LI17x AT Commands

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Quanta Computer Inc.

Address: No.211, Wen Hwa 2nd Rd.,
Kuei Shan Hsiang, Tao Yuan Shien,
Taiwan, 300
Tel: +886-3-327-2345
Fax： +886-3-327-8855
Website: www.quantatw.com
Email: qci.agm@quantatw.com

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History

Version	Date	Description	Author
0.1	2013/01/28	Preliminary	Pierce Chen
0.2	2013/04/09	Modify standard AT commands	Pierce Chen
0.3	2013/11/06	Modify and Merge with Altair AT commands	Pierce Chen

Contents

1 Overview

1.1 Introduction

This document provides information about the AT command set supported by the LI170. In addition, the AT commands are divided to two groups: 3GPP standard AT commands and Altair's proprietary AT commands. Finally, the error codes supported for the CMEE commands are provided for the SW developer's reference.

NOTE: For detailed description of standard 3GPP AT commands please refer to spec (3GPP TS 27.007).

2 3GPP Standard AT commands

The modem software of LI170 supports 2 groups of AT commands: 3GPP standard commands and Altair proprietary commands. The 3GPP standard AT commands are listed as the table below.

AT Command	Description	Standard Reference	Altair
Additional AT Commands Required - All Device Types			
+CGMI	Request Manufacturer Identification	3GPP TS 27.007 (Sec. 5.1)	Y
+CGMM	Request Model Identification	3GPP TS 27.007 (Sec. 5.2)	Y
+CGMR	Request Revision Identification	3GPP TS 27.007 (Sec. 5.3)	Y
+CGSN	Request Product Serial Number Identification	3GPP TS 27.007 (Sec. 5.4)	Y
+CSCS	Select TE Character Set	3GPP TS 27.007 (Sec. 5.5)	Y
+CIMI	Request International Mobile Subscriber Identity	3GPP TS 27.007 (Sec. 5.6)	Y
+WS46	PCCA STD 101 [17] select wireless network (only E-UTRAN supported)	3GPP TS 27.007 (Sec. 5.9)	Y
+CEER	Extended Error Report	3GPP TS 27.007 (Sec. 6.10)	Y
+CNUM	Subscriber Number	3GPP TS 27.007 (Sec. 7.1)	Y
+COPS	PLMN Selection	3GPP TS 27.007 (Sec. 7.3)	Y
+CLCK	Facility Lock	3GPP TS 27.007 (Sec. 7.4)	Y
+CPWD	Change Password	3GPP TS 27.007 (Sec. 7.5)	Y
+COPN	Read Operator Names	3GPP TS 27.007 (Sec. 7.21)	N
+CPAS	Phone Activity Status	3GPP TS 27.007 (Sec. 8.1)	Y
+CFUN	Set Phone Functionality	3GPP TS 27.007 (Sec. 8.2)	Y
+CPIN	Enter PIN	3GPP TS 27.007 (Sec. 8.3)	Y
+CSQ	Signal Quality	3GPP TS 27.007 (Sec. 8.5)	Y
+CIND	Indicator Control	3GPP TS 27.007 (Sec. 8.9)	N
+CCLK	Clock	3GPP TS 27.007 (Sec. 8.15)	Y
+CSIM	Generic SIM Access	3GPP TS 27.007 (Sec. 8.17)	Y
+CRSM	Restricted SIM access	3GPP TS 27.007 (Sec. 8.18)	Y
+CLAC	List All Available AT Commands	3GPP TS 27.007 (Sec. 8.37)	Y
+CGPIAF	Printing IP Address Format	3GPP TS 27.007 (Sec. 8.62)	N
+CESQ	Extended Signal Quality	3GPP TS 27.007 (Sec. 8.69)	N
+CMEE	Report Mobile Termination Error	3GPP TS 27.007 (Sec. 9.1)	Y

+CGDCONT	Define PDP Context	3GPP TS 27.007 (Sec. 10.1.1)	Y
+CGDSCONT	Define Secondary PDP Context	3GPP TS 27.007 (Sec. 10.1.2)	Y
+CGTFT	Traffic Flow Template	3GPP TS 27.007 (Sec. 10.1.3)	Y
+CGATT	PS Attach Or Detach	3GPP TS 27.007 (Sec. 10.1.9)	Y
+CGACT	PDP Context Activate Or Deactivate	3GPP TS 27.007 (Sec. 10.1.10)	Y
+CGCMOD	PDP Context Modify	3GPP TS 27.007 (Sec. 10.1.11)	Y
+CGPADDR	Show PDP Address	3GPP TS 27.007 (Sec. 10.1.14)	Y
+CGEREP	Packet Domain Event Reporting	3GPP TS 27.007 (Sec. 10.1.19)	Y
+CGSMS	Select Service for MO SMS Messages	3GPP TS 27.007 (Sec. 10.1.21)	Y
+CEREG	EPS Network Registration Status	3GPP TS 27.007 (Sec. 10.1.22)	Y
+CGCONTRDP	PDP Context Read Dynamic Parameters	3GPP TS 27.007 (Sec. 10.1.23)	Y
+CGSCONTRDP	Secondary PDP Context Read Dynamic Parameters	3GPP TS 27.007 (Sec. 10.1.24)	Y
+CGTFTRDP	Traffic Flow Template Read Dynamic Parameters	3GPP TS 27.007 (Sec. 10.1.25)	Y
+CGEQOS	Define EPS Quality Of Service	3GPP TS 27.007 (Sec. 10.1.26)	Y
+CGEQOSRDP	EPS Quality Of Service Read Dynamic Parameters	3GPP TS 27.007 (Sec. 10.1.27)	Y
+CEMODE	UE Modes of Operation for EPS	3GPP TS 27.007 (Sec. 10.1.28)	Y
+CSMS	Select Message Service	3GPP TS 27.005 (Sec. 3.2.1)	Y
+CPMS	Preferred Message Storage	3GPP TS 27.005 (Sec. 3.2.2)	Y
+CMGF	Message Format	3GPP TS 27.005 (Sec. 3.2.3)	Y
+CSCA	Service Centre Address	3GPP TS 27.005 (Sec. 3.3.1)	Y
+CSMP	Set Text Mode Parameters	3GPP TS 27.005 (Sec. 3.3.2)	Y
+CMGL	List Messages	3GPP TS 27.005 (Sec. 3.4.2)	Y
+CMGR	Read Message	3GPP TS 27.005 (Sec. 3.4.3)	Y
+CMGS	Send Message	3GPP TS 27.005 (Sec. 3.5.1)	Y
+CMSS	Send Message From Storage	3GPP TS 27.005 (Sec. 3.5.2)	Y
+CMGW	Write Message to Memory	3GPP TS 27.005 (Sec. 3.5.3)	Y
+CMGD	Delete Message	3GPP TS 27.005 (Sec. 3.5.4)	Y
Additional AT Commands Required - Handset Devices Only			
+CMEC	Mobile Termination Control Mode	3GPP TS 27.007 (Sec. 8.6)	NA
+CKPD	Keypad control	3GPP TS 27.007 (Sec. 8.7)	NA
+CMER	Mobile Termination event reporting	3GPP TS 27.007 (Sec. 8.10)	NA
+CTSA	Command Touch Screen Action	3GPP TS 27.007 (Sec. 8.52)	NA
+CSO	Command Screen Orientation	3GPP TS 27.007 (Sec. 8.53)	NA
+CSS	Command Screen Size	3GPP TS 27.007 (Sec. 8.54)	NA

VZW Specific AT Command			
+VZWAPNE	Write command causes the APN table on the DUT to be overwritten.		Y
+VZWRSRP	Execution command returns the RSRP values for all cells which the UE is measuring.		Y
+VZWRSRQ	Execution command returns the RSRQ values for all cells which the UE is measuring.		Y
Other 3GPP AT commands supported (not in required list)			
ATZ	TA sets all parameters to their defaults	3GPP TS 27.007 (Sec. 5.8)	Y
ATI	Request manufacturer specific information	3GPP TS 27.007 (Sec. 5.8)	Y
AT+GCAP	Request overall capabilities	3GPP TS 27.007 (Sec. 5.8)	Y
AT+CREG	Network registration	3GPP TS 27.007 (Sec. 7.2)	Y
AT+CPNET	Preferred network indication	3GPP TS 27.007 (Sec. 7.27)	Y
AT+CPNSTAT	Preferred network status	3GPP TS 27.007 (Sec. 7.28)	Y
+CCHO	Open Logical Channel	3GPP TS 27.007 (Sec. 8.45)	Y
+CCHC	Close Logical Channel	3GPP TS 27.007 (Sec. 8.46)	Y

3 Altair Proprietary AT commands

The Altair proprietary AT commands are listed as the table below.

Altair proprietary AT Commands			
AT%GETCFG	Get a configuration field from NV memory.	Altair proprietary	Y
AT%SETCFG	Set a configuration field in NV memory	Altair proprietary	Y
AT%EARFCN	Configure the DL EARFCN	Altair proprietary	Y
AT%VER	Display all FW versions	Altair proprietary	Y
AT%CSQ	Signal Quality	Altair proprietary	Y
AT%CPININFO	Returns the number of	Altair proprietary	Y
AT%SETLOG	Set log severity in RAM	Altair proprietary	Y
AT%GETLOG	Get log severity in RAM	Altair proprietary	Y
AT%DTLOG	Enable/Disable Drive Test logs	Altair proprietary	Y
AT%STATUS	Get entity status	Altair proprietary	Y
AT%MEAS	Returns measurement for specified measurement Type	Altair proprietary	Y
AT%PCONI	Returns physical connectivity parameters info	Altair proprietary	Y
AT%SCAN	Return the last RSSI scan results	Altair proprietary	Y
AT%BANDCAP	Report supported bands capabilities	Altair proprietary	Y
AT%LSTASSRT	Return the last assert or exception	Altair proprietary	Y
AT%GETID	Return identification values of the board	Altair proprietary	Y
AT% PPPAUTH	Defines APN authentication parameters	Altair proprietary	Y
AT%TRSHCMD	Enable PHY logs	Altair proprietary	Y
AT%CEER	protocol error notification	Altair proprietary	Y
AT%CATSTAT	Allows the CAT to receive status bytes of SIM transactions	Altair proprietary	Y
AT%CATPOLLINT	Modify polling interval of SIM for CAT purposes	Altair proprietary	Y
AT%CATLOCINF	retrieve data required by CAT application	Altair proprietary	Y
AT%STATEV	reports events for different important state transitions and system occurrences	Altair proprietary	Y
AT%NOTIFYEV	Notify the Host about important events occurred in LTE device	Altair proprietary	Y
AT%NETSEL	Command is intended to select network	Altair proprietary	Y

	architecture and parameters		
AT%TSTRF	Simple RF test mode	Altair proprietary	Y
AT%SPMMODE	Command is intended to manage special measurement mode	Altair proprietary	Y
AT%SETPCO	This command is used to set PCO request in the modem attach/connect request	Altair proprietary	Y
AT%MBMSCMD	MBMS command to select received services	Altair proprietary	Y
AT% MBMSEV	Unsolicited notification on services update	Altair proprietary	Y
AT%PCOINFO	This command is used to get PCO replay (solicited and unsolicited) modem attach/connect request	Altair proprietary	Y
AT% GETFINFO	This command is used to get information about LTE parametric files.	Altair proprietary	Y
AT%EXE	This command execute script file in NP.	Altair proprietary	Y
AT%GETAID	Command to get identification values of hardware components managed by NP	Altair proprietary	Y
AT%LTEINFO	Get LTE protocol layer information	Altair proprietary	Y
AT%CMATT	send a attach command from embedded CM	Altair proprietary	Y
AT%DPDNACT	open or close internet PDN	Altair proprietary	Y

AT%GETCFG:

Description: Get configuration from NV memory

Use: AT%GETCFG=<param1>,<param2>

Purpose	Param1	Param2	Returns
Reads device's operation mode from NV	“OPER”		"SERV"," NET"
Reads device's image in focus from NV	“IMG”		"HOST", "1", "2"
Reads device's log module severity from NV	“LOG”	"SYS","L1A", "MAC","RLC", "PDCP", "RRC", "VL1", "NAS","L1AC", "USIM","FRM", "ROHC",	"DEBUG", "FINE","DEBUGW", "DEBUGE", "DEBUGF", "INFO", "NOTICE", "WARN", "ERROR", "CRIT", "ALERT",

		"PROF0", "PROF1", "PROF2", "PROF4", "PROF6", "OSAL", "SERV"	"EMRG"
Reads device's global log severity from NV	"LOG"	"ALL"	"DEBUG", "FINE","DEBUGW", "DEBUGE", "DEBUGF", "INFO", "NOTICE", "WARN", "ERROR", "CRIT", "ALERT", "EMRG"
Read bands defined in DOP file, these bands are the ones to be calibrated and scanned	“BAND”		Bands: “X”, “Y”, “Z”
Read the USIM simulator status	"USIM_SIMULATOR"		
Read the reset on assert status	"DISABLE_RESET"		0-disabled 1-enabled
Read stored cell status	”SC_STATE"		0-disabled 1-enabled
Read the device's stored cell information	"SC_INFO"		MCC, MNC, EARFCN
Reads if the device RFIF to GPIO feature is enabled	“RFIF_TO_GPIO_EN”		0-disabled 1-enabled
Reads device’s Watch Dog module enable/disable in NV	“WATCHDOG_EN”		0-disabled 1-enabled
Reads device’s Watch Dog time parameter in NV	“WATCHDOG_TIMEOUT”		Time in seconds
Reads device’s FW crash mechanism module enable/disable in NV	“CRASH_EN”		0-disabled 1-enabled
Reads device’s FW crash mechanism module time parameter in NV	“CRASH_TIMEOUT”		Time in seconds

Reads power save mode for not in service states	“PW_MODE”		0 – None 1 - PHY only 2 - Shallow sleep 3 - Deep sleep
Reads shallow and Deep sleep values	“PW_ATTR”		Time in microseconds
Get Verizon mode Enable flag	“VZW_MODE_EN”		0 - disabled, 1 - enabled
Get 3GPP Rev. 9 enable flag – currently affects only CapabilityInformation reporting	” LTE_RELEASE_NUM”		SW default, Release 8, Release 9
Get IMEI from DOP (only if OTP is not locked)	“IMEI”		“IMEI value”
Read heating power control enable flag	"HEATIG_PWR_EN"		0 - disabled. 1 - enabled
Read heating power control params	"HEATIG_PWR_PRM "		
Read heating shutdown enable flag	"HEATIG_SD_EN"		0 - disabled. 1 - enabled
Read heating shutdown control params	"HEATIG_SD_PRM"		
Reads if band64 half-duplex mode is enabled	"HD_BAND64_EN”		0 - disabled. 1 - enabled
Reads CEMODE stored value	"CEMODE_VAL”		0 - PS only, 1 – combined PS/CS, non-EPS preferred, 2 – combined PS/CS, EPS - preferred
Reads USB buffer configuration	"USB_BUFF_CONFIG ”	0 – SW default (10640) 1 – Small (1520) 2 – Medium (5320) 3 – Large (10640)	Size in Bytes
Reads ROHC RTP port recognition mode	“ROHC_RTP_RECG ”		0 - SW default 1 – don’t recognize

			RTP 2 – RTP auto recognition 3 – use port list for RTP recognition
Reads ROHC RTP port number	"ROHC_RTP_NUM"		0-6
Reads Scan Plan feature enabled flag	"SCAN_PLAN_EN"	0 - disabled 1 - enabled	
Reads Scan List row	"SCAN_LIST"	[row_index] (1-40) If omitted, whole list is reported	band, EARFCN start, EARFCN end, EARFCN step
Reads LTE category setting	"LTE_CATEGORY"	0 – SW default 3 – CAT3 4 – CAT4 5 – CAT5	
Reads if external CAT is enabled in NPD mode	"NPD_CAT_EN"	0 - disabled 1 - enabled	

AT%SETCFG

Description: Set a configuration field in NV memory

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

Purpose	Param1	Param2	Param3	Param4	Returns
Sets device's operation mode in NV	"OPER"	"SERV"," NET"			OK\ ERROR
Sets device's image in focus in NV	"IMG"	"HOST", "1", "2"	OK\ ERROR		OK\ ERROR
Sets device's log module severity in NV	"LOG"	"SYS","L1A", "MAC","RLC", "PDCP", "RRC", "VL1", "NAS", "L1AC", "USIM", "FRM", "ROHC",	"DEBUG", "FINE","DEBUGW", "DEBUGE", "DEBUGF", "INFO", "NOTICE",		OK\ ERROR

		"PROF0", PROF1", "PROF2", “PROF4", "PROF6", "OSAL", "SERV"	"WARN", "ERROR", "CRIT", "ALERT", "EMRG"		
Sets device's global log severity in NV	"LOG"	"ALL"	"DEBUG", "FINE","DEBUGW", "DEBUGE", "DEBUGF", "INFO", "NOTICE", "WARN", “ERROR", "CRIT", "ALERT", "EMRG"		OK\ ERROR
Set bands defined in DOP file, these bands are the ones to be calibrated and scanned – note only bands that also reside in PhyBP are allowed	“BAND”	“X”	“Y”	“Z”	OK\ ERROR
Sets device's USIM simulator enable/disable in NV	"USIM_SIMULATOR"	"0" (disable), "1" (enable).			OK\ ERROR
Set stored cell feature state	“SC_STAT E”	"0" (disable), "1" (enable).			OK\ ERROR
Set reset on assert	“DISABLE_ RESET”	"0" (disable), "1" (enable).			OK\ ERROR
sets if the device RFIF to GPIO feature is enabled	“RFIF_TO_ GPIO_EN”	"0" (disable), "1" (enable).			OK\ ERROR
Sets device's Watch Dog module	“WATCHD OG_EN”	"0" (disable), "1" (enable).			OK\ ERROR

enable/disable in NV					
Sets the WD time parameter in NV	“WATCHDOG_TIMEOUT”				OK\ ERROR
Sets device's FW crash mechanism enable/disable in NV	“CRASH_E N”	"0" (disable), "1" (enable).			OK\ ERROR
Sets the FW crash mechanism time parameter in NV	“CRASH_TIMEOUT”				OK\ ERROR
Sets power save mode for Idle RRC state	“PW_IDLE”	“none”, “shallow”			OK\ ERROR
Sets min interval to which shallow sleep may be applied	“PW_SS_MIN”	Time in microseconds			OK\ ERROR
Sets estimated entry time to shallow sleep	“PW_SS_ENTRY”	Time in microseconds			OK\ ERROR
Sets estimated exit time from shallow sleep	“PW_SS_EXIT”	Time in microseconds			OK\ ERROR
Sets min interval to which deep sleep may be applied	“MIN_DS_DURATION”	Time in microseconds			OK\ ERROR
Sets estimated entry time to deep sleep	“DS_ENTRY_GUARD_TIME”	Time in microseconds			OK\ ERROR
Sets estimated exit time from shallow sleep	“DS_EXIT_GUARD_TIME”	Time in microseconds			OK\ ERROR
Sets estimated entry time to deep sleep	“PW_DS_ENTRY”	Time in microseconds			OK\ ERROR
Sets estimated exit	“PW_DS_E	Time in			OK\

time from shallow sleep	XIT”	microseconds			ERROR
Sets Verizon mode Enable flag	“VZW_MODE_EN”	"0" (disable), "1" (enable)			OK\ ERROR
3GPP Rev. 9 enable flag – currently affects only CapabilityInformation reporting	“LTE_RELEASE_NUM”	“default”, “release8”, “release9”			OK\ ERROR
Set IMEI to DIP (only if OTP is not locked)	“IMEI”	“IMEI value”			OK\ ERROR
Sets heating power control enable flag	"HEATIG_PWR_EN"	"0" (disable), "1" (enable)			OK\ ERROR
Sets heating power control params	"HEATIG_PWR_PRM"	Reduce power temperature threshold			OK\ ERROR
Sets heating shutdown enable flag	"HEATIG_SD_EN"	"0" (disable), "1" (enable)			OK\ ERROR
Sets heating shutdown control params	"HEATIG_SD_PRM"	UL shutdown threshold			OK\ ERROR
Sets if device shall disable PHY logger mechanism at wakeup	"PHY_LOG_DISABLE”	"0" (enable), "1" (disable)			OK\ ERROR
Sets band64 half-duplex mode enable flag	"HD_BAND64_EN”	"0" (disable), "1" (enable)			OK\ ERROR
Reads CEMODE stored value	"CEMODE_VAL”	“0” - PS only, “1” – combined PS/CS, non-EPS preferred, “2” – combined PS/CS, EPS - preferred			OK\ ERROR
Sets USB buffer	"USB_BUF	“0” - SW default			OK\

configuration	F_CONFIG ”	“1” - Small “2” - Medium “3” - Large			ERROR
Sets ROHC RTP port recognition mode	“ROHC_RTP_RECOG”	“0” – SW default, “1” – don’t recognize RTP, “2” – RTP auto recognition, “3” – use port list for RTP recognition			OK\ ERROR
Sets RTP recognition port list to DOP file	"ROCH_RTP_LIST"	Port1[,Port2[,Port3[,Port4[,Port5[,Port6]]]]]			OK\ ERROR
Sets BOOTP ‘sname’ for internal DHCP server	“BOOTP_SNAME”	String up to 64 symbols.			OK\ ERROR
Sets DHCP lease time for internal DHCP server	“DHCP_LEASE”	0 or more Zero means use SW default.			OK\ ERROR
Sets Scan Plan feature enabled flag	“SCAN_PLAN_EN”	"0" (disable), "1" (enable)			OK\ ERROR
Sets Scan List Row	“SCAN_LIST”	row_index (1-40)	"0" (disable), "1" (enable)	[band] (band to scan, optional for disable)	OK\ ERROR
Sets LTE category	“LTE_CATEGORY”	“0” – SW default “3” – CAT3 “4” – CAT4 “5” – CAT5			OK\ ERROR
Sets external CAT enable flag for NPD mode	“NPD_CAT_EN”	“0” - disable “1” - enable			OK\ ERROR

AT%EARFCN

Description: AT command for setting the DL EARFCN (E-UTRAN DL frequency channel number):

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> Currently camped EARFCN.
%EARFCN=?	%EARFCN: (list of <earfcn>s found in scan)

AT%VER

Description: Display all FW versions (SB/MAC/PHY/ASIPS)

Use: AT%VER

Returns: SB/MAC/PHY/ASIPS Revisions

AT%CSQ

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.

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

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

AT%CPININFO

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

AT%SETLOG

Description: Command to set log severity in RAM per module

Use: AT%SETLOG=<param1>,<param2>

Purpose	Param1	Param2	Returns
Sets module log	"SYS","L1A",	"DEBUG",	OK\ ERROR

severity in RAM	"MAC","RLC", "PDCP", "RRC", "VL1", "NAS","L1AC", "USIM","FRM", "ROHC", "PROF0", "PROF1", "PROF2", "PROF4", "PROF6", "OSAL", "SERV"	"FINE","DEBUGW", "DEBUGE", "DEBUGF", "INFO", "NOTICE", "WARN", "ERROR", "CRIT", "ALERT", "EMRG"	

AT%GETLOG

Description: Command to get log severity in RAM per module

Use: AT%GETLOG=<param1>

Purpose	Param1	Returns
Reads device's log module severity from RAM	"SYS","L1A", "MAC","RLC", "PDCP", "RRC", "VL1", "NAS","L1AC", "USIM","FRM", "ROHC", "PROF0", "PROF1", "PROF2", "PROF4", "PROF6", "OSAL", "SERV"	"DEBUG", "FINE","DEBUGW", "DEBUGE", "DEBUGF", "INFO", "NOTICE", "WARN", "ERROR", "CRIT", "ALERT", "EMRG"

AT%DTLOG

Description: Enable/Disable Drive Test logs

Use: AT%DTLOG=<mode>

Purpose	Mode	Returns
Disable Drive Test logs	0	OK
Enable Drive Test logs	1	OK

Note: This setting is applied only during run-time (not NV stored) and will be lost after reboot

AT%STATUS

Description: Get entity status

Use: AT%STATUS=<entity>

Purpose	Entity	Returns	Status
Get USIM status	"USIM"	USIM: REAL USIM	Valid USIM inserted
		USIM: USIM SIMULATOR	USIM Simulator active
		USIM: NO USIM	No USIM present
		USIM: INVALID USIM	Invalid USIM
Get init procedure status	"INIT"	INIT:0	Init in progress
		INIT:1	Init complete
Get APN-AMBR status	"AMBR"	eps bearer id: Downlink: x kbps Uplink: x kbps	
Get RRC status	"RRC"	"IDLE" "CONNECTED" "UNKNOWN" – Used for all other states (init, standby, flight mode, etc.)	

AT%MEAS

Description: Command returns measurement for specified measurement type.

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

Note: "reported" value for RSRP and RSRQ means max value for 2 antennas. The SINR is not reported over the air, its "reported" value contains combined value of both antennas' measurements.

The per antenna measurement value RXyTXz (y,z=0/1) is the result of wide-band measurement of the RS symbols' power calculated over the entire bandwidth.

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

Read command is not supported.

Use: AT%MEAS="<measurement type>"[,<EARFCN>[,<cell ID>]]

Command	Possible response(s)
%MEAS=<measurement type>[,EARFCN[,cell ID]]	For RSRP, RSRQ, SINR, RSSI: %MEAS: <measurement type>: Reported=<measurement value>, Rx0Tx0=<measurement value>,

	Rx0Tx1=<measurement value>, Rx1Tx0=<measurement value>, Rx1Tx1=<measurement value> For Temperature, Pathloss: %MEAS: <measurement type>: <measurement value> For TX Power: %MEAS: <measurement type>: PUSCH=<measurement value>, PUCCH=<measurement value>, PRACH=<measurement value>, SRS=<measurement value> For Signal Quality: %MEAS: <measurement type>: RSRP=<measurement value>, RSRQ=<measurement value>, SINR=<measurement value>, RSSI=<measurement value> For all NBS RSRP and RSRQ: %MEAS:[ERFCN=<value>], CellID=<value>, <measurement type>=<measurement value> [<CR><LF>%MEAS:[ERFCN=<value>], CellID=<value>, <measurement type>=<measurement value>] […] For all neighboring NBS simultaneous RSRP and RSRQ reporting: %MEAS:[ERFCN=<value>], CellID=<value>, RSRP=<measurement value>, RSRQ=<measurement value> [<CR><LF>%MEAS:[ERFCN=<value>], CellID=<value>, <measurement type>=<measurement value>] […]
%MEAS?	ERROR (OPRATION_NOT_ALLOWED) Operation is not supported

%MEAS=?	%MEAS: <list of supported measurements>

Defined values:

<Measurement type>:

- "0 " - RSRP
- "1 " - RSRQ
- "2 " – SNR (only for serving eNB)
- "3 " – RSSI (only for serving eNB)
- "4 " – TX Power
- "5 " – Temperature
- "6 " – Pathloss
- "97" – RSRP & RSRQ for all detected NBS
- "98 " – RSRP for all detected NBS
- "99 " – RSRQ for all detected NBS

<EARFCN>:

Decimal EARFC value:

- 0 – EARFCN of current serving cell
- Others as per 3GPP encoding for EARFCN. Reserved for future use.

Optional parameter, if missed serving eNB is always selected.

<cell ID>:

Decimal Cell ID value:

- 0 – cell ID of current serving cell
- Others as per 3GPP encoding for cell ID. Reserved for future use.

Optional parameter, if missed serving eNB is always selected.

<measurement value>:

The measurement results are returned in native for each measurement units:

- dBm for RSRP, RSSI, Pathloss
- dB for RSRQ
- 10dBm for TX Power
- Degrees (°C) for Temperature
- Degrees (phase) & 256*dBM (RSSI) units for Antenna relative phase

Measurement range:

- -140 <= RSRP <= 0
- -64 <= RSRQ <=0
- -12 <= SINR <= 40
- -26 <= TX Power <= 40
- -128 <= Temperature <= 128

If measurement value for some antenna is not supported (if neighbor reporting is selected, for

example), 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" - not available indication for this specific antenna in the returned string.

Example:
AT%MEAS="0"
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%PCONI
Description: Returns physical connectivity parameters info. Command returns ERROR if connection to eNB is not established yet. Read and Test commands are not supported.
Use: AT%PCONI
Returns: <duplexing mode>, <antenna mode>, <bw>, <EARFCN>, <cell ID>

Field	Values
Duplexing Mode	TDD FDD
Antenna Mode	SISO Tx diversity Open loop MIMO Close loop
BW	0 – 1.4 MHz (unsupported) 1 – 3 MHz (unsupported) 2 – 5 MHz 3 – 10 MHz 4 – 15 MHz (unsupported)

DL EARFCN	As per 3GPP encoding for EARFCN
Global Cell ID	As per 3GPP encoding for Cell ID
Physical cell ID	Physical cell Id acquired by cell search
Errors	514 ,"Not camped on cell" 513,"Bad Personalization File"

AT%SCAN

Description: Return a list of cells (EARFCNs) which were successfully acquired from SIB1.

Use: AT%SCAN?

Returns: <DL Bandwidth>, <Global Cell ID>, <DL EARFCN >, <physical Cell ID>, <PLMN ID>, <RSRP>

Mapping the BW index is as followed:

BW index	BW
0	1.4 MHz
1	3 MHz
2	5 MHz
3	10 MHz
4	15 MHz
5	20MHz

AT%BANDCAP

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.

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

AT%LSTASSRT

Description: Command returns information regarding the last assert or exception occurred in the system. Execute and Test commands are not supported.

Command	Possible response(s)
%LSTASSRT=	ERROR (OPRATION_NOT_SUPPORTED) Operation is not supported

%LSTASSRT?	<cpu> CPU: <errorType> <address>[ExcCode: <excCode>]
%LSTASSRT=?	ERROR (OPRATION_NOT_SUPPORTED) Operation is not supported

Defined values:

<cpu>

0 – UMAC

1 - PHY

<errorType>:

- "Last assert at"
- "last full mailbox item:"
- "Last exception at"

<address>

- Any 32-bit value in hexadecimal format.

<excCode>

- As per MIPS' CAUSE register

Implementation Notes:

The command will deliver valid information after SW reset, but will not be valid after HW reset (all values will be zeros).

In case of double assert (assert in one task causing one more assert in other task), the command will deliver the information of the first assert, as it is the root cause for the issue.

AT%GETID

Description: Command to get identification values of the board, and board's components from NV memory.

Command	Possible response(s)
%GETID =[<parameter>]	<SerialNumber> – returns the serial number of the board. <BoardType> – returns the revision number of the board. <UsbProductId> - returns the USB product identification number. <UsbVendorId> – returns the USB vendor identification number. <VendorModelId> – returns the vendor model ID number. <ManufDate> - returns the manufacture date of the board. Returns "+CME ERROR: operation not allowed" for any other entered value

% GETID?	Not supported Returns +CME ERROR: operation not allowed
% GETID =?	Returns a list of supported ID values: SerialNumber, BoardType, UsbProductId, UsbVendorId, VendorModelId, ManufDate

AT%PPPAUTH

Description: Defines APN authentication parameters for the PDP context id <cid>.

Command	Possible response(s)
%PPPAUTH=<cid>, <auth_type>, <auth_name>, <auth_pwd>	OK ERROR
%PPPAUTH?	ERROR (OPRATION_NOT_SUPPORTED) CME ERROR: operation not allowed
% PPPAUTH =?	ERROR (OPRATION_NOT_SUPPORTED) CME ERROR: operation not allowed

Supported ID values:

<auth_type>

- None
- PAP
- CHAP

<auth_name>

Username used for authentication.

<auth_pwd>

Password used for authentication.

AT% TRSHCMD

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.

Read command is not supported.

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

Defined values:

<module>:

- "PHYLOG" – PHY Log module

<cmd>

- "FREQ" - Frequency

  Correction – averaged correction value (after IIR filter). The value is in Q10.

  Detector – correction value calculated on the present SF. The value is in Q10.

  Accumulated – accumulation of the "correction" values.

- "TIMING" – Timing

  Correction – averaged correction samples (after IIR filter).

  Detector – correction samples calculated on the present SF.

  Accumulated – accumulation of the "correction" values.

- "TXP" - TX Power

  PUSCH power – the power value is in dBm Q8.

  Pcmax – maximum allowed power in dBm Q8.

- "AGC"

  Antenna number - 0 or 1.

  Max power – maximum power detected in the present SF (in Q4).

  IIR power – filtered (averaged) power (in Q4).

  RF gain – the RF gain value in dB (in Q4).

- "SINRS0" - SINR Symb0

  The SINR calculated over symbol 0.

  Mantissa

  Exponent – in Q10

  To obtain the SINR value in dB:

- "SINRS7" - SINR Symb7

  The SINR calculated over symbol 7.

- "DCIP" - DCI Parameters

- "CFIC" - CFI type counters

  CFI counter – counts how many SF arrived with the current CFI

- “CFIHI” - CFI and HI values
  CFI – how many SFs has been detected with each CFI (1, 2 or 3).
  HI – detected HI (0-nack, 1-ack, 2- none).
- “CRCTB0” - CRC Error TB0
  CRC counter over TB0.
- “CRCTB1” - CRC Error TB1
  CRC counter over TB1
- “ACKSR” – ACK/NACK counters, SR
- “HARQR” - HARQ Retransmission counter
  Context ID – the context index
  Retransmission counter – counts retransmissions on the current context
  TBS - TB size
- “ALL” – used to disable all PHY logs described above. 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.

<param>:

- “0” – disable
- “1” – enable

<module>:

- "SERVICE" – Service module

<cmd>

- “CONN4MEAS"

<param>:

EARFCN

<module>:

- "TIMERS" – 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.

<param>:

Timer value in ms

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

- "TXANT" – TX antenna selection module. The antenna selection is ignored if “isTxDiversitySupported” is disabled in PHYBP file.

<cmd>:

- “ALTDEFM" – Altair default TX diversity mode for antenna selection
- “USRSELM” – User manual TX antenna selection mode

<param>:

- 0 – TX0 antenna, relevant for “USRSELM” command only.
- 1 – TX1 antenna, relevant for “USRSELM” command only

AT%CEER

This command is used for protocol error notification by enabling unsolicited reporting if needed.

Command	Possible response(s)
%CEER=[<mode>]	OK or ERROR
%CEER?	%CEER: <mode> [,<module>, <procedure>, <failure> [,<reject cause>, [<error info>]]] +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>]]

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

<module>: protocol layer or protocol entity

“NAS-EMM”

“NAS-ESM”

“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”

<failure>:

“REJECT”

“MAXRETRY”

“UNEXPECTED”

<reject cause>: as per protocol definition

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

<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.

Supported ID values:

<auth_type>

- None
- PAP
- CHAP

<auth_name>

Username used for authentication.

<auth_pwd>

Password used for authentication.

Example:

For read:

AT%CEER?

%CEER 0, “NAS-EMM”, “ATTACH”, “REJECT”, #3, INVALID SIM

OK

For unsolicited report:

%CEER “NAS-EMM”, “ATTACH”, “MAXRETRY”

Implementation Notes:

1. This AT command is mostly used in unsolicited report mode. Each time system protocol error occurs, specified layer/module will send message to AT Manager, which will send unsolicited report,

if unsolicited mode is enabled.

2. The AT command manager stores last error report string internally and send it as answer to "AT%CEER?" (read command) adding info about current mode on top of the message. If there was not any error occurred until now, the "AT%CEER?" will return only "mode" value.

3. Some failure may be indicated by more than one error, for example Combined Attach may return Attach Reject with reject cause #19, "ESM failure". In addition the PDN CONNECTIVITY REJECT message will contain ESM reject code. In such a case the NAS entity will send more than one message to AT Manager. These messages will be interpreted as two separate unsolicited reports sent to the host over AT command channel. Note that the last ESM code is more important in this scenario. It is enough that only this last code will be always returned as an answer to "AT%CEER?"

4. Note that when there is no reject cause (for example in Authentication Reject or in Max Retry scenario) the reject cause and the error info will not be displayed

AT%CATSTAT

Command	Possible response(s)
%CATSTAT=<mode>	OK / ERROR
%CATSTAT?	%CATSTAT=<mode>[,<SW1>,<SW2>]
(unsolicited result code)	%CATSTAT: <SW1>,<SW2><module2>:<list of supported commands>…
%CATSTAT=?	%CATSTAT: (list of supported <modes>)

Description

This command allows the CAT to receive status bytes of SIM transactions in order to follow proactive SIM operation. %CATSTAT are provided by terminal as unsolicited AT commands whenever a valid statues word is received (91-xx).

The CAT application can control when it is activated and can get proactive commands.

When terminal powers up the default mode is 0 i.e. no status indication are transferred to host.

Once the CAT application is activated, it will transfer the terminal to mode 1 as it waits for CAT commands from SIM.

Read command provides last proactive command status (only last 0x91XX status). Status is cleared after each read.

Defined values

<mode>:

0 - No statues words are transferred to CAT application (default).

1 - Statues words 91 XX are transferred to CAT application.

2 - All statues words are transferred to CAT application.

<sw1>, <sw2>:

Status words.

AT%CATPOLLINT

Command	Possible response(s)
%CATPOLLINT=<interval>	OK/ERROR
%CATPOLLINT?	%CATPOLLINT: <interval>
%CATPOLLINT=?	OK

Description

This command is used to modify polling interval of SIM in seconds for CAT purposes. Default value is 30 sec.

A value of 0 indicates no polling.

Defined values

<interval>:

Time value in seconds

AT%CATLOCINF

Command	Possible response(s)
% CATLOCINF = <type>	%CATLOCINF: <data>
% CATLOCINF?	ERROR (OPRATION_NOT_ALLOWED)
% CATLOCINF =?	%CATLOCINF: (list of supported < type>s)

Description

This command is used to retrieve data required by CAT application to respond to USIM LOCAL_INFO request.

Defined values

<type>:

0 - Location information as defined in TS 102.223

1 - IMEI of terminal

2 - Measurement results as defined in TS 102.223 & TS 31.111

3 – 5 - Reserved for future use as per TS 102.223

6 – Access Technology as defined in TS 102.223

7 – 8 - Reserved for future use as per TS 102.223

9 - Search mode – will return PLMN search mode as defined in TS 102.223 (0- manual, 1 automatic)

<data>:

As defined in the above specs for the relevant data

Implementation Notes:

1. Location information as defined in TS 102.223 – will be taken from

nas_db_info.identities.Last_Visited_Reg_TAI

2. IMEI of terminal – will be taken from nas_db_info.identities.IMEI
3. Measurement results as defined in TS 102.223 & TS 31.111 – will be taken from (same as at%meas=98 – it will contain also inter measurements)

AT%STATEV

Command	Possible response(s)
AT% STATEV =< mode >	OK or ERROR
AT% STATEV?	ERROR (Operation not allowed)
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

AT%NOTIFYEV

Command	Possible response(s)
AT% NOTIFYEV =<cmd>	OK or ERROR
AT% NOTIFYEV?	ERROR (Operation not allowed)
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.
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.

Defined values:

<ev_type>:

"LTIME" – local time is received from network

"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.

"ALL" – enables/disables all event types. This event type cannot be sent in unsolicited reporting.

<param1>:

For "LTIME": <time> as encoded in +CCLK response defined in 27.007

For "SIMREFRESH": <mode> as encoded in %SIMREFRESH command

<param2>:

For "SIMREFRESH": <isRestart> as encoded in %SIMREFRESH command

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"

AT%NETSEL

Command	Possible response(s)
AT%NETSEL=<arch>,<apn_table>	OK or ERROR
AT% NETSEL?	Current APN table
AT% NETSEL =?	OK

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.

Read command is not supported.

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

AT%TSTRF

Command	Possible response(s)
AT%TSTRF=<cmd>[,<earfcn>,<time>, <RX_antenna/TX_type>[,<TX_power>,<TX_param>]]	For <cmd>=4 (RX read)only: %TSTRF: min=<min>, avg=<avg>, max=<max> For all: OK or +CME ERROR: <error>
AT%TSTRF?	%TSTRF=<status> OK/ERROR
AT% TSTRF =?	OK

Description:

Test AT command is intended for RF TX/RX test mode.

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

The RX and TX test commands only triggers test operation and are not blocking for the time defined in <time> parameter. To interrupt TX and RX test mode the abort sub-command (AT%TSTRF=1) is required. To return to normal operational mode after any type of the RF tests the return to normal mode sub-command (AT%TSTRF=0) is required.

The SC-FDMA transmission will be on full BW.

For RX tests:

When applying CW to UE antenna, it is recommended to use 1Mhz offset to central frequency to avoid DC interference

When applying LTE signal to UE antenna, it is recommended to use a continuous FDD radio frame, which occupy all subcarriers including the ones dedicated for PBCH/PSC/SSC.

Defined values:

<cmd>:

0 - Return to normal mode

1 - Abort RX/TX test

2 – Start RX test

3 – Start TX test

4 – RX test results read

<earfcn>:

EARFCN decimal value as per LTE spec

<time> - test execution time in ms:

0 – special value:

For RX: 0 is not allowed

For TX: continuous TX forever

1-600000 ms

< RX_antenna/TX_type>:

For RX (2):

0 - primary antenna

1 - secondary antenna

For TX (3) – type of transmitted signal:

0 - SC-FDMA

1 – CW (continuous waveform) AT Commands Interface

<TX_power>:

Absolute output power [dBm]

<TX_param>:

For SC-FDMA-BW:

0 – 1.4 MHz

1 – 3 MHz

2 – 5 MHz

3 – 10 MHz

4 – 15 MHz

5 – 20 MHz

For CW:

offset to central frequency in Hz

<min>, <avg>, <max>:

Measured energy value in dBm.

<status> - status of test:

0 – busy

1 – ready

<error>

As per 3GPP 27.007

Invalid EARFCN

Implementation Notes:

MAC always replies to this AT command immediately.

If test start is commanded (2 and 3), the MAC-PHY API is always blocking up to PHY FW response over MAC-PHY API.

The PHY internally shall manage zero value differently:

For RX time=0 implies one measurement and return.

For TX time=0 implies continuous TX (immediate return or not?). Only abort command will stop PHY TX.

The TX continuous mode requires abort to return to normal system operation.
PHY shall be ready to receive nested abort command not only for continuous mode, but also for any limited timer operation.
MAC does not sniff all AT command parameters. MAC shall be kept simple.
This is a reason why the return to normal mode <cmd> = 0 is expected from user.
The MAC logic is the next:

On any command: 1, 2, 3 MAC turns the rfTest flag to true and pass the command to PHY.

On command: 0 MAC turns the rfTest flag to false. In addition MAC shall send abort command to PHY to be sure that RX/TX tests are aborted. PHY shall be ready to ignore abort command if there is not any test running

On command: 4 MAC returns last acquired from PHY measurement or returns ERROR if the PHY response on RX test is still did not returned.

If CFUN=1 is received when rfTest = true, return error.

AT%SPMMODE

Command	Possible response(s)
AT%SPMMODE=<state>[,<rel_state>[,<rel_th>[,<abs_ia>[,<abs_ir>]]]]	OK or ERROR
AT% SPMMODE?	<state>
AT% SPMMODE =?	OK

Description:

The command is intended to command enter and exit from Special measurement mode.
Special measurement mode may be enabled only if device is in RRC IDLE state. Use AT%STATUS="RRC" to get the RRC state. Alternatively, the unsolicited AT%STATEV may be used to detect that device is entered IDLE mode sending status 2 (Enter Camped). Any attempts to enable Special mode in other than RRC_IDLE state will be declined with error.
Use unsolicited AT%STATEV with event=3 (Connection Establishment) to detect that Special mode is interrupted as a result of Connection establishment attempt.

Defined values:

< state > - status of Special mode and its reporting:

0 – disable Special mode

1 – enable Special mode

<rel_state> - status of relative threshold:

0 – disable relative threshold

1 – enable relative threshold

<rel_th> - relative threshold value in dB (same for inter and intra)

<abs_ia> - intra absolute RSRP threshold value in dBm

<abs_ir> - inter absolute RSRP threshold value in dBm

AT% SETPCO

Command	Possible response(s)
AT% SETPCO = <cid>[,<pcoid>[,<payload>]]	OK or ERROR
AT% SETPCO?	ERROR (OPRATION_NOT_SUPPORTED) CME ERROR: operation not allowed
AT% SETPCO =?	OK

Description:

User defined PCO ID which needs to be requested by LTE modem for the PDP context id <cid>.

Defined values:

<cid> - The ID of the PDP context on which the PCO request should be sent.

<pcoid>- The PCO container ID as defined in 3GPP 24.008 section 10.5.6.3

<payload> - The payload to be sent on the PCO request in HEX format (As an example, this may include MCC, MNC as defined in 3GPP 24.008 section 10.5.6.3).

Implementation Notes:

The LTE modem support single "user defined PCO" request. Therefore, if this command is called again with other parameters, it is override the previous setting.

If the <pcoid> and <payload> fields are not specified, then PCO request shall be disabled

AT%PCOINFO

Command	Possible response(s)
AT% PCOINFO=<mode>[,<cid>]	Mode 0,1: OK ERROR Mode 2: %PCOINFO:<mode>,<cid>[,<pcoid>[,<payload>]] OK ERROR
AT% PCOINFO?	OK
AT% PCOINFO=?	%MBMSCMD: List of supported <cmd>
(unsolicited report)	%PCOINFO:<cid>,<pcoid>[,<payload>]

Description:

This command queries the modem to get the last PCO payload which was received for the pre-configured

AT%SETPCO. The received <payload> is for the <pcoid> configured by the AT%SETPCO.

The command may used also to set unsolicited indication for network unsolicited PCO indication.

See 3GPP
24.008 section 10.5.6.3 for list of PCO's.
For <mode>=2:

If result code is ERROR, this is because PCO request was not sent or because the modem still wait for PCO response (over ATTACH ACCEPT or over ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST)

If received result code is <cid> but without <pcoid>and without <payload> then consider it as network reply (ATTACH ACCEPT or ACTIVATE DEFAULT EPS BEARER CONTEXT REQUEST) without PCO.

The AT%PCOINFO? return the list of PCO information for the active PDNs.

Defined values:

<mode> - the mode of the command:

- 0 – disable unsolicited PCO notification
- 1 – enable unsolicited PCO notification
- 2 – query received PCO

<cid> - The ID of the PDP context on which the PCO request was sent.
<pcoid>- The PCO container ID as defined in 3GPP 24.008 section 10.5.6.3
<payload>- PCO container payload received from LTE network for the specified <cid> and <pcoid>. The payload shall be received in HEX format

AT%GETFINFO

Command	Possible response(s)
% GETFINFO = <file>,<info_type>	<info> OK/ERROR
% GETFINFO?	ERROR (not supported)
% GETFINFO =?	%MBMSCMD: List of supported <cmd>

Description:

This command is used to get information about LTE parametric files.

Defined values:

<file> - file name:

"BOOTBP"
"SYSBP"
"PHYBP"
"FCF"
"DIP"
"DOP"
"PRSNP"

"EXTSIMP"

<info_type>:

"CRC" – CRC over entire file content. In case of NPD is embedded in

<info>:

For CRC:

32-bit CRC value in decimal representation

Implementation Notes:

For CRC:

In case of NPD the CRC is embedded into file header

For NPE the CRC shall be calculated over entire file content.

For better consistency the CRC may be calculated on this AT command for both configurations: NPD and NPE.

AT%MBMSCMD

Command	Possible response(s)
%MBMSCMD=<cmd>[,<param1>[,<param2>]]	OK/ERROR
%MBMSCMD?	Return list of available services: %MBMSCMD: <AreaID>,<TMGI>[,<SessionID>] %MBMSCMD: <AreaID>,<TMGI>[,<SessionID>] … %MBMSCMD: <AreaID>,<TMGI>[,<SessionID>] OK/ERROR
%MBMSCMD=?	%MBMSCMD: List of supported <cmd>

Description:

AT command to manage MBMS reception.

Defined values:

<cmd>

"ACTIVATE" - Activate specific <TMGI> on specific <AreaID>

"DEACTIVATE" - Deactivate specific <TMGI> on specific <AreaID>

<param1>:

AreaID (See details in <AreaID> description below)

<param2>:

TMGI (See details in <TMGI> description below)

<cmd>:

"DEACTIVATE_ALL" - Deactivate all running services

<cmd>:

"CTRLPDN" – Set the <cid> of the MBMS control PDN (default <cid> is 1)

<param1>:

CID - The ID of the PDP context on which MBMS control traffic is sent.

<AreaID>: int

Area in which participating cells transmit same synchronized content on the same frequency. Within MBSFN area, cells which don't participate on MBMS transmissions are not allowed to overlap the transmissions with their own content. The device can receive content from up to 8 Areas concurrently.

<TMGI>: string

TMGI (Temporary MBMS Group Identity) includes both service ID and PLMN ID. The service ID represent single "channel" which transmit content. Each area ID has its own services. Currently, the device can receive up to 29 services in total.

The format of TMGI is defined in 3GPP 23.003:

<SessionID>: int

SessionID is required higher level middleware functionality.

AT%MBMSEV (unsolicited)

Command	Possible response(s)
AT%MBMSEV=<cmd>	OK/ERROR
AT%MBMSEV?	ERROR (not supported)
AT%MBMSEV=?	%MBMSEV: List of supported <cmd>
(unsolicited result code)	%MBMSEV: <event>

Description

This unsolicited command indicates the host that there are changes in the MBMS services. The host may query for updated service list by using "AT%MBMSCMD?".

Defined values

<cmd> : a numeric parameter AT Commands Interface

0 – Disable unsolicited MBMS indications

1 – Enable unsolicited MBMS indications

<event> : a numeric parameter

0 – Service change event

1-99 – Reserved

AT%LTEINFO

Command	Possible response(s)
AT%LTEINFO= <layer>,<type>	LTEINFO:<info1>[, <info2>] OK/ERROR
AT%LTEINFO?	ERROR (not supported)
AT%LTEINFO=?	OK

Description

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

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

AT%CMATT

Command	Possible response(s)
%CMATT=0/1	OK/ERROR
%CMATT?	%CMATT: <0/1>
%CMATT=?	OK

Description

This command is used to send a attach command from embedded CM.

"Connect"/"Disconnect" commands

- *AT%CMATT=1*
- *AT%CMATT=0*

AT%DPDNACT

Command	Possible response(s)
%DPDNACT=0/1	OK/ERROR
% DPDNACT?	% DPDNACT: <0/1>
% DPDNACT =?	OK

Description

This command is used to open or close internet PDN. User will fail to open internet PDN until IMS server is registered.

Open/Close INTERNET/Data PDN:

- *AT%DPDNACT=1*
- *AT%DPDNACT=0*