%TRSHCMD?	ERROR
%TRSHCMD=?	TRSHCMD: <module1>:<list of supported commands>, <module2>:<list of supported commands> ...

Description

This command is used for system troubleshooting at post-production, integration or field troubleshooting stage. It is intended for experienced user and may move device into different test modes applicable only for testing.

The command is compound, which means that <cmd> and <params> parameters are <module> specific.

The commands applied to SERVICE module move device to Service operational mode. There is no back transfer from Service mode to normal operational mode. To return to normal operational mode the UE shall be resettled through AT command or physically.

Note: all settings are applied only during run-time (not NV stored) and will be lost after reboot.

Defined Values

<module>:

- “PHYLOG” – PHY Log module

<cmd>:

- “RSRP”
- “ARSRP” - Average RSRP
- “FREQ” - Frequency
- “TIMING” - Timing
- “TXP” - TX Power
- “AGC”
- “SINRS0” - SINR Symb0
- “SINRS7” - SINR Symb7
- “DCIP” - DCI Parameters
- “CFIC” - CFI type counters
- “CFIHI” - CFI and HI values
- “CPR” – CQI, PMI, RI

- “CRCTB0” - CRC Error TB0
- “CRCTB1” - CRC Error TB1
- “ACKSR” – ACK/NACK counters, SR
- “HARQR” - HARQ Retransmission counter
- “TXCOMP” – TX compressed log
- “RXCOMP” – RX compressed log
- “ALL” – used to disable all PHY logs described above. Some important PHY logs cannot be disabled by this command. Since enabling all PHY logs may cause PHY operation starvation under heavy traffic, the enable all PHY logs command is prohibited. If commanded, the ERROR response will be returned.
- “LOGGER” – used to completely disable PHY logs mechanism. Once enabled, this command will return to the PHY previous log settings (default or last updated using the current command).

<param>:

- “0” – disable
- “1” – enable

<module>:

- “SERVICE” – Service module

<cmd>:

- “CONN4MEAS”

<param>:

- EARFCN

<module>:

- “TIMER” – Different protocol timers

<cmd>:

- “TCBAR” - cell barring timer used for reestablishment purposes and defined in TS36.304 as 300sec. The change in this timer value does not impact frequency barring timer (same 300sec) used in IDLE mode.
- “T3402” – Override standard timer value of 12 minutes for testing purposes. To return the timer to default value, the value of 720 sec (12 min) shall be commanded.

<param>:

- Timer value in sec

<cmd>:

- "NpSleep" - modify default (3sec) NP CPU sleep timer.

<param>:

- Timer value in ms; valid range: 500-5000 ms

<module> - following feature is supported starting v4.02:

- "TXANT" – TX antenna selection module.

<cmd>:

- "ALTDEFM" – Altair default TX diversity mode for antenna selection

<cmd>:

- "USRSELM" – User manual TX antenna selection mode. The antenna selection is ignored if "isTxDiversitySupported" is disabled in PHYBP file.

<param>:

- 0 – TX0 antenna.
- 1 – TX1 antenna.

<module> - following feature is supported starting version (late 4.5.6):

- "RXANT" – RX antenna selection module

<module> - following feature is supported starting v4.5:

- "TXPWR" – TX power management

<cmd>:

- "DEFMAX" – limiting the max TX power by PHYBP NV values as by default
- "USRMAX" – User manual max TX power override in floating units
- "USRMAXD" - User manual max TX power override in decimal units
- For "USRMAX":

<param> - string; floating value in quotes:

- max TX power for all TX channels
- For "USRMAXD":

<param> - integer:

- max TX power in 100*dBm for all TX channels

<module> - following feature is supported starting v4.5.1:

- "UE_CAPABILITIES" – UE Capabilities

<cmd>:

- "Category" – Setting the UE Category

<param>:

- "1", "2", "3", "4" or "5".

<cmd>:

- "ASReleaseNum" – Setting the Access Stratum Release Number

<param>:

- "release8"
- "release9"
- "release10"
- "release11"
- "release12"

<module> - following feature is supported starting v4.5.6:

- "RSIM" – Remote USIM module

<cmd>:

- "TIMEOUT" – Time out value for the commands sent from our UE to the remote USIM until response is expected (units are in msec)
- Value of 0 will leave the timeout to be the SW default – 5000m

<param>:

- Timeout value

<module> - following feature is supported starting late v4.5.6:

- "NETWORK" – Network provider features management

<cmd>:

- "ARCH" – network provider architecture
- "EnableIpv6SrcFiltering"

<param>:

- For “ARCH”:
- “0” – default LTE 3GPP-compliant architecture
- “1” – VZW compliant architecture
- 2-99 – Reserved for future use
- For “EnableIpv6SrcFiltering”:
- “0” – false (disable)
- “1” – true (enable)

<module>:

- "USIM"

<cmd>:

- “ERASE_EF” - Erase file regardless of location on SIM or BSP

<param1>: string

- “0” – erase EMM information (EPSLOCI, EPSNSC and ACSGL)

<module>:

- "BSPFILE"

<cmd>:

- “ERASE_LTEPP” - Erase some specific entity of LTEPP file (in NV and in RAM)

<param1>: string

- “0” – erase MRU table
- “1” – erase ERPLMN List
- “2” – erase NB-IOT MRU table. Starting LTESYS-19366.

<cmd>:

- “TECHSEL” – Selects the technology for duplicated objects in MDOP, which will be accessed by AT%SETCFG/GETCFG.

<param1>

- “0” – currently running technology
- “1” – CAT-M
- “2” – NB-IOT

<module>:

- "SIMDET"

<cmd>:

- "CNTL" - SIM control command, which changes SIM power and SIM HW detection status

<param1>: string

- "0" - Switch to SIM power down mode.
- "1" – Switch to SIM power up mode (if needed) with SIM_DET pin disabled. This operation causes BSP settings override, if SIM_DET feature is enabled in both GSYSBP and DOP files.
- "2" – Switch to SIM power up mode (if needed) with SIM_DET pin enabled. For use-case, that HW SIM_DET feature is disabled in GSYSBP and/or DOP files, any attempt to enable SIM_DET pin will be silently ignored and command returns OK (no BSP override). If such switch is required once UE is in "0" power down mode, the UICC power will be turned on regardless of following SIM_DET operations.

<module> :

- "MACLOG" - MAC log run-time policy modification

<cmd>:

- "SEVOVER" – Run-time modification for DOP/MDOP macLogSeverityOverride parameter

<param1>: string

- "0" – disable override, use default setting
- "1" and more – enable override; overrides SW default for all MAC modules with the same severity value

5.2.73 AT%BANDCAP

Command	Possible Response(s)
AT%BANDCAP	%BANDCAP:band1[,band2[,band3[,band4[,band5]]]]]
AT%BANDCAP?	%BANDCAP:[band1[,band2[,band3[,band4[,band5]]]]]
AT%BANDCAP=?	ERROR (OPRATION_NOT_ALLOWED) Operation is not supported

Description

Command returns band(s) entered during production into PHYBP file. For these bands the calibration process is intended to be executed at Production by board vendor.

Defined Values

<band>:

- 0 - indicated one-SKU multiband support
- band number in numeric value

Example

```
AT%BANDCAP  
%BANDCAP: 3,38  
OK
```

5.2.74 AT%CUSTWA

Command	Possible Response(s)
AT%CUSTWA =<cmd> [,<param1>[,<param2>[...]]]	OK or ERROR
AT%CUSTWA?	ERROR (not supported)
AT%CUSTWA=?	OK

Description

This command is used for different customer one-shot workarounds or NW Operator/Vendor proprietary spec-incompliant changes in standard LTE behavior. Some sub-commands will be accepted only in non-operational modes CFUN=0/4. Otherwise sub-command will return an ERROR.

Some sub-commands will be accepted only for special NW Operator ID and/or Customer ID configured in BSP. Otherwise, command will return an ERROR.

Error conditions are clarified per sub-command.

Defined Values

<cmd>:

- “CREATE38” – create band 38 PHYBP and FCF from band 41.
- Command returns OK if band41 BSP files are present, but band38 are missed.
- If there is not band41 in BSP or band38 entities are already created, AT command returns ERROR.
- “CREATE41” – create band 41 (with limited boundaries) PHYBP and FCF from band 38.
- Command returns OK if band38 BSP files are present, but band41 are missed.
- If there is not band38 in BSP or band41 entities are already created, AT command returns ERROR.
- “SWIMSI” – switch to special IMSI value. Command is accepted only in non-operational modes for SKT NW Operator only.
- “DRX_USIM_DEACT” – apply advanced eDRX policy to deactivate (switch off) SIM in normal DRX (Idle paging) mode of operations.
- “INTERSEARCHTH” – apply different cell reselection criteria than defined in 3GPP.
- “EDRXUSIMACT” - apply special eDRX policy to keep USIM active in eDRX mode.

<param1>:

For “SWIMSI”:

- 0 - Switch to standard IMSI

- 1 - Switch to special IMSI

For "DRX_USIM_DEACT":

- 0 – Disable feature
- 1 – Enable feature

For "LHGTIME":

- guard time in microseconds

For "INTERSEARCHTH":

- 0 – Disable feature
- 1 – Enable feature

For "EDRXUSIMACT":

- 0 – Disable feature
- 1 – Enable feature

<param2>:

For "INTERSEARCHTH":

- Min RSRP value in 1 dBm units

<param3>:

For "INTERSEARCHTH":

- Min RSRQ value in 1 dB units

Example

AT%CUSTWA="CREATE38"

OK

5.2.75 AT%LWM2MCMD

Command	Possible Response(s)
AT%LWM2MCMD=<cmd>[,<param1>[,<param2>[,<param3>]]]	<p>For "SERVERSINFO", list of server details $\text{[%LWM2MCMD:<ServerUri>,<ServerID>,<\text{Lifetime}>,<\text{binding}>,<\text{ServerStat}>[,<\text{LastRegDate}>]]}$[<CR><LF>] $\text{[%LWM2MCMD:<cmd>,<ServerUri>,<ServerID>,<\text{Lifetime}>,<\text{binding}>,<\text{ServerStat}>[,<\text{LastRegDate}>] [...]]}$</p> <p>For "GET_RESOURCE", list of server details $\text{[%LWM2MCMD:<ObjectID>[,<\text{ObjectInstanceID}>[,<\text{ResourceID}>[,<\text{ResourceInstanceID}>[,<\text{val}>]]]]}$[<CR><LF>] $\text{[%LWM2MCMD:<ObjectID>[,<\text{ObjectInstanceID}>[,<\text{ResourceID}>[,<\text{ResourceInstanceID}>[,<\text{val}>]]]]}$[...]</p> <p>For other commands: OK/ERROR</p>
AT%LWM2MCMD?	ERROR
AT%LWM2MCMD=?	OK

Description

AT command to control LWM2M client. The command is used by FOTA Manager.

Defined Values

<cmd>

- “REGISTER” – Application initiated command to register with LWM2M server

<param1>: decimal

- Short Server ID as defined in section 6.2 of [1]

<cmd>

- “DEREGISTER” - Application initiated command to de-register from LWM2M server

<param1>: decimal

- Short Server ID as defined in section 6.2 of [1]

<cmd>

- “REGISTERUPD” - Application initiated command to Re-register LWM2M server

<param1>: decimal

- Short Server ID as defined in section 6.2 of [1]

<cmd>

- “UPDATEREP” – FOTA manager report of the update result

<param1>: decimal

- Firmware updated successfully
- Firmware update failed This Resource MAY be reported by sending Observe op

<param2>: decimal

- Short Server ID as defined in section 6.2 of [1]

<cmd>

- “DLRSP” - A command answers to the request from OMA-DM client to start/cancel/defer package download.

<param1>:

- “ACCEPT” – Accept the request to start package download
- “CANCEL” – Cancel the request to start package download
- “RESUME” – Resume download after internal download error (e.g. out of coverage, reboot etc..)

<param2>: decimal

- Short Server ID as defined in section 6.2 of [1]

<cmd>

- “UPDRSP” - A command answers to the request of OMA-DM client to update firmware with the downloaded package.

<param1>:

- "ACCEPT" – Accept the request to update firmware
- "CANCEL UPDATE" – Cancel the request to update firmware (but keep package for later update)
- "PACKAGE_CRC_ERROR" – Cancel the whole FOTA process
- "PACKAGE_UNSUPORTED" – Cancel the whole FOTA process

<param2>: decimal

- Short Server ID as defined in section 6.2 of [1]

<cmd>

- "SERVERSINFO" - A query for server information

<cmd>

- "SET_RESOURCE" – Set resource value to LwM2M tree. This command when executed on multi resource instance will generate instance if not already exist. Note that this command can also write single resource instance in case of multi-resource instance.
- "GET_RESOURCE" – Get resource value from LwM2M tree. This can be a multiline reply (each describing single resource value) when query:
 - Object ID - retrun all the resource values of the object ID
 - Object-instances ID – return all the resource values of of that Object-instances ID
 - Resource ID – return all the multi-resource values of of that Resource ID
- "DEL_RESOURCE_INSTANCE" – Delete specific resource instance of multi-resource instance.

<param1>: decimal

- See definition of <ObjectID>

<param2>: decimal

- See definition of <ObjectInstancelD>

<param3>: decimal

- See definition of <ResourceID>

<param4>: decimal

- See definition of <ResourceInstancelD>

<param5>: string

- See definition of <val>

<ServerUri>: string

- The Server URI as defined in 6.2 of [1]

<ServerID>: decimal

- The Server Short ID as defined in 6.2 of [1]

<Lifetime>: decimal

- The server registration period from the last registration date in seconds.

<binding>: decimal

- 0 – Unknown
- 1 – UDP (U)
- 2 – UDP queue mode (UQ)
- 3 – SMS (S)
- 4 – SMS queue mode (SQ)
- 5 – UDP with SMS (US)
- 6 – UDP queue mode with SMS (UQS)

<ServerStat>: decimal

- 0 - not registered or bootstrap not started
- 1- registration pending
- 2 - successfully registered
- 3 - last registration failed
- 4 - registration update pending
- 5 - deregistration pending
- 6 - bootstrap hold off time
- 7 - bootstrap request sent
- 8 - bootstrap on going
- 9 - bootstrap done
- 10 - bootstrap failed

<LastRegDate>: decimal

- The UTC time in 10msec units counted since 00:00:00 on 1 January, 1900.

<ObjectID>: decimal

- Specifies the LWM2M Object ID

<ObjectInstanceID>: decimal

- Specifies the LWM2M Instance ID of the object (Optional parameter)

<ResourceID>: decimal

- Specifies the LWM2M resource ID of the object instance (Optional parameter)

<ResourceInstanceID>: decimal

- Specifies the LWM2M resource Instance ID of the object instance (Optional parameter)

<val>: string

- Specifies the value of the resource (Optional parameter)

Type	Values
Boolean	"TRUE", "FALSE"
Integer/float/text	String within " "
Buffer (opaque field)	Data buffer delivered in chunks of 3000 Byte and formatted as "HEX" string.
Object link	"object;object-instance"
"Observe" Event	"pmin={minimum period}&pmax={maximum period}>={greater than}<={less than}&st={step}" All the parameter in the string are optional.

5.2.76 AT%USMSF

Command	Possible Response(s)
%USMSF=<smsformat>	OK/ERROR
%USMSF?	%USMSF: <smsformat>
%USMSF=?	%USMSF: List of supported <smsformat>

Description

The command is used to configure the format of outgoing user SMS: 3GPP or 3GPP2. The new configuration is updated on the device NV

The command has the following limitations:

- It controls outgoing SMS transmission and storage format: 3GPP or 3GPP2. Incoming SMS is supported with both 3GPP and 3GPP2 formats.
- It has effect only when the user sends the SMS in text mode.
- The command shall return an error when trying to configure SMS format to 3GPP2 while SMS is configured to be stored in UICC. The 3GPP2 configuration is applicable only to storage in NP internal file system or when SMS is sent without storage.
- The 3GPP2 configuration is applicable only for SMS over IMS. The command shall return an error when trying to configure SMS format to 3GPP2 in SMS over SGs mode.

Defined Values

<smsformat>:

- "3GPP"
- "3GPP2"

6 CMEE Error Codes Supported

The table below details the CMEE error codes supported by the ALT1250 system software solution, per release.

Table 5. Error Codes Supported for CMEE Command in ALT1250 Software

Error Code	Supported by Altair	
	CMEE=1	CMEE=2
3 Operation not allowed	•	•
4 Operation not supported	•	•
10 SIM not inserted	•	•
11 SIM PIN required	•	•
12 SIM PUK required	•	•
13 SIM failure	•	•
15 SIM wrong	•	•
16 Incorrect password	•	•
17 SIM PIN2 required		•
18 SIM PUK2 required		•
30 No network service	•	•
31 Network timeout	•	•
32 Network not allowed - emergency calls only	•	•
40 Network personalisation PIN required	•	•
41 Network personalisation PUK required	•	•
50 Incorrect parameters	•	•
100 Unknown	•	•

6.1 Extended Error Report

AT+CEER will always return the last error cause that was returned by the network. If no error cause was returned yet, the AT+CEER will return OK. In case that the error received by the network is different from the list below the returned error will be “others”.

In the following cases, AT+CEER will supply the error cause, if returned by the network:

- Attach reject
- Service reject

- Tracking area update reject
- Dedicated bearer activation failure
- Dedicated bearer deactivation failure

Table 6. Extended Error Report

Error code	Send by
IMSI_UNKNOWN_IN_HLR	EMM
ILLEGAL_UE	EMM
ILLEGAL_ME	EMM
EPS_SERVICES_NOT_ALLOWED	EMM
EPS_AND_NON_EPS_SERVICES_NOT_ALLOWED	EMM
UE_IDENTITY_CANNOT_BE_DERIVED_BY_THE_NETWORK	EMM
IMPLICITLY_DETACHED	EMM
PLMN_NOT_ALLOWED	EMM
TRACKING_AREA_NOT_ALLOWED	EMM
ROAMING_NOT_ALLOWED_IN_THIS_TRACKING_AREA	EMM
EPS_SERVICES_NOT_ALLOWED_IN_THIS_PLMN	EMM
NO_SUITABLE_CELLS_IN_TRACKING_AREA	EMM
MSC_TEMPORARILY_NOT_REACHABLE	EMM
NETWORK_FAILURE	EMM
CS_DOMAIN_NOT_AVAILABLE	EMM
MAC_FAILURE	EMM
SYNCH_FAILURE	EMM
CONGESTION	EMM
UE_SECURITY_CAPABILITIES_MISMATCH	EMM
SECURITY_MODE_REJECTED_UNSPECIFIED	EMM
NOT_AUTHORIZED_FOR_THIS_CSG	EMM
SEMANTICALLY_INCORRECT_MESSAGE	EMM
INVALID_MANDATORY_INFORMATION	EMM
MESSAGE_TYPE_NON_EXISTENT	EMM
MESSAGE_TYPE_NOT_COMPATIBLE_WITH_THE_PROTOCOL_STAT	EMM
INFORMATION_ELEMENT_NOT_EXISTENT	EMM
CONDITIONAL_IEI_ERROR	EMM
MESSAGE_NOT_COMPATIBLE_WITH_THE_PROTOCOL_STATE	EMM
PROTOCOL_ERROR_UNSPECIFIED	EMM

Error code	Send by
OPERATOR_DETERMINED_BARRING	ESM
INSUFFICIENT_RESOURCES	ESM
UNKNOWN_OR_MISSING_APN	ESM
UNKNOWN_PDN_TYPE	ESM
USER_AUTHENTICATION_FAILED	ESM
ACTIVATION_REJECTED_BY_SERVING_GW_OR_PDN_GW	ESM
ACTIVATION_REJECTED_UNSPECIFIED	ESM
SERVICE_OPTION_NOT_SUPPORTED	ESM
REQUESTED_SERVICE_OPTION_NOT_SUBSCRIBED	ESM
SERVICE_OPTION_TEMPORARILY_OUT_OF_ORDER	ESM
PTI_ALEARDY_IN_USE	ESM
REGULAR_DEACTIVATION	ESM
EPS_QoS_NOT_ACCEPTED	ESM
NETWORK_FAILURE	ESM
FEATURE_NOT_SUPPORTED	ESM
SEMANTIC_ERROR_IN_THE_TFT_OPERATION	ESM
SYNTACTICAL_ERROR_IN_THE_TFT_OPERATION	ESM
UNKNOWN_EPS_BEARER_CONTEXT	ESM
SEMANTIC_ERRORS_IN_PACKET_FILTERS	ESM
SYNTACTICAL_ERRORS_IN_PACKET_FILTERS	ESM
EPS_BEARER_CONTEXT_WITHOUT_TFT_ALREADY_ACTIVATED	ESM
PTI_MISMATCH	ESM
LAST_PDN_DISCONNECTON_NOT_ALLOWED	ESM
PDN_TYPE_IPV4_ONLY_ALLOWED	ESM
PDN_TYPE_IPV6_ONLY_ALLOWED	ESM
SINGLE_ADDRESS_BEARERS_ONLY_ALLOWED	ESM
ESM_INFORMATION_NOT_RECEIVED	ESM
PDN_CONNECTION_DOES_NOT_EXIST	ESM
MULTIPLE_PDN_CONNECTIONS_FOR_APN_NOT_ALLOWED	ESM
COLLISION_WITH_NETWORK_REQUEST	ESM
INVALID_PTI_VALUE	ESM
ESM_SEMANITICALLY_INCORRECT_MESSAGE	ESM

Error code	Send by
ESM_INVALID_MANDATORY_INFORMATION	ESM
MESSAGE_TYPE_NON_EXISTENT_OR_NOT_IMPLEMENTED	ESM
MESSAGE_TYPE_NOT_COMPATIBLE_WITH_THE_PROTOCOL_STATE	ESM
INFORMATION_ELEMENT_NON_EXISTENT_OR_NOT_IMPLEMENTED	ESM
CONDITIONAL_IE_ERROR	ESM
ESM_MESSAGE_NOT_COMPATIBLE_WITH_THE_PROTOCOL_STATE	ESM
ESM_PROTOCOL_ERROR_UNSPECIFIED	ESM
APN_RESTRICTION_VALUE_INCOMPATIBLE_WITH_ACTIVE_EPS_BEAKER_CONTEXT	ESM

6.2 Altair Proprietary Error Codes

The following error codes are returned by CME ERROR in addition to what is defined in 27.007 in sec. 9.2:

- 513 - Bad Personalization File
- 514 - Not camped on cell
- 515 – PLMN busy
- 516 – Invalid EARFCN