



AT Commands Guide

Version: RK_03_02_00_00_20161_001

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Introduction

This document provides information about the CAT-M, NB-IOT, and 2G AT commands supported by the ALT1250. The AT commands are listed and associated with a particular RK SW version.

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

- 3GPP Standard AT Commands
- Altair's Proprietary AT Commands

References

The following documents are referenced in this document.

- [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.docx
- [4]: 3GPP 27.005 SMS & CBS Commands
- [5]: Verizon Wireless, Device requirements for LTE 3GPP band 13 network access V15.0

Standard 3GPP AT Commands

List of AT commands

- A
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- **CHLD**
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- CSCI
- CSDH
- CSIM
- CSMP
- CSMS
- CSODCP
- CSQ
- CSSAC
- CSSN
- CSUS
- CTZR
- CTZU
- CUSATE
- CUSATT
- CUSD
- D
- DT
- DT99
- E
- E0
- E1
- F0
- GCAP
- GMI
- GMM
- GMR
- GSN
- H
- H0
- I
- ICF
- IFC
- IPR
- K
- O
- Q
- Q1
- QO
- RING
- S2
- V
- V1
- VO
- VTS
- WS46
- Z

Overview

The section below provides description of the supported standard 3GPP AT Commands.

Detailed Description

A

Description: Accept incoming call.

Notes/Limitations: Relevant for VOLTE only.

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

CAVIMS

Description: Availability for voice calls with IMS.

Notes/Limitations: Relevant for VOLTE only. Note: Altair modem which includes internal stack of IMS/VoLTE may automatically set CAVIMS to the correct mode depends if VoLTE is enabled/disabled on the device.

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CCHC

Description: Close Logical Channel.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CCHO

Description: Open Logical Channel.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CCIOTOPT

Description: CIoT EPS optimization.

Notes/Limitations: ALT-1250 only Only CP-CIoT is supported. The UP-CIoT configuration is not supported yet.

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CCLK

Description: Set the Real Time clock.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CCWA

Description: Incoming waiting call indication.

Notes/Limitations: Relevant for VOLTE only In set command <mode> and <class> are not supported. Unsolicited result code return only: <number>, <type>, <class>, <alpha>

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CDS

Description: URC delivery of status report to host.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CDSI

Description: URC indication of status report to host.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CDU

+CDU=<action>[,<URI>[,<client> [,<mpidx>[,<CLIR_OIR>[,<CUG_pointer> [,<type_of_call>[,<3gpp_res1>[,<3gpp_res2>[, <3gpp_res3>]]]]]]][,<param_type>,<param>,< value>[...]]	+CME ERROR:<err> when <action>=0 and command successful: [+CDUT:<URI_scheme>[,<client>] [<CR><LF>+CDUT:<URI_scheme>[,<client >]] [...]] when <action>=1 and command successful: [+CDU:<ccidx>] when <action>=1 and command unsuccessful: [+CDUI:<cause>]
+CDU=?	+CDU:(list of supported <URI_scheme>s)

Description:

The command is the same as standard AT+CDU with additional proprietary parameters. These additional parameters can be provided at the end of parametric list for <action>=1 (dial).

Defined values:

<3gpp_res1> - parameter placeholder reserved for future 3GPP command extensions.

<3gpp_res2> - parameter placeholder reserved for future 3GPP command extensions.

<3gpp_res3> - parameter placeholder reserved for future 3GPP command extensions.

<param_type> - string type; additional parameter type to be used in dial:

- "INVITEHDR" - SIP invite header

For "INVITEHDR":

<param> - string type; header name

<value> - string type; header value

All other parameters are defined in 3GPP 27.007

Examples:

```
AT+CDU=1,"sip:gcs-incoming-test@garmin-waldo-1.sip.us1.twilio.com",,,,,,,,,,"INVITEHDR","x-testHeader","testData","INVITEHDR","X-Auth-Token","fa8426a0-8eaf-4d22-8e13-7c1b16a9370c"
```

```
+CDU: 1
```

```
OK
```

CDUU

Description: URC Indication of the current call status.

Notes/Limitations: Relevant for VOLTE only

Spec Rev: 3GPP 27.007 Rev11, Set for User Equipment AT Commands (UE)

CEDRXRDP

Description: Retrieves eDRX parameters.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CEDRXS

Description: Controls the setting of eDRX parameters.

Notes/Limitations: Persistence depends on 'AtCmdSetPersistence' parameter in 'modem_apps' configuration file.

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE) \

CEER

Description: Extended error report.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CEMODE

Description: UE modes of operation for EPS.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CEN

Description: Emergency Numbers.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CEPPI

Description: Power Preference Indication for EPS.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CEREG

Description: EPS network registration status.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CESQ

Description: Extended Signal Quality.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CEUS

Description: UE's usage setting for EPS.

Notes/Limitations: Relevant for VOLTE only.

Spec Rev: 3GPP 27.007 Rev11, Set for User Equipment AT Commands (UE)

CEVDP

Description: UE's Voice Domain Preference.

Notes/Limitations: Relevant for VOLTE only

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CFUN

Description: Set phone functionality.

Notes/Limitations: Only mode 4 (flight mode) is stored in NV memory. <fun>=2/3 are not supported. <fun> 128/129 are not supported

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGACT

Description: PDP context activate or deactivate.

Notes/Limitations: Note: Altair modem which includes internal stack may automatically activate/deactivate PDN context. Command shall be used with caution

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGAPNRC

Description: Report the APN rate control parameters.

Notes/Limitations:

Spec Rev: Rev14

CGATT

Description: PS attach or detach.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGAUTH

Description: Define PDP context authentication parameters.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGCLASS

Description: GPRS mobile station class.

Notes/Limitations: Applicable only for 2G

Spec Rev: Rev4

CGCMOD

Description: PDP Context Modify.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGCONTRDP

Description: PDP Context Read Dynamic Parameters.

Notes/Limitations: <IM_CN_Signalling_Flag_Ind>: Parameters omitted. <WLAN_Offload>: Parameters omitted. <Reliable_Data_Service>: Parameters omitted

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGDCONT

Description: Define PDP Context

Notes/Limitations: <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 <Reliable_Data_Service>: Parameters omitted Note: Altair modem may automatically set the PDN context. Command shall be used with caution. Persistency depends on 'AtCgdcontSetPersistence' parameter in 'modem_apps' configuration file.

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGDSCONT

Description: Define Secondary PDP Context.

Notes/Limitations: <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

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGEQOS

Description: Define EPS Quality Of Service.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGEQOSRDP

Description: EPS Quality Of Service Read Dynamic Parameters.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGEREP

Description: Packet Domain event reporting.

Notes/Limitations: The set command only serves as +CGEV enabler and disabler. The Buffer modes are ignored (no buffering) +CGEV has no support for: ME CLASS NW CLASS ME MODIFY ME PDN ACT - doesn't return <reason>, <cid_other> and <WLAN_Offload>

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGLA

Description: Generic UICC logical channel access.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGMI

Command	Possible response(s)
+CGMI	<manufacturer> +CME ERROR: <err>
+CGMI=?	

Description: This execution command causes the TA to return one or more lines of information text <manufacturer>, determined by the MT manufacturer, which is intended to permit the user of the TA to identify the manufacturer of the MT to which it is connected to. Typically, the text will consist of a single line containing the name of the manufacturer, but manufacturers may choose to provide more information if desired.

Refer subclause 9.2 for possible <err> values.

Defined values:

<manufacturer>: The total number of characters, including line terminators, in the information text should not exceed 2048 characters. Text should not contain the sequence 0<CR> or OK<CR>.

CGMM

Command	Possible response(s)
+CGMM	<model> +CME ERROR: <err>
+CGMM=?	

Description: This execution command causes the TA to return one or more lines of information text <model>, determined by the MT manufacturer, which is intended to permit the user of the TA to identify the specific model of the MT to which it is connected to. Typically, the text will consist of a single line containing the name of the product, but manufacturers may choose to provide more information if desired. Refer subclause 9.2 for possible <err> values.

Defined values:

<model>: The total number of characters, including line terminators, in the information text should not exceed 2048 characters. Text should not contain the sequence 0<CR> or OK<CR>.

CGMR

Command	Possible response(s)
+CGMR	<revision> +CME ERROR: <err>
+CGMR=?	

Description: This execution command causes the TA to return one or more lines of information text <revision>, determined by the pertinent information of the MT to which it is connected to. Typically, the text will consist of a single line containing the version of the product, but manufacturers may choose to provide more information if desired. Refer subclause 9.2 for possible <err> values.

Defined values:

<revision>: The total number of characters, including line terminators, in the information text should not exceed 2048 characters. Text should not contain the sequence 0<CR> or OK<CR>

CGPADDR

Description: Show PDP address +CGPADDR.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGQMIN

Description: Quality of service profile (minimum acceptable).

Notes/Limitations: Relevant for 2G only.

Spec Rev: Rev4

CGQREQ

Description: Quality of service profile (requested).

Notes/Limitations: Relevant for 2G only.

Spec Rev: Rev4

CGREG

Description: GPRS network registration status.

Notes/Limitations: Only applicable in 2G

Spec Rev: Rev12

CGSCONTRDP

Description: Secondary PDP Context Read Dynamic Parameters.

Notes/Limitations: <IM_CN_Signalling_Flag_Ind>: Parameters omitted. <WLAN_Offload>: Parameters omitted

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGSMS

Description: Switch MO SMS between IMS to SGs.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGSN

Description: Request revision identification.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGTFT

Description: Traffic Flow Template. Used to define a Traffic Flow Template for a PDP context or a Traffic Flow Aggregate for an EPS bearer resource.

Notes/Limitations: Filtering of <local address and subnet mask> - not supported

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CGTFTRDP

Description: Traffic flow template read dynamic parameters.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CHLD

Description: Accept incoming call.

Notes/Limitations:;Relevant for VOLTE only. Only <n>=1,2 are supported

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

CIMI

Description: Request international mobile subscriber identity (IMSI).

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CIPCA

Description: Attach with or without a PDN connection.

Notes/Limitations: Only <n>=3 applicable to E-UTRAN is supported

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CIREG

Description: Enable + CIREGU URC indication.

Notes/Limitations: Relevant for device with IMS.

Spec Rev: 3GPP 27.007 Rev11, Set for User Equipment AT Commands (UE)

CIREP

Description: IMS network reporting.

Notes/Limitations: Relevant for VOLTE only

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CLAC

Description: List all available AT commands.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

Command	Possible response(s)
+CLAC	<AT Command1> [<CR><LF><AT Command2> [...]] +CME ERROR: <err>
+CLAC=?	+CME ERROR: <err>

Description: This execution command causes the MT to return one or more lines of AT Commands. Refer subclause 9.2 for possible <err> values.

NOTE: This command only returns the AT commands that are available for the user.

Defined values:

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

Implementation: Optional.

CLCC

Description: Accept incoming call.

Notes/Limitations: Relevant for VOLTE only. Only mandatory fields are returned.

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

CLCK

Description: Facility lock.

Notes/Limitations: Supported facilities: - "SC" - "PN" - "PS" - "PU"

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CLIP

Description: Enable +CLIP URC indication.

Notes/Limitations: Relevant for device with IMS and devices with VOIP(Without IMS).

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CMEE

Description: Report mobile termination error.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CMGC

Description: Sends a command message (SMS-COMMAND).

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CMGD

Description: Delete Messages.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CMGF

Description: Message Format.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CMGL

Description: List Messages.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CMGR

Description: Read Messages.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CMGS

Description: Send Message from host.

Notes/Limitations: Support Text/PDU mode.

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CMGW

Description: Write Message to Memory.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CMMS

Description: More Messages to Send.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CMSS

Description: Send SMS from storage.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CMT

Description: URC delivery of SMS to host.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CMTI

Description: URC indication of SMS to host.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CNEC

Description: Report ESM/EMM Network failures.

Notes/Limitations: No MM/GMM/GSM support

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CNEM

Description: Network emergency bearer services support.

Notes/Limitations: Relevant for VOLTE only

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CNMA

Description: New Message Acknowledgement to ME/TA.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CNMI

Description: New Message Indications.

Notes/Limitations: 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.

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CNMPSD

Description: Indicates that no application is expected to exchange data.

Notes/Limitations: None

Spec Rev: Rev15

CNUM

Description: Subscriber number.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

COPN

Description: Read Operator Names.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

COPS

Description: PLMN selection.

Notes/Limitations: <mode>=4 is not supported

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CPAS

Description: Phone activity status.

Notes/Limitations: Relevant for VOLTE only. Only <pas>=0/1/3/4 are supported

Spec: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CPBF

Description: Find phonebook entries.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CPBR

Description: Read phonebook entries.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CPBS

Description: Select phonebook memory storage.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CPBW

Description: Write phonebook entry.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CPIN

Description: Enter PIN.

Notes/Limitations: Supported facilities: - SIM PIN - SIM PUK - SIM PIN2 - SIM PUK2 - PH-SIM PIN -PH-NET PIN

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CPINR

Description: Remaining PIN retries.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CPLS

Description: Selection of preferred PLMN list.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CPMS

Description: Preferred Message Storage.

Notes/Limitations: Supports only "ME" or "SM" storage

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CPNER

Description: Enable +CPNERU URC indication.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CPNET

Description: Preferred network indication.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CPNSTAT

Description: Preferred network status.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CPOL

Description: Preferred PLMN list.

Notes/Limitations: The command accepts <oper> in numeric format only

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CPSMS

Description: Power Saving Mode Setting.

Notes/Limitations: Persistency depends on 'AtCmdSetPersistence' parameter in 'modem_apps' configuration file.

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE) \

CPWD

Description: Change password.

Notes/Limitations: Supported facilities: - "SC" - "P2" - "PN" - "PS" - "PU"

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CRCES

Description: Returns coverage enhancement status.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CREG

Description: Network registration.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CRES

Description: Restore Settings.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CRLA

Description: Restricted UICC Logical Channel access.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CRSM

Description: Restricted SIM access.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CRTDCP

Description: Enable and disable URC for data transmitted over control plain.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CSAS

Description: Save Settings.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CSCA

Description: Service Centre Address.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CSCON

Description: Report connected state.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CSCS

Description: Select TE (Terminal) character set.

Notes/Limitations: Affects only SMS AT commands. Support only: "UCS2" "8859-1" (Latin) "IRA" "PCCP437"

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CSDH

Description: Show text mode parameters.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CSIM

Description: Generic SIM access.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CSMP

Description: Set Text Mode Parameters.

Notes/Limitations: 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.

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CSMS

Description: Select Message Service.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CSODCP

Description: Transmit data over control plane.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CSQ

Description: Signal quality.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CSSAC

Description: Service Specific Access Control restriction status.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CSSN

Description: Enable +CSSI and +CSSU indication.

Notes/Limitations: Relevant for VOLTE only

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CSUS

Description: Set card slot.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CTZR

Description: Time Zone reporting.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CTZU

Description: Automatic Time Zone update.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CUSATE

Description: Send a USAT envelope command.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CUSATT

Description: Send USAT terminal response.

Notes/Limitations: None

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

CUSD

Description: Unstructured supplementary service data.

Notes/Limitations: supported only in 2G

Spec Rev: Rev4

D

Command	Possible response(s)
D*99[***<ext_sessionID>#]	OK/ERROR

Description: This command initiates end to end PPP session with the LTE network on specific PDN which is set by the <ext_sessionID> parameter. If optional part of AT command is omitted, the <ext_sessionID>=1 is selected.

Defined values:

<ext_sessionID> - integer type. See definition in AT%PDNSET.

DT

Command	Possible response(s)
DT*99[***<ext_sessionID>#]	OK/ERROR

Description:

Same as D*99* for Windows host.**

This command initiates end to end PPP session with the LTE network on specific PDN which is set by the <ext_sessionID> parameter. If optional part of AT command is omitted, the <ext_sessionID>=1 is selected.

Defined values:

<ext_sessionID> - integer type. See definition in AT%PDNSET.

DT99

Description: ATD*99*** / ATDT*99*** - End to end PPP over LTE connection establishment.

Notes/Limitations: Refer to 27.007 \,sec. 10.2.1.1:

GPRS_SC=99 (Packet Domain)

<called_address> - omitted

<L2P> - omitted, default PPP}

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

E

Description: Command Echo disabled\, same as E0.

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

E0

Description: Command Echo disabled.

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

E1

Description: Command Echo enabled.

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

F0

Description: Sets to Factory-Defined Configuration.

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

GCAP

Description: Request overall capabilities of TA; the response code shall be CLTE3 or CLTE4 (based on configured LTE category).

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

GMI

Description: Request TA manufacturer identification (equals to +CGMI).

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

GMM

Description: Request TA model identification (equals to +CGMM).

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

GMR

Description: Request TA revision identification (equals to +CGMR).

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

GSN

Description: Request TA serial number identification (may equal to +CGSN).

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

H

Description: Reject incoming call.

Notes/Limitations: Relevant for VOLTE only

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

H0

Description: Hangs-Up PPP connection after +++.

Notes/Limitations: None REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

I

Description: Request manufacturer specific information about the TA.

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

ICF

Description: DTE-Modem Character Framing.

Notes/Limitations: Command settings are stored into NV.

Support only:

<format>={1,2,3,5}

<parity>={0,1}

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

IFC

Description: DTE-Modem Flow Control.

Notes/Limitations: Command settings are stored into NV.

Support only:

AT+IFC=0,0

AT+IFC=2,2.}

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

IPR

Description: Fixed DTE Interface Rate.

Notes/Limitations: Automatic Detection not supported

Default rate is 115200

Command settings are stored into NV.

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

K

Description: Flow Control.

Notes/Limitations: Supports only &K0 and &K3

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

O

Description: Return To On Line Mode.

Notes/Limitations: Only ATO command is supported without additional parameter

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

Q

Description: Result code suppression, same as ATQ0.

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

Q1

Description: Result code suppression enable.

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

QO

Description: Result code suppression disable.

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

RING

Description: URC incoming call notification.

Notes/Limitations: Relevant for VOLTE only

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

S2

Description: Escape Character.

Notes/Limitations: None

Spec Rev: Rockwell Rev4

V

Description: Response format,same as ATV0.

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

V1

Description: Response format verbose.

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

VO

Description: Response format numeric.

Notes/Limitations: None

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

VTs

Description: Accept incoming call.

Notes/Limitations: Relevant for VOLTE only. Only single <tone> is supported. <duration> is not supported

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

WS46

Description: Select wireless network.

Notes/Limitations: We support only EUTRAN The modem returns "28" for the read and test command. The set command accepts only 28.

Spec Rev: 3GPP 27.007 Rev14, Set for User Equipment AT Commands (UE)

Z

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

Notes/Limitations: Reset device but doesn't return values to factory default.

Spec Rev: REC-V.250-200307.pdf: ITU-T V.250 Serial Asynchronous Automatic Dialing and Control

4. Proprietary Altair AT Commands

List of AT commands

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- **%TSTEXT**
- **%TSTRF**
- **%TSTSIM**
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- **VZWRSRP**
- **VZWRSRQ**

The section below provides detailed description of the proprietary Altair specific AT Commands.

Detailed Description

%ALERT

Command	Possible response
AT%ALERT=<ev_type>,<mode>[,<ps_tout>[,<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),(range of <ps_tout>)
(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 commanded <mode>=0 (disable) param setting will be applicable to ALL events of the same <ev_type>.
- Last commanded setting of <ps_tout> value is also common and will be applied 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.
- "ANTITAMPER" anti-tamper attack attempt notification

<mode> - status of unsolicited result response presentation:

- 0 - disabled (default)
- 1 - enabled URC on each occurrence of condition. N/A to "ANTITAMPER"
- 2 - enable one-shot URC. To receive next URC the URC should be re-enabled again.

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

- 1-5

<ps_tout> - integer type; optional parameter, may be omitted. Indicates if the alert source should be polled in power save modes and what is the max polling interval in sec:

- 0 - infinite, no polling needed (default)
- 1 - 32767

<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 "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)

Examples:

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

```
AT%ALERT="TEMP",1,,2,1,55,65
```

OK

2. URC arrival:

```
%ALERTU:"TEMP",2,67
```

...

```
%ALERTU:"TEMP",2,55
```

%APNN

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

Description: This command allows the 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 under operator control.

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 requires 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.

%APPLOG

Command	Possible response(s)
AT%APPLOG=<op>[,<param1> [,<param2>]]	For "GET": [%APPLOG: <module>,<severity>] OK or ERROR For "GETSTATE": [%APPLOG: <rep_state>,<buf_state>] OK or ERROR
AT%APPLOG?	%APPLOG: <module>,<severity> <CR><LF>%APPLOG: <module>,<severity> ... <CR><LF>%APPLOG: <module>,<severity>
AT%APPLOG=?	%APPLOG: (list of <op>s), (list of <module>s), (list of <severity>s)

Description:

This command is used to manage the output and storage of the Application CPU log.

Reporting of Application CPU logs to the external Host is disabled by default as they slow down the system. The AT%APPLOG="ENABLE" should be applied to trigger log reporting. Per-module reporting is controlled by per-module severity. Default severity for each module is hardcoded in SW. Once log is enabled and severity is defined for some module (hardcoded or overridden by this AT):

- all lower severity logs are disabled for this module.
- the <severity> and higher severity logs are reported for this module.

The AT%APPLOG="SET" without any parameters returns all modules to their default severity. Execution command provides opportunity to modify log <severity> at run-time. All other settings are applied after reboot. All the settings (including <severity>) are stored persistently into NV memory. Read command returns the list of modules with their severities.

Defined values:

<op> - string type; operation to be applied to log:

- "DISABLE" - disable reporting of Application CPU logs to the external Host
- "ENABLE" - enable reporting of Application CPU logs to the external Host
- "SET" - set per-module log severity
- "GET" - get per-module log severity
- "BUFMAX" - set debug maximum log buffer size
- "BUFDEF" - set default log buffer size
- "GETSTATE" - get states of App logs
- "ADDMCU" - insert hex buffer into the external database

For "SET" and "GET":

<param1> - string type; module/sub-system name. N/A to <op>="DISABLE"/"ENABLE":

- "INIT"
- "DEFAULT"
- "INTERRUPT"
- "DEFATBIN"
- "LTEDRVFILE"
- "LTEDRVAT"

- "LTEDRVMAIN"
- "LTEDRVCTRL"
- "LTEDRVPACK"
- "ATSWITCH"
- "ATCLIENT"
- "LWIP"
- "PWRMNG"
- "SLPMNG"
- "SOCKSERVER"
- "TIMESTAMP"
- "TRAPPER"
- "ALHTHTTPC"
- "ECM"
- "MODEMCOMMON"
- "MEMRTN"
- "HIFC"
- "FILEMNG"
- "TMRSVC"
- "JSON"
- "RADIOM"
- "FILESYSTEM"
- "SERIALFLASH"
- "ATAWS"
- "MQTT"

<param2> - string type; log severity value in higher to lower order. N/A to <op>=
"DISABLE"/"ENABLE":

- "EMRG"
- "ERROR"
- "WARN"
- "NOTICE"
- "INFO"
- "DEBUG"
- "PROLIX"

For "ADDMCU":

<param1> - integer type; size in bytes of sent data:

- 1-1500

<param2> - hexadecimal type; log data is represented as ASCII hex string. The length of hex string is twice longer than actual binary data length in bytes: each hex byte is encoded into 2 ASCII bytes.

<rep_state> - integer type; status of reporting of Application CPU logs to the external Host:

- 0 - disable
- 1 - enable

<buf_state> - integer type; status of debug maximum log buffer size:

- 0 - disable: default sized buffers
- 1 - enable: maximal sized buffers

%AUDCMD

Command		Possible response(s)
AT%AUDCMD=<cmd>[,<param1>,...]	For <cmd>="VESTAT": [%AUDCMD: <CR><LF><count_dump>]	OK or ERROR
AT%AUDCMD?	ERROR (not supported)	
AT%AUDCMD=?	%AUDCMD: (list of supported <cmd>s)	

Description:

AT command to record and play audio.

Command is relevant for VoLTE enabled devices, however not in parallel to the actual voice call.

All sub-commands are unblocking. They only triggers recording or playing.

Recording will be stopped if one of 3 conditions will occur first:

- Explicit user call of AT%AUDCMD="RECSTOP"
- Max audio file size (TBD) overflow
- Recording timeout exhausted

The files are created in "b:/audio". So, the file storage parameter means filename with or without relative path to this folder.

Defined values:

<cmd>:

- "RECSTART" - Trigger audio recording
- "RECSTOP" - Stop audio recording.
- "PLAYSTART" - Trigger audio play.
- "PLAYSTOP" - Stop audio play.
- "PLAYPAUSE" - Pause audio play.
- "PLAYRESUME" - Resume audio play.
- "LBTEST" - Execute loopback test.
- "SETAGC" - Run-time AGC feature settings.
- "VESTAT" - Network Quality Statistics.

For "RECSTART":

<param1> - string type; the name of the file (with or without relative path) to record. The name of the file itself is limited by 29 bytes.

<param2> - integer type; audio format:

- 0 - AMR-NB mode
- 1 - AMR-WB mode
- 2 - PCM mode

<param3> - integer type; optional parameter, recording timeout in seconds.

- 0 - 300

Note: It is recommended to use filename extensions properly:

- .amr for AMR-NB
- .awb for AMR-WB
- .pcm for PCM

For "PLAYSTART":

<param1> - string type; the name of the file (with or without relative path) to play. The name of the file itself is limited by 29 bytes.

<param2> - integer type; optional repetition (looping):

- 0 - single play (default)
- 1 - looping play

Note: Play media file in PCM format (*.pcm) is not supported.

For "LBTEST":

<param1> - integer type; loopback test duration in seconds:

- 1-60

For "SETAGC":

<param1> - integer type; feature enabler:

- 0 - disable
- 1 - enable

<param2> - integer type; optional parameter. If omitted the value of configuration file or previous run-time setting is used. Gain level:

- 0 - 0dB
- 1 - 3dB
- 2 - 6dB
- 3 - 9dB
- 4 - 12dB
- 5 - 15dB
- 6 - 18dB
- 7 - 21dB
- 8 - 24dB

<param3> - integer type; optional parameter. If omitted the value of configuration file or previous run-time setting is used. Additional 3db gain level:

- 0 - disable over amplifying
- 1 - 3dB additional gain
- 2 - 6dB additional gain
- 3 - 9dB additional gain
- 4 - 12dB additional gain
- 5 - 15dB additional gain
- 6 - 18dB additional gain

Example:

Record media file in AMR-NB format, store it in FS:

```
AT%AUDCMD="RECSTART", "voice1.amr",0
```

OK

Stop recording:

```
AT%AUDCMD="RECSTOP"
```

OK

Record media file in AMR-WB format 5 sec, store it in FS:

```
AT%AUDCMD="RECSTART", "voice2.awb",1,5
```

OK

Play the voice1 media file once:

AT%AUDCMD="PLAYSTART","voice1.amr\"

OK

Play the voice2 media file repeatedly:

AT%AUDCMD="PLAYSTART","voice2.awb\",1

OK

Stop playing:

AT%AUDCMD="PLAYSTOP"

OK

Loopback test:

AT%AUDCMD="LBTEST",20

OK

Set AGC:

ATAUDCMD="SETAGC", 1, ,6

OK

%AUDEV

Command	Possible response(s)
AT%AUDEV=<ev_type>,<mode>	OK or ERROR
AT%AUDEV?	ERROR (not supported)
AT%AUDEV=?	%AUDEV: (list of supported <ev_type>s),(list of supported <mode>s)

Description:

The command is intended to notify about Audio events by %AUDEVU:<ev_type>[,<reason>]
Default Audio mode is URC disabled for all event types. Event(s) are related to asynchronous operation triggered by ATAUDCMD.

Defined values:

<ev_type> - string type:

- "PLAYFINISH" - Indicates end of single play triggered by AT%AUDCMD="PLAYSTART"/"PLAYRESUME"
- "RECSTOP" - Indicates end of recording triggered by AT%AUDCMD="RECSTART"
- "SILENCETOUT" - Indicates period of silence in audio recording triggered by AT%AUDCMD="RECSTART"
- "SOUNDDET" - Indicates detection of voice after silence detection in audio recording triggered by AT%AUDCMD="RECSTART"
- "RECCOMPLETED" - Indicates end of writing recording data to flash (triggered by AT%AUDCMD="RECSTART")
- "ALL" - All events, used only in execution command

<mode> status of unsolicited result response presentation:

- 0 - disabled (default)
- 1 - enabled

<reason>- integer type; reason to stop recording:

- 0 - recording timeout expired
- 1 - flash out of space
- 2 - internal error

%AUTH

Command	Possible response(s)
%AUTH=<logical_channel>, <autn>,<rand>	%AUTH :<status>[,<res>],[<ck>],[<ik>][,<auts>]] OK/ERROR
%AUTH?	ERROR (OPRATION_NOT_ALLOWED)
%AUTH=?	OK

Description:

This command is used to provide SIM authentication for host requests.

Prior to this command, the logical channel is required to be open, by using the +CCHO command

Defined values:

<logical_channel>:

- 0-3 Value 0 is reserved for USIM authentication, the rest of the channels can be used for other applications

<autn>:

- 16byte hexadecimal Authentication Token as per 33.102

<rand>

- 16byte hexadecimal random input as per 33.102

Response:

<status> - command execution status:

- 0 - USIM Authentication Response success,
- 1 - USIM Authentication Response sync failure,
- 2 - USIM Authentication Response MAC failure,
- 3 - USIM Authentication Response non-EPS authentication unacceptable failure,
- 4 - USIM Authentication Response security context not supported

<xres>, <ck>, <ik> (expected response XRES, cipher key CK and integrity key IK):

- conditional hexadecimal parameters related to successful status

<auts> - synchronization failure parameter as per 33.102

Notes:

All hexadecimal parameters in this command are encoded without quotes ("").

Examples:

```
AT%AUTH=1,B756ABA9E30A0000483D44503EA5F239,66552797069527F4E46F01FC12ACFA
86
```

Status 0 - success

```
%AUTH:0,43C60171,95A3004CA5AE4EBF5143B8EBD1AA15A6,CDA269152E1763A7805E393
F5D2FA13A
OK
```

Status 1 - sync failure

%AUTH : 1,,,,3FDD6C44FE9919A65CC4ACE757B3

Status 2 - Response MAC failure

%AUTH : 2

Status 3 - non-EPS authentication unacceptable failure

%AUTH : 3

Status 4 - security context not supported

%AUTH : 4

%AWSIOTCFG

Command	Possible response(s)
AT%AWSIOTCFG=<cmd>,<param1>[,<param2>[,<param3>]]	OK or ERROR
AT%AWSIOTCFG?	ERROR (not supported)
AT%AWSIOTCFG=?	%AWSIOTCFG: (list of supported <cmd>s)

Description: This command is used to configure AWS IOT cloud connection parameters. To start a new AWS IOT connection, at least the "CONN" parameters should be defined. Mandatory TLS profile ID, which should be pre-configured by AT%CERTCFG, is a special TLS profile, which does not contain both: root certificate file and root certificate path.

The root certificate path is hardcoded in SW and implies the usage of trusted root CA pre-installed into device to support proper AWS security level. If the selected TLS certificate profile contains <ca_file> or <ca_path> fields (see AT%CERTCFG), the AT command returns ERROR.

If "PROTOCOL" parameters are not configured, default protocol parameters will be selected (see below).

Defined values:

<cmd>:

- "CONN"- pre-configure connection parameters

<param1> - string type; endpoint URL

<param2> - integer type; TLS predefined authentication context (profile) previously configured by AT%CERTCFG.

<param3> - string type; optional unique client ID used to connect to the broker. The IMEI is used as client ID by default.

<cmd>:

- "IP"

<param1> - integer type; optional Session ID - numeric PDN identification defined in APN table for specified PDN.

If Session ID=0 or omitted default data PDN is used:

- 0 - use default data PDN
- 1-max value defined in NP config file

<param2> - integer; optional IP type used to configure preferred IP type for connection:

- 0 - IPv4v6 (default value)
- 1 - IPV4
- 2 - IPV6

<cmd>:

- "PROTOCOL"- pre-configure protocol parameters

<param1> - integer type; optional MQTT keep-alive time in seconds. Default 1200 sec (20 min).

- 1-1200

<param2> - integer type; optional QoS setting for "PUBLISH":

- 0 - with no confirmation (default value)
- 1 - confirmed (acknowledged)

%AWSIOTCMD

Command	Possible response(s)
AT%AWSIOTCMD=<cmd>,[<param1>[,<param2>]]	For "SUBSCRIBE"/"UNSUBSCRIBE"/"PUBLISH":[%AWSIOTCMD: <msg_id>]
AT%AWSIOTCMD?	ERROR (not supported)
AT%AWSIOTCMD=?	%AWSIOTCMD: (list of supported <cmd>s)

Description: This command is used to communicate with AWS IoT message broker.

All commands are unblocking.

The information about command success or fail will be provided in %AWSIOTEVU URC. Non-zero message ID may be used to pair subscribe, unsubscribe and publish (confirmed) messages with their URCs. At this stage, message ID is not supported, zero value is returned.

Defined values:

<cmd>:

- "CONNECT" - Start connection.

<cmd>:

- "DISCONNECT" - End connection.

<cmd>:

- "SUBSCRIBE" - Subscribe (register) to the topic on the endpoint
- <param1> - string type; the subscription topic name

<cmd>:

- "UNSUBSCRIBE" - Stop subscription (unregister) from the topic on the endpoint.
- <param1> - string type; the subscription topic name

<cmd>:

- "PUBLISH" - Publish (send) packet to endpoint

<param1> - string type; the publication topic name

<param2> - string type; message that appears in the publication

<msg_id> - message ID:

- 0 - not in use
- 1-65535

%AWSIOTEV

Command	Possible response(s)
AT%AWSIOTEV=<ev_type>,<mode>	OK/ERROR
AT%AWSIOTEV?	ERROR (not supported)
AT%AWSIOTEV=?	%AWSIOTEV: (list of supported <ev_type>s), (list of supported <mode>s) (unsolicited) %AWSIOTEVU:<ev_type>,<res1>[,<res2>[,<res3>]]

Description: This command is intended to notify about AWS IOT events.

Default mode is URC disabled for all event types except of "PUBRCV", which is enabled by first call of AT%AWSIOTCMD="SUBSCRIBE". Most of the events are related to asynchronous operation triggered by AT%AWSIOTCMD. Such acknowledgment may be normally disabled. Only "PUBRCV" event provides the data from the topic, to which the client was pre-subscribed (pre-registered) by AT%AWSIOTCMD="SUBSCRIBE".

Note that AT%AWSIOTCMD="PUBLISH" in unconfirmed mode (no ACK) will not send any acknowledge message and <ev_type>="PUBCONF" is not expected.

Non-zero message ID may be used to pair subscribe, unsubscribe and publish (confirmed) messages sent by AT%AWSIOTCMD with their URCs. At this stage, message ID is not supported, zero value is always reported.

Note: If a TCP session is disconnected because of link lost, no URC is sent.

Defined values:

<ev_type> - string type:

- "CONCONF" - Connect procedure confirmation status
- "DISCONF" - Graceful disconnect procedure confirmation status
- "SUBCONF" - Subscribe procedure confirmation status
- "UNSCONF" - Unsubscribe procedure confirmation status
- "PUBCONF" - Outgoing publication procedure confirmation status
- "PUBRCV" - Incoming publication message received
- "CONNFALL" - Connection failure
- "ALL" - All events, used only in execution command

<mode> - status of unsolicited result response presentation:

- 0 - disabled (default value)
- 1 - enabled

For "CONCONF"/"DISCONF":

<res1> - integer type; result code:

- 0 - success
- 1 - fail

For "SUBCONF"/"UNSCONF"/"PUBCONF":

<res1> - message ID:

- 0 - not in use
- 1-65535

<res2> - integer type; result code:

- 0 - success
- 1 - fail

For "PUBRCV":

<res1> - string type; the publication topic name

<res2> - string type; publication message content received from endpoint

%BANDCAP

Command	Possible response(s)
%BANDCAP	%BANDCAP:band1[,band2[,band3[,band4[,band5]]]]
%BANDCAP?	%BANDCAP:[band1[,band2[,band3[,band4[,band5]]]]
%BANDCAP=?	OK

Description:

This 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. Zero value is returned for this chipset if list of bands is not defined in SW_CAP configuration file.
- band number in numeric value

Examples:

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

Command	Possible response(s)
AT%BANDCAP	%BANDCAP:[band1[,band2[,band3[,band4[,band5]]]]
AT%BANDCAP?	%BANDCAP:[band1[,band2[,band3[,band4[,band5]]]]
AT%BANDCAP=?	OK

Description: This command returns band(s) entered during production into PHYBP file. For these bands the calibration process should be executed at Production by board vendor.

Defined values:

<band>:

- 0 - indicated one-SKU multiband support; applicable only for ALT1250. Zero value is returned for this chipset if list of bands is not defined in SW_CAP configuration file.
- band number in numeric value

Example:

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

%BOOTEV

Command	Possible response(s)
(Unsolicited result code)	%BOOTEV: <boot_reason>

Description: Unsolicited event to inform Host about boot type wakeup.

This URC is normally sent as a first URC after boot procedure has been completed.

This URC is not activated by some other AT.

The activation flag is stored into "manager" configuration file and may be modified by:

AT%SETACFG="manager.uncBootEv.enabled","true"/"false"

New configuration setting will be applicable after next boot.

Defined values:

<boot_reason> - integer type; boot reason. Currently only single unknown (0) reason is supported, which covers all potential boot use-cases: power on, reset and stateless sleep exit, which triggers complete boot procedure.

- 0 - unknown
- 1 and more - reserved FFU

%CBCMD

Command	Possible response
AT%CBCMD=<cmd>[,<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 (CFUN=0) mode and unregistered state. If device is in (CFUN=1) mode and still in deregistered state, the command triggers LTE procedures, which should be finished in camping on one of the cells other than BL.

Once BL cell info parameters are settled and <earfcn> & <pci> are defined, 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.

Defined values:

<cmd>:

- 0 - disable cell block (default)
- 1 - enable cell block

<earfcn> - cell EARFCN

<pci> - cell PCI

%CCID

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

Description:

This execution command reads the ICCID (card identification number) from SIM EFICCID file. The ICCID is a unique identification number for the SIM. If SIM is not inserted, ERROR is returned by the execution command.

Defined values:

<iccid> - 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

Examples:

AT%CCID

%CCID: "01234567890123456789"

OK

%CCLK

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

Description:

This 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:
 - 1. CCLK (highest priority - user set)
 - 2. SIB16 (since it is more accurate than EMM)
 - 3. 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

%CEDRXS

Command	Possible response(s)
%CEDRXS=<ptw>	OK or ERROR
%CEDRXS?	ERROR (not supported)
%CEDRXS=?	OK

Description:

This command sets eDRX parameters, which setting is not supported by standard AT+CEDRXS. Parameter's persistence is conditional and controlled by same storage rules as AT+CEDRXS. Similar to standard AT+CEDRXS, new ATCEDRXS parameter(s) will be applied after next TAU or re-attach only.

Defined values:

<ptw> - integer type; LTE-specific paging transmission window (eDRX parameter missed in AT+CEDRXS):

CAT-M specific paging transmission window values:

- 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

NB-IoT specific paging transmission window values:

- 0 - 2,56 seconds
- 1 - 5,12 seconds
- 2 - 7,68 seconds
- 3 - 10,24 seconds
- 4 - 12,8 seconds
- 5 - 15,36 seconds
- 6 - 17,92 seconds
- 7 - 20,48 seconds
- 8 - 23,04 seconds
- 9 - 25,60 seconds
- 10 - 28,16 seconds
- 11 - 30,72 seconds
- 12 - 33,28 seconds
- 13 - 35,84 seconds
- 14 - 38,40 seconds

- 15 - 40,96 seconds

%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>]]]]
%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.

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

Test command returns list of supported modes.

Defined values:

<mode> - integer type; status of unsolicited result response presentation

- 0 - disabled (default)
- 1 - enabled

<clear_err> - integer type; clear last stored failure report

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

<rep_type> - integer 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> - string type; protocol layer or protocol entity

- "NAS-EMM"
- "NAS-ESM"
- "PDM"
- "RRC"
- "PDCP"
- "RLC"
- "MAC"
- "L1A"

<procedure> - string type; 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> - string type; failure type:

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

<reject_cause> - integer type; 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> - integer type; cell EARFCN

<pci> - integer type; cell PCI

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

<ta> - hexadecimal type; as defined to AT+CEREG (in quotes)

Examples:

For read:

AT%CEER?

%CEER: 0,"NAS-EMM","ATTACH","REJECT",#3,INVALID SIM
OK

For unsolicited report:

%CEER: "NAS-EMM","ATTACH","MAXRETRY"

CEINFO

Command	Possible response(s)
AT+CEINFO=	ERROR
AT+CEINFO=1	OK
AT+CEINFO=0	OK
AT+CEINFO?	+CEINFO: <Reporting>,<CE Enabled>,<UE State>,<Downlink Repetition Factor>,<Uplink Repetition Factor>,<RSRP>,<CINR> OK or +CME ERROR: <err>
AT+CEINFO=?	+CEINFO: (0-1)

Description: Retrieve Coverage Enhancement (CE) Mode Information.

Execution command is only supported for +CEINFO=0.

The query command returns the current CE Mode Information

If command fails, +CME ERROR: <err> is returned. If device is not in RRCE_IdleCampedOnCell or RRC_Connected states, the "+CME ERROR: operation not allowed" is reported as per 3GPP TS 27.007 subclause 9.2 for <err> values.

Defined values:

<Reporting>:

- Integer type; indicates if unsolicited report for CE Mode is enabled or disabled (0=Disabled, 1=Enabled)

<CE Enabled>:

- Integer type; indicates whether the serving cell supports CE mode A/B (0=Disabled, 1=Enabled)

<UE State>:

- String type; indicates UE state at the time of the report (I=Idle, R=RACH, C=Connected)

<Downlink Repetition Factor>:

- Integer type; indicates downlink repetition factor, shows actual value of the defined ASN (for example enumeration pusch-maxNumRepetitionCEmodeA-r13 r32 will be displayed as 32)
- Idle / Rach state:
- CAT-M: PRACH-ParametersCE-r13 (based on CE Level) mpdcch-NumRepetition-RA-r13 value
- NB-IoT: NPRACH-Parameters-NB-r13 (based on CE Level) npdcch-NumRepetitions-RA-r13 value
- Connected state:
- CAT-M: EPDCCH-SetConfig-r11 mpdcch-NumRepetition-r13;
- NB-IoT: NPDCCH-ConfigDedicated-NB-r13 npdcch-NumRepetitions-r13

<Uplink Repetition Factor>:

- Integer type; indicates uplink repetition factor, value is set to the integer representation of the defined ASN enumeration
-
- Idle / Rach state:
- CAT-M: PRACH-ParametersCE-r13 (based on CE Level) numRepetitionPerPreambleAttempt-r13 value
- NB-IoT: NPRACH-Parameters-NB-r13 (based on CE Level) npdcch-NumRepetitions-RA-r13 value
- Connected state:
- CAT-M: last used number of PUSCH repetitions from UL grant

- NB-IoT: last used number of NPUSCH repetitions from UL grant

<RSRP>:

- Integer type; Current RSRP Level at time of report
- CAT-M: (numerical range $-140 \leq \text{RSRP} \leq -44$ dBm)
- NB-IoT: (numerical range $-156 \leq \text{RSRP} \leq -44$ dBm)
- <CINR>:
- Integer type; Current RS SNR (reference signal signal-to-noise ratio) in 0.1 dB (numerical range $-12.0 \leq \text{RS_SNR} \leq 40.0$)

%CEN

Command	Possible response
AT%CEN[=<reporting>]	OK or ERROR
AT%CEN?	%CEN1: <reporting> <CR><LF>[%CEN2: <cat>,<number> [<CR><LF>%CEN2: <cat>,<number> [...]]]
AT%CEN=?	%CEN: (list of <reporting> modes)

Description:

This command used to query from UICC Emergency numbers, which are stored on it. Read command returns one line of intermediate result code %CEN1: <reporting> with the current <reporting> setting. Then follows zero or more occurrences of the emergency numbers with intermediate result code %CEN2: <cat>,<number>.

Defined values:

<reporting>: integer type; Enables and disables reporting of new emergency numbers stored in UICC.

- 0 - disable reporting (default)
- 1 - enable reporting

<number>: String type. Representing an emergency number from the list defined in 3GPP TS 24.008 sub clause 10.5.3.13. The <number> is encoded with one digit per character.

<cat>: integer type. A bitmap indicating the Emergency Service Category Value according to 3GPP TS 24.008 [8] table 10.5.135d.

%CERTCFG

Command	Possible response(s)
AT%CERTCFG=<op>,<profile_id>[,<ca_file>][,<ca_path>][,<dev_cert>][,<dev_key>][,<psk_id>,<psk_key>]]]	OK or ERROR
AT%CERTCFG?	[%CERTCFG: <profile_id>[,<profile_id>...]] OK
AT%CERTCFG=?	%CERTCFG: (list of supported <op>s)

Description: Execution command is used to to add/delete TLS/DTLS profiles into TLS/DTLS profiles config file. Device contains 2 certificate storage locations:

- Root Trusted folder, which contains only root CAs
- User Trusted folder, which contains root CAs and device credentials (certificate and private key) installed by user or provisioned over the air.

The Altair proprietary <dev_cert>, <dev_key> embedded into on-chip Secure Element shall be signaled by "*" asterisk symbol in filename field.

The customer PSK data is always stored into User Trusted folder

The parameters encoded in AT commands and composed then into single TLS/DTLS profile stored into configuration file.

This config file content will be composed from per-profile sections like:

```
"profile_id": {
"cafile": "ca_file",
"capath": "ca_path",
"cert": "dev_cert",
"key": "dev_key",
"pskid": "psk_id",
"pskkey": "psk_key"
}
```

The PKI (ca_xx, and dev_xx) portion and PSK (psk_xx) portion of profile should not coexist in the same profile. The profile is normally intended to be used in one of TLS/DTLS modes:

- Certificate (PKI) mode
- PSK mode

When <profile_id> section is created, the <ca_file>, <ca_path>, <dev_cert>, <dev_key>, <psk_id> and <psk_key> are taken from the input parameter list.

Any <ca_file>, <ca_path>, <dev_cert>, <dev_key>, <psk_id> and <psk_key> are optional and may be omitted.

The <dev_cert> and <dev_key> shall be always added together or omitted together.

The <psk_id> and <psk_key> shall be always added together or omitted together.

If some parameters are omitted, they will be also omitted in config file.

When per-profile section is created by this AT, TLS/DTLS security layer using this profile will apply next rules for proper PKI CA search and selection

- If root CA file name is known and <ca_file> parameter is set, then try to find <ca_file> in both storage locations in next order:
 - Root Trusted folder
 - User Trusted folder

- If <ca_file> is defined, but not found or if root CA file name is unknown and <ca_file> parameter is omitted, apply <ca_path> parameter, if present:
 - If <ca_path> = "~", then use Root Trusted folder to verify server certificate
 - If <ca_path> = ".", then use User Trusted folder to verify server certificate
- Always use User Trusted folder to find device <dev_cert> and <dev_key> pair

This is the AT responsibility, which is going to use TLS profile (i.e. AT%SOCKETCMD, AT%ATSIOTCMD, etc.) to verify if the profile is properly defined and contain all needed credential for mutual, server or device authentication.

The Default profile ID=0 cannot be defined by this AT and does not present in TLS/DTLS profile (i.e. AT%SOCKETCMD, AT%AWSIOTCMD, etc.)

This default profile implies only server authentication using root CA stored into Root Trusted folder.

The <ca_file>, <dev_cert>, <dev_key>, <psk_id> and <psk_key> parameters may include relative path to CA data storage.

Next size limitation are applicable to the size of <ca_file>, <ca_path>, <dev_cert>, <dev_key>, <psk_id> and <psk_key> parameters:

- The name of the file itself is limited by 29 bytes
- The name of the relative path (including file name, if present) is limited by 64 bytes

Read command returns the list of Profile IDs already in use. If there is not any profile ID defined yet, read command returns only OK.

Defined values:

<op> - string type; operation to be applied to TLS profile in config file. Add operation applied to existed profile will return ERROR. Explicit profile deletion is expected:

- "ADD" - add new profile
- "DELETE" - delete profile

<profile_id> - integer type; numeric value to identify set of credentials used together for some TLS connection(s). The profile_id=0 is prohibited and reserved for root trusted certs already stored into default root trusted folder. Range:

- 1-255

<ca_file> - string type; the name of the root certificate file, if it is known.

<ca_path> - string type; the path of the user-added or trusted root certificates. Use "~" (home directory) to create 'ca_path' config file parameter for default root trusted folder. Use "." to create 'ca_path' config file parameter for user root certificate folder (which content is populated by AT%CERTCMD="WRITE").

<dev_cert> - string type; the name of the user-added device cert file.

<dev_key> - string type; the name of the user-added device private key file.

<psk_id> - string type; the name of the user-added PSK ID.

<psk_key> - string type; the name of the user-added PSK. PSK filename shall have .psk extension. Any attempt to create profile with PSK filename with different extension will be rejected with ERROR.

Example:

1. Create new config file section:

```
AT%CERTCFG="ADD",1,"AmazonRootCA3ECC256.pem",,"b7c1bd8c7c-certificate.pem.crt",,"b7c1bd8c7c-private.pem.key"
```

OK

Created section:

```
CERTCFG"1": {  
  CERTCFG'cafile': "AmazonRootCA3ECC256.pem",  
  CERTCFG'cert': "b7c1bd8c7c-certificate.pem.crt",  
  CERTCFG'key': "b7c1bd8c7c-private.pem.key",  
}
```

2. Create new PSK config file section:

```
AT%CERTCFG="ADD",2,,,,,"testPskId.bin","testPsk.psk"
```

OK

Created section:

```
"2": {  
  "pskid": "testPskId.bin",  
  "pskkey": "testPsk.psk"  
}
```


%CERTCMD

Command	Possible response(s)
AT%CERTCMD=<cmd>[,<filename>[,<type>,<CR><LF><data>]]	For <cmd>="READ": [%CERTCMD: <data>] For <cmd>="DIR": [%CERTCMD: <filename>[,<filename>...]]
AT%CERTCMD?	ERROR (not supported)
AT%CERTCMD=?	%CERTCMD: (list of supported <cmd>s), (list of supported <type>s)

Description: Execution command is used to read/write/delete/list/copy user TLS/DTLS objects to/from NV. The PEM pseudo-text format specifics is that this format contains newlines (<LF>) in the <data> body. This causes some AT command processing troubles even if the <data> string context is enclosed in quotes. To overcome these troubles, the AT%CERTCMD="WRITE" command shall contain <CR><LF> additional newline separator just before PEM data enclosed in quotes. For consistency, the same rules are applied to the PSK related <data> in hexadecimal format. The certificate data size for "WRITE" and "READ" operations is limited by 3000KB. To install larger certificates and especially certificate bundles into the device, use the "COPY" command instead of the "WRITE" command. The certificate or certificate bundle shall be previously downloaded to drive b: via AT%FILECMD="PUT". Note that "WRITE" and "COPY" commands do not execute existed file override operation. Use the "DELETE" sub-command if an existed credential update is expected. The "WRITE" and "COPY" commands return ERROR if there is not enough space on drive d: to store new user credentials. The private key and PSK cannot be read. The "READ" command returns ERROR.

Defined values:

<cmd> - string type; file operation on the NV storage:

- "READ" - read the certificates pointed by <filename>. [Private key cannot be read, command returns ERROR.]
- "WRITE" - write the credentials with its <filename> to the NV storage
- "COPY" - copy the credential file from temporary <filename> location on drive b: to their permanent NV storage location under same name.
- "DELETE" - delete the credential pointed by the <filename> from the NV storage
- "DIR" - get the list of credential file names pointed by <filename>.

<filename> - string type; the name of the file (with or without relative path) to be transferred, deleted or listed. Use "~" for this parameter to retrieve trusted root certificates folder content. If omitted, the list of files from user root certificate folder (written by AT%CERTCMD="WRITE") is shown. Next size limitation are applicable to the size of this parameter:

- The name of the file itself is limited to 29 bytes
- The name of the relative path (including file name) is limited to 64 bytes

Note: if <type>=3 (PSK), the filename shall have .psk extension. Any attempt to store PSK into file with different extension will be rejected with ERROR. All other TLS/DTLS objects (<type>=0/1/2) shall not use this extension.

<type> - integer type:

- 0-certificate
- 1-private key
- 2-PSK ID
- 3-PSK key

<data> - The parameter format depends on <type> of <data>

- string type; certificate/private key in PEM format. Usage of quotes is mandatory. The data content in PEM format is transferred in pseudo-text format with <LF> (0x10) service symbols inside and will be shown with newlines.
- hexadecimal type for PSK ID/PSK. Usage of quotes is mandatory. The data size is limited by: Up to 128 bytes for PSK ID 8-64 bytes for PSK

Example:

1. Upload CA certificate named AmazonRootCA3ECC256.pem
 AT%CERTCMD="WRITE","AmazonRootCA3ECC256.pem",0,"
 -----BEGIN CERTIFICATE-----

...
 -----END CERTIFICATE-----"
 OK

2. Upload client private key named 97fbc28291-private.pem.key while encrypting the key
 AT%CERTCMD="WRITE","97fbc28291-private.pem.key",1,
 "-----BEGIN RSA PRIVATE KEY-----"
 ...
 -----END RSA PRIVATE KEY-----"
 OK

3. Read Client Certificate named b7c1bd8c7c-certificate.pem.crt
 AT%CERTCMD="READ","b7c1bd8c7c-certificate.pem.crt"
 %CERTCFG: "-----BEGIN CERTIFICATE-----"
 ...
 -----END CERTIFICATE-----"
 OK

4. Get the list of credential folder files:
 AT%CERTCMD="DIR"
 %CERTCFG: "AmazonRootCA3ECC256.pem","b7c1bd8c7c-private.pem.key",
 "b7c1bd8c7c-certificate.pem.crt"
 OK

5. Upload PSK ID value "123456789" into file:
 AT%CERTCMD="WRITE","testPskID.bin",2,
 "313233343536373839"
 OK

6. Upload PSK Passphrase "mySharedKey" into file:
 AT%CERTCMD="WRITE","testPSK.psk",3,
 "6d795368617265644b6579"
 OK

7. Read PSK ID file named testPskId.bin:
 AT%CERTCMD="READ","testPskId.bin"
 %CERTCFG: "313233343536373839"
 OK

8. Read PSK file named testPsk.psk:

```
AT%CERTCMD="READ","testPsk.psk"
```

ERROR

9. Copy customer certificate bundle from b: to user root certificate folder:

```
ATCERTCMD="COPY","CaBundle.pem"
```

OK

%CGDCONT

Command	Possible response(s)
%CGDCONT=<cid>	[<traffic_type>][,<preferred_transport_type>]]
%CGDCONT?	[%CGDCONT:<cid>,<traffic_type>,<preferred_transport_type>] [<CR><LF>%CGDCONT:<cid>,<traffic_type>[...]]]
%CGDCONT=?	OK

Description:

This command is supplementary to AT+CGDCONT command and provides additional information about PDN (PDP context). This optional command is used ordinary just after standard AT+CGDCONT.

The Execution command specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter, <cid>.

The <preferred_transport_type> in Read command may be omitted if preference was not selected by execution command.

Defined values:

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

<traffic_type>: integer type, the purpose PDN will be used for:

- 0 - non-data traffic
- 1 - data traffic
- 2 - VoLTE traffic (IMS signaling + voice streams)
- 3 - 99 - Reserved for future use if more detailed info about non-data traffic PDNs (VOIP, SUPL, etc.) will be required

<preferred_transport_type>: integer type; indicates the UE's preference for transport type.

- 0- No preference.
- 1- Preference for control plane.
- 2- Preference for user plane.

%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 the "cid" type is queried, the command returns the cid value assigned by the modem to the specified session ID. If no cid value is found for the specified <sessionID> parameter, the command returns zero cid value.

The returned cid value may be later used with any of the packet domain commands defined in section 10 of 27.007.

Defined values:

<type> - string type; object type to retrieve information:

- "cid"

<sessionID> - integer type; value of session identifier defined in APN config file.

For "cid":

<info1> - integer type; cid value. If no cid found for specified <sessionID>, zero value is returned.

Example:

```
AT%CGINFO="cid",1
```

```
%CGINFO: 3
```

```
OK
```

%CLCMD

Command	Possible response
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 should be finished in camping on one of the cells from WL.

This command is not supported if the RAT in use is 2G, the command returns ERROR in such a case.

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> should 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.

Examples:

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

%CLI

Command	Possible response(s)
AT%CLI=<cmd>[,<param1>[,<param2>...]]	OK/ERROR
AT%CLI?	ERROR (not supported)
AT%CLI=?	OK

Description: Execution command is used to switch serial interface from AT command mode to CLI-style command mode.

%CMATT

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

Description: This command is sent from the 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

CMEEU

Command	Possible response(s)
(unsolicited result code)	%CMEEU: <n>

Description:

Unsolicited event to inform higher layer Apps about last AT+CMEE settings. The URC is activated by any AT+CMEE command call.

Defined values

<n>: integer type, same value as received in last AT+CMEE, see 27.007.

- 0 - disable +CME ERROR: <err> result code and use ERROR instead
- 1 - enable +CME ERROR: <err> result code and use numeric <err> values (refer subclause 9.2 of 27.007)
- 2 - enable +CME ERROR: <err> result code and use verbose <err> values (refer subclause 9.2 of 27.007)

%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=?	OK

Description:

The standard AT+CMGS command, defined in 3GPP 27.00, returns single message reference index and assumes 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 this case concatenation is required and it is fully handled by the modem which fragments the incoming long SMS, sends few sequential SMS fragments and returns the list of message-references, each is a reference of a single SMS fragment.
- to send large message in a small fragments using concatenation User Data Header (UDH) with each fragment. The fragment parameters shall be manually specified in <id>, <index> and <total> optional parameters to be coded by modem into the UDH of the SMS. In this case (params are present in AT call) the SMS cannot be larger then defined in the standard. In this use-case incoming data is not be divided into pieces and only single SMS will be sent and single message-reference will be returned.

If delivery report has been requested by the sender, then it should be received for each SMS fragment if concatenation is handled by modem. 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 for <da>, <toda> and <mr>.

<id> - integer type; User Data Header (UDH) concatenated message ID.

<index> - integer type; UDH concatenated message index.

<total> - integer type; UDH total number of concatenated messages.

%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, returns single storage location index and assumes 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 returns the list of indexes, which 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.

%COAPCFG

Command		Possible response(s)		
AT%COAPCFG=	<profile_id>[[<param1>][[<param2>]...]]	OK or ERROR
<obj>				
AT%COAPCFG?		ERROR (not supported)		
AT%COAPCFG=?		%COAPCFG: (list of supported <cmd>s),(list of supported <profile_id>s)		

Description:

AT command to configure COAP connection parameters.

To create new COAP connection the "IP" layer with IP address/URL parameter shall be defined at least.

Other configurations may be omitted, default settings are used:

- If "DTLS" layer is not configured, unsecured connection will be established by default. It will be considered as misconfiguration if "IP" URL requires security (coaps), but "DTLS" layer is not configured. Any attempt to use AT%COAPCMD will be rejected for such misconfiguration.
- If "OPTIONS" parameter(s) are not configured, all URI options will be filled from <uri> parameter of AT%COAPCMD (if present) by default.

To make this omission confidentially working, it is strictly recommended to call "CLEAR" sub-command before entering new configuration for previously used <profile_id>.

Profile ID parameter is introduced to handle multiple pre-defined COAP configuration settings in RAM. The unique ID for multi-profile configuration is assigned by user and then used for all following profile configurations via same AT%COAPCFG.

[Note that COAP timeouts is expected to be added to new COAP config file (or some other old config file) separately from LWM2M COAP timeout settings. Some of them may be added into this AT later on customer demand per-profile].

Defined values:

<obj>:

- "IP" - configure IP layer parameters.
- "DTLS" - configure DTLS layer security parameters.
- "OPTIONS" - pre-defined options to be sent with COAP command.
- "PROTOCOL" - configure COAP protocol parameters.
- "CLEAR" - clear all previous configuration settings for specified <profile_id>
- "ABORT" - clear all data from buffers for selected <profile_id> and abort current transaction

<profile_id> - integer type; new or previously assigned <profile_id>:

- 1-5

For "IP":

<param1>: string type; destination (server) IP address or URL.

<param2>: integer type; optional destination (server) UDP port number. If omitted default COAP port number is used. Range:

- 1-65535

<param3> - integer type; optional Session ID - numeric PDN identification defined in APN table for specified PDN. If omitted default data PDN is used.

- 0 -use default data PDN
- 1 -MAX value defined in NP config file

<param4> - integer; optional IP type used to configure preferred IP type for connection in URL use-case:

- 0 - IPv4v6
- 1 - IPv4
- 2 - IPv6 (default)

For "DTLS":

<param1> - integer type; predefined DTLS context (profile) previously configured by AT%CERTCFG. The profile ID=0 is reserved for root trusted certs already stored into default root trusted folder. Range:

- 0-255

<param2> - integer type; DTLS mode:

- 0 - PSK mode
- 1 - Certificate mode

<param3> - string type; optional, DTLS certificate authentication mode:

- 0 - mutual authentication (default)
- 1 - authenticate client side only
- 2 - authenticate server side only
- 3 - no authentication

<param4> - integer type; optional parameter to enable DTLS session resumption. If this flag is configured to enable, a DTLS resumption will be used instead of full DTLS handshake in case of DTLS session expiry (timeout value is taken from configuration file) or when reopening a socket due to LTE connectivity loss or similar issue. The DTLS session is released only after "CLEAR" commands will be applied to specified COAP <profile_id>:

- 0 - disable (default value)
- 1 - enable

<param5>: integer type; Optional cipher suite filtering option to be applied to the default list of supported ciphers for negotiation with server:

- 0 - white list, to leave only selected cipher suites
- 1 - black list, to remove mentioned cipher suites

<param6>: string type; Optional cipher suite list (white or black) as per <https://www.iana.org/assignments/tls-parameters/tls-parameters.xhtml> 1 definition. All cipher suites in the list are encoded into single string using hexadecimal cipher suite ID separated by ";", i.e. "C02C;C0AD...C003". The list of permitted values to be inserted into string (refer to IANA site for exact definition):

- C02C
- C030
- 009F
- C0AD
- C09F
- C024
- C028
- 006B

- C00A
- C014
- 0039
- C0AF
- C0A3
- C02B
- C02F
- 009E
- C0AC
- C09E
- C023
- C027
- 0067
- C009
- C013
- 0033
- C0AE
- C0A2
- C008
- C012
- 0016
- 00AB
- C0A7
- C038
- 00B3
- C036
- 0091
- C0AB
- 00AA
- C0A6
- C037
- 00B2
- C035
- 0090
- C0AA
- C034
- 008F
- 009D
- C09D
- 003D
- 0035
- C032
- C02A
- C00F
- C02E
- C026
- C005
- C0A1
- 009C
- C09C
- 003C
- 002F

- C031
- C029
- C00E
- C02D
- C025
- C004
- C0A0
- 000A
- C00D
- C003
- 00AD
- 00B7
- 0095
- 00AC
- 00B6
- 0094
- 0093
- 00A9
- C0A5
- 00AF
- 008D
- C0A9
- 00A8
- C0A4
- 00AE
- 008C
- C0A8
- 008B

For "OPTIONS":

<param1> - string type; binary mask to add Uri-xxx options into COAP packet. Enabled options are extracted from URI parameter defined in AT%COAPCMD. Any bit combination from below may be selected:

- "0001" - Uri-Host
- "0010" - Uri-Port
- "0100" - Uri-Path
- "1000" - Uri-Query
- ...
- "1111" - all (default)

"PROTOCOL":

<param1> - integer type; response waiting timeout for:

- Separate confirmable response
- Non-confirmable GET response

Protocol timeout is selected as minimum value between this parameter and MAX_TRANSMIT_SPAN defined in RFC7252. Parameter is applied to all profiles, <profile_id> value is ignored. If omitted, the MAX_TRANSMIT_SPAN will be used by default. Units: sec.

Range:

- 0 - default value: MAX_TRANSMIT_SPAN
- 1 - MAX_TRANSMIT_SPAN

%COAPCMD

Command	Possible response(s)
AT%COAPCMD=<cmd>,<profile_id>,[<uri>],<confirm>,[<token>],[<content>],<data_len>,[<blk_szx>],[<blk_num>],[<blk_m>],[<param1>,...]]] [<CR><LF><data>]	%COAPCMD: <token> OK or ERROR
AT%COAPCMD?	ERROR (not supported)
AT%COAPCMD=?	%COAPCMD: (list of supported <cmd>s)

Table: %COAPCMD command syntax

Description:

AT command to communicate with COAP server.

All commands are unblocking.

The information about command success (for confirmable operations) or fail will be provided in %COAPEVU URC.

Command supports both: Host provided and internally generated <token>s. This <token> is always returned in command response regardless of how it was assigned: by Host or by COAP client internally. Using <token> Host may always identify related to message URC for any confirmable message.

Only single confirmable message per profile can be proceed at any given time. Other incoming messages will be stored into internal message queue. Next queued message processing will be started once previous confirmable message processing will be finished and reported to the Host via URC (if enabled).

The command provide opportunity to define COAP options for specified method.

Some mandatory options (uri, content-format, BLOCK1, etc.) are encoded in dedicated parameters explicitly.

For URI-xxx options filling this command provides two alternative mechanisms:

- If <uri> parameter is present, it will be decomposed into URI-xxx options in accordance with RFC7252, sec 6.4. For this procedure, if some special URI-xxx option exclusive zero bit is set in the bitmask by AT%COAPCFG="OPTIONS" subcommand, such URI-xxx option will be filtered out and not used, even if provided as part of <uri> string.
- The URI-xxx options can be provided also explicitly in the list of the options type/value as a part of first command line.

The URI related option list has a preference: if some URI-xxx option is provided explicitly in the command, the <uri> parameter will be silently ignored.

Both <uri> and URI-xxx options may be omitted. The default values for the Uri-Host (IP literal representing the destination IP address) and Uri-Port (destination UDP port) are sufficient for requests to most servers.

Other more rarely used options (including URI-xxx) may be added as a pair of option type/value at the end of first command line as defined in RFC 7252:

- 1 - If-Match
- 3 - Uri-Host
- 4 - ETag
- 5 - If-None-Match
- 6 - Observe

- 7 - Uri-Port
- 8 - Location-Path
- 11 - Uri-Path
- 14 - Max-Age
- 15 - Uri-Query
- 20 - Location-Query
- 28 - Size2
- 35 - Proxy-Uri
- 39 - Proxy-Scheme
- 60 - Size1

User may repeat type & value (<param1>/<param2>) pairs few times, if few options are needed to be sent. Number of such pairs is limited only by overall AT command buffer size of 3KB.

Defined values:

<cmd> - string type; COAP method:

- "GET" - Trigger COAP GET.
- "PUT" - Trigger COAP PUT.
- "POST" - Trigger COAP POST.
- "DELETE" - Trigger COAP DELETE.

<profile_id> - integer type; previously assigned <profile_id>:

- 1-5

<uri> - string type; optional URI of the target resource at server.

<confirm> - integer type; confirmation mode:

- 0 - non-confirmed
- 1 - confirmed

<token> - hexadecimal type; optional parameter, generated internally if omitted. It is mandatory for GET operation with OBSERVE option. Max size: 8 bytes.

For "GET", "PUT" and "POST":
<content> - integer type; the value of sent content format ("Context-format" (12) option) for POST/PUT or the optional value of expected content format ("Accept" (17) option) for GET as defined in RFC 7252:

- 0 - Text/plain
- 40 - Application/link-format
- 41 - Application/xml
- 42 - Application/octet-stream
- 47 - Application/exi
- 50 - Application/json

<data_len> - integer type; actual <data> payload size in bytes to send in "PUT" and "POST". Always zero for "GET":

- 0
- 1-1024

<blk_szx> - integer type; optional parameter applied to blockwise data transfer. Block size of transferred data (PUT/POST) to be acknowledged with server (GET/PUT/POST). Only power-of-two block sizes are acceptable:

- 32-1024

<blk_num> integer type; optional parameter applied to blockwise data transfer. Block sequence number:

- 0-1048575 (? 20 bits)

<blk_m> integer type; optional parameter applied to blockwise data transfer. Indicates that the data in the message is the last block or more blocks are available. Always zero for "GET":

- 0 - last block
- 1 - more blocks available

<param1> - integer type; optional parameter. Option type as defined in "Description".

<param2> - string type; optional parameter, used together with <param2>. The option value as defined in RFC 7252. Any parameter value is represented in quotes including:

- string
- uint
- opaque

For "empty" option value (i.e. ETag option or with zero length), this parameter shall be omitted in command string (omitted parameter is signaled by ",,").

Note: Repeat <param2> & <param3> pairs few times, if few options are needed to be sent in the message.

<data> - hexadecimal type; COAP plain payload without quotes.

Implementation Notes:

The RFC7959 is very clear which block to use in sec. 2.3:

AT/URC		Op		BLOCK1		BLOCK2	
		szx	num	m	szx	num	m
%COAP CMD	PUT	v (proposed)	v	v	-	-	-
	POST	v (proposed)	v	v	-	-	-
	GET	-	-	-	v (proposed)	0	v
%COAP EVU	PUT	v (agreed)	v	v	-	-	-
	POST	v (agreed)	v	v	-	-	-
	GET	-	-	-	v (agreed)	v	v

?Only single set of block (1 or 2) is used in each AT/URC.

User does not need to know about BLOCK1/2 difference.

The description of <blk_szx>/<blk_num>/<blk_m> covers this table.

%COAPEV

Command	Possible response(s)
AT%COAPEV=<ev_type>,<mode>	OK/ERROR
AT%COAPEV?	ERROR (not supported)
AT%COAPEV=?	%COAPEV: (list of supported <ev_type>s), (list of supported <mode>s)
(unsolicited)	For "xxxCONF"/"GETRCV": %COAPEVU: <ev_type>,<profile_id>,<token>,<status> ,<rsp_code>,<data_len>,[<content>] ,[<blk_szx>],[<blk_num>],[<blk_m>],[<res1> ...] [<CR><LF><data>] For "CMDRST": %COAPEVU: <ev_type>,<profile_id>,<token> For "CMDTERM": %COAPEVU: <ev_type>,<profile_id>,<token>,<error>

Description:

The command is intended to notify about COAP events.

Default COAP mode is URC disabled for all event types. Most of the events are related to asynchronous operation triggered by AT%COAPCMD. Such acknowledgement may be normally disabled.

Note that the messages sent in non-confirmable mode will not return acknowledge message and no URC is expected.

Server may report even failed operation with Diagnostic Payload transferred in <data> parameter. If no Content-format option is provided with such payload, the error is expected to be a brief human-readable diagnostic message, explaining the error situation. Note, that such payload will be hex encoded as any other COAP raw payload and needs to be converted into readable text.

Defined values:

<ev_type> - string type:

- "PUTCONF" - PUT procedure confirmation status
- "POSTCONF" - POST procedure confirmation status
- "DELCONF" - Delete procedure confirmation status
- "GETRCV" - GET procedure data arrival event
- "CMDRST" - Command rejected by COAP server, RST message received
- "CMDTERM" - Command execution terminated remotely or locally
- "ALL" - All events, used only in execution command

<mode> - status of unsolicited result response presentation:

- 0 - disabled (default)
- 1 - enabled

<profile_id> - integer type; previously assigned <profile_id>:

- 1-5

<token> - hexadecimal type; optional parameter, may be omitted if generated internally for command sent via AT%COAPCMD. It is always present in the response of GET operation with OBSERVE option. Max size: 8 bytes

<status> - integer type; command execution status indication, relevant for "xxxCONF"/"GETRCV":

- 0 - success
- 1 - fail

<rsp_code> - integer type; response code of CoAP Protocol. Refer to the RFC 7252:

- 201 - 2.01 Created
- 202 - 2.02 Deleted
- 203 - 2.03 Valid
- 204 - 2.04 Changed
- 205 - 2.05 Content
- 231 - 2.31 - Continue
- 400 - 4.00 Bad Request
- 401 - 4.01 Unauthorized
- 402 - 4.02 Bad Option
- 403 - 4.03 Forbidden
- 404 - 4.04 Not Found
- 405 - 4.05 Method Not Allowed
- 406 - 4.06 Not Acceptable
- 408 - 4.08 - Request Entity Incomplete
- 412 - 4.12 Precondition Failed
- 413 - 4.13 Request Entity Too Large
- 415 - 4.15 Unsupported Content-Format
- 500 - 5.00 Internal Server Error
- 501 - 5.01 Not Implemented
- 502 - 5.02 Bad Gateway
- 503 - 5.03 Service Unavailable
- 504 - 5.04 Gateway Timeout
- 505 - 5.05 Proxying Not Supported

<error> - integer type; relevant for "CMDTERM":

- 1 - Command execution terminated locally due to LTE connectivity lost.
- 2 - Command execution terminated locally due to timeout waiting for the respond to be received.
- 3 - ICMP error
- 4 - Command execution terminated by client (RST sent) due to Unrecognized option(s) of class "critical" detected in server response.
- 5-255 - Reserved
- 256-262 - Command execution terminated locally due to DTLS authentication failure:
- 256 - An invalid SSL record was received.
- 257 - The server has no ciphersuites in common with the client.
- 258 - No client certification received from the client, but required by the authentication mode.
- 259 - The own certificate is not set, but needed by the server.
- 260 - No CA Chain is set, but required to operate.
- 261 - A fatal alert message was received from our peer.
- 262 - Verification of our peer failed.
- TBD more errors for DTLS-PSK

For "GETRCV", "DELCONF", "POSTCONF" & "PUTCONF" :

<data_len> - integer type; <data> payload size in bytes of <data> payload. If missed or equal to 0, no any <data> payload is expected.

- 0
- 1 - 1024

<content> - integer type; optional parameter, the value of received Content-format (option 12) as defined in RFC 7252:

- 0 - Text/plain
- 40 - Application/link-format
- 41 - Application/xml
- 42 - Application/octet-stream
- 47 - Application/exi
- 50 - Application/json

<blk_szx> - integer type; optional parameter applied to blockwise data transfer. Block size acknowledged by server:

- 32-1024

<blk_num> - integer type; optional parameter applied to blockwise data transfer. Block number:

- 0-1048575 (? 20 bits)

<blk_m> integer type; optional parameter applied to blockwise data transfer. Indicates that the data in the message is the last block or more blocks are available for "GET". Refer to RFC7959 for this flag meaning for "PUT"/"POST":

- 0 - last block for "GETRCV"
- 1 - more blocks available for "GETRCV"

<res1>-<res2>... - COAP Option of incoming message (option type/value) of received packet, if present. See option list in AT%COAPCMD command Description. The <res1>&<res2> pairs may be repeated few times.

<data> - hexadecimal type; COAP plain payload without quotes.

%COLLECTLOGS

Command	Possible response(s)
AT%COLLECTLOGS	%COLLECTLOGS: <lpath>
AT%COLLECTLOGS?	[%COLLECTLOGS: <lpath> [<CR><LF>%COLLECTLOGS:<lpath>] ...]
AT%COLLECTLOGS=?	OK

Description: This command is used to enable storage of RTOS. If no parameter is supplied, then logs are placed to B:/logs.

Example:

```
AT%COLLECTLOGS
```

```
%COLLECTLOGS" "b:/logs/Thu_Jan_1_00.00.10_1970.bin"
```

```
OK
```

%COUNT

Command	Possible response(s)
%COUNT <layer>[,<filter>][,<counter_type>][,<action>]]]]	%COUNT: <stats string>
%COUNT?	ERROR (OPERATION_NOT_ALLOWED) Operation is not supported
%COUNT=?	%COUNT: (list of supported <layer>s)

Description:

This command returns counters per LTE protocol layer/sub-system.
Read command is not supported.

Defined values:

<layer>:

- "PDM"
- "PDCP"
- "RLC"
- "MAC"
- "L1A"
- "RRC"
- "NAS"
- "TIMERS"
- "LOG"
- "CRITICALERR"
- "MEM"
- "L1AEXT"
- "ALL"
- "PWR"
- "USIM"
- "RPM"
- "phywarn"

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

- "TX"
- "RX"

<counter_type> - used to reduce the 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 an arbitrary format for specified layer counters reporting starting from "LAYER Stats:" textual prefix.

Examples:

To clear counters:

AT%COUNT="PDM",,, "CLEAR"

OK

%CPININFO

Command	Possible response(s)
%CPININFO	%CPININFO: <PIN attempts left>, <PUK attempts left>, <PIN2 attempts left>, <PUK2 attempts left>
%CPININFO?	ERROR Operation not supported
%CPININFO=?	OK

Description:

The number of attempts left for PIN and PUK.

This execution command queries for the CPIN status information on the USIM. This command should be used by an external application (e.g. Connection Manager) to give the user additional information regarding the lock status.

The supported fields are:

- PIN attempts left - the number of failed tries to enter PIN, before it is blocked
- PUK attempts left - the number of failed tries to enter PUK, before PUK is permanently blocked
- PIN2 attempts left - the number of failed tries to enter PIN2, before it is blocked
- PUK2 attempts left - the number of failed tries to enter PUK2, before PUK2 is permanently blocked

The execution command returns the relevant CPIN information shown above

Example:

3 PIN and PIN(2) tries left and 10 PUK and PUK(2) tries left:

```
AT%CPININFO
```

```
%CPININFO: 3, 10, 3, 10
```

```
OK
```

%CPSMS

Command	Possible response(s)
AT%CPSMS=<cmd>[,<param1>[...]]	OK or ERROR
AT%CPSMS?	%CPSMS: <state>,<act>
AT%CPSMS=?	%CPSMS: (list of supported <cmd>s)
(unsolicited)	%CPSMSU:<event>

Description:

This command controls non-standard PSM operations and provides enabling/disabling for PSM status change notification.

This command is not supported when RAT is 2G: ERROR is displayed.

The execution AT%CPSMS=2 triggers cell selection procedure while modem is in PSM. After that modem is considered as camped on cell while in PSM. Read command returns PSM activity status <act>=1 in this state.

The AT%CPSMS=2 is accepted only in PSM. Otherwise the ERROR will be returned.

The AT%CPSMS=3 interrupts action of AT%CPSMS=2 command and returns modem to regular PSM.

The AT%CPSMS=3 is accepted only if AT%CPSMS=2 was previously sent and before one of <event>s 0/3 received. These events indicates that the PSM itself or the camping while in PSM has been left already. Otherwise the ERROR will be returned.

Warning: Power consumption of modem when it is camped on cell while in PSM is much higher than of regular PSM. Long stay in this mode can drain battery.

Read command returns together:

- PSM feature enabled state (may be also retrieved by AT+CPSMS?)
- Current PSM activated status (may be also retrieved by AT%STATUS="PSM")

Defined values:

<cmd> - integer type; mode of unsolicited result response presentation:

- 0 - disable %CPSMSU URC (default)
- 1 - enable %CPSMSU URC
- 2 - trigger attempt to camp on cell while in PSM.
- 3 - interrupt camping on cell while in PSM.

For <cmd>=2 (trigger attempt to camp on cell while in PSM)

<param1> - integer type, optional camping attempt timeout in sec. Default:120 sec:

- 1-12000

<state> - integer type; state of PSM feature:

- 0 - disabled
- 1 - enabled

<act> - integer type; PSM activity status:

- 0 - inactive
- 1 - active

<event> - integer type:

- 0 - exit PSM
- 1 - enter PSM
- 2 - successfully camped on cell while in PSM
- 3 - camping attempt interrupted by timeout

%CSDH

Command	Possible response(s)
%CSDH=<show>	
%CSDH?	%CSDH: <show>
%CSDH=?	%CSDH: (list of supported <show>s)

Description:

This command enables proprietary optional fields in the response for AT commands CMGR/CMGL/CMT.

The optional fields carry information related to:

- Concatenated SMS (<msgid>,<msgn>,<msgpn>)
- WDP header (<wdpdst>, <wdpsrc>)
- 3GPP2 <message_id> & <teleservice_id>
- CMGL extra info (<fo>,<pid>,<dcs>, <sca>,<tosca>)

The definition of these parameters can be found in the description of the user modified commands: AT+CMGR, AT+CMGL and +CMT in this document.

Note: This command has effect only when AT+CSDH=1

Defined values:

<show>: integer type:

- 0 - So not show any proprietary optional info
- 1 - Show concatenated header info
- 2 - Show Concatenated header info, WDP info, 3GPP2 message & teleservice id (if the SMS is 3GPP2) and CMGL extra info

%CSMP

Command	Possible response(s)
%CSMP=<replayreq>,<encoding>,<teleid>,<priority>,<cbaddr>	OK/ERROR
%CSMP?	+CSMP:<replayreq>,<encoding>,<teleid>,<priority>,<cbaddr>
%CSMP=?	%CSMP: (list of supported <replayreq>),(list of supported <encoding>s),(list of supported <teleid>s ,(list of supported <priority>s),<cbaddr>

Description:

This command is used to set text mode parameters for outgoing 3GPP2 SMS (applicable for text mode SMS).

Remark: The <replayreq> parameter must be specified, but all the other parameters may be omitted and therefore will be written as ",," .

Defined values:

<replayreq>: integer type

- 0 - no request for DAK(3GPP2 delivery Ack request)
- 1 - request for DAK

If parameter is not specified, the default setting is applied

<encoding>:

- "GSM7BIT"
- "LATIN"
- "UNICODE"
- "IA5"
- "ASCII7BIT"

<teleid>: integer type; Teleservice ID

- 4097 - page
- 4098 - SMS message (factory default)

<priority>: integer type; The priority is different with every carrier.

In case of Sprint

- 0 - Normal (factory default)
- 1 - Interactive
- 2 - Urgent
- 3 - Emergency

In case of Verizon:

- 0 - Normal (factory default)
- 1 - High

<cbaddr>: string

- Callback address

%CSQ

Command	Possible response(s)
%CSQ	%CSQ: <rsrp>,<ber>,<rsrq-signal quality> If RAT is 2G: %CSQ: <rssi>,<ber>,99
%CSQ?	ERROR (OPERATION_NOT_ALLOWED) Operation is not supported
%CSQ=?	%CSQ:(0-31,99),(0-7,99),(0-34,99) OK

Description:

If RAT in use is not 2G, execution command returns received signal received power <rsrp>, channel bit error rate <ber> and <rsrq> signal quality from the MT.

If RAT in use is 2G, execution command returns received signal strength indication <rssi> and channel bit error rate <ber> from the MT.

Taken from the above link, the definition for the <ber> is: "The BER values used to define a quality band are the estimated error probabilities before channel decoding, averaged over the full set or sub set of TDMA frames as defined in subclause 8.4."

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:

<rsrp> or <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> (parameter is insignificant in 2G):

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

%CULCKI

Command	Possible response(s)
AT%CULCKI=<fac>,<pass>,<index>,[<net>],[<netsub>],[<sp>],[<corp>],[<imsi>],[<capacity>]	OK or Error
AT%CULCKI=<fac>,<pass>,<index>,<?>	%CULCKI:<active>[,<capacity>,<net>],[<netsub>],[<sp>],[<corp>],[<imsi>]]
AT%CULCKI?	ERROR Not supported
AT%CULCKI=?>	%CULCKI: (list of supported <fac>s)

Description:

This command is used to insert/modify, erase and query specific personalization information.

When all 4 initial parameters are provided and assuming the provided password matches the specific category password, the information provided will be loaded to the record referenced by index. If a record already exists, it will be rewritten with the new data. The specific information elements need to be included according to the category used.

The categories (facilities) currently supported on each chipset are reflected in AT%CULCKI=? test command response.

Useless irrelevant for selected category parameters should be omitted in command line.

The optional <capacity> parameter is applied only to category "PN" (Network personalization), "PS" (IMSI personalization) and per customer demand may be added to other categories. For "PN" it permits to define a range of MNCs within the same MCC. If parameter is omitted the <capacity>=1 is assumed.

When the command only includes the first 3 parameters the specific record referenced by fac and index will be erased and deactivated.

Including a "?" in the 4th parameter of execution command will return the values stored in the specific referenced record. This is a special execution AT format, it is not a regular read AT command.

Defined values:

<fac> - string type:

- "PS" - SIM personalization info
- "PN" - Network personalization info
- "PU" - Network Subset personalization info
- "PP" - Service Provider personalization info

<pass> - string type:

- An up to 16 digit password for the specific category

<index> - integer type:

- 1-70

<net> - string type; Network personalization information

<netsub> - string type; Sub Network personalization information

<sp> - string type; Service Provider personalization information

<corp> - string type; Corporate personalization information (not supported)

<imsi> - string type; IMSI for SIM personalization

<active> - integer type; indication if the queried category is locked (active) or not (1=active, 0=inactive)

<capacity> - integer type; range parameter starting from explicitly devined category values:
For set command:

- 1-999 - for "PN"
- 1 - 2^{32} - for "PS"
- 1 - for "PU" and "PP"

For Read command: number of MNCs within the same MCC:

- 0 - invalidated entry
- 1 and more - capacity of valid (active) "PN" and "PS" entries

Examples:

1. Set one network (PN) entry:

```
AT%CULCKI="PN","12345678",1,"310410"  
OK
```

2. Set one IMSI entry:

```
AT%CULCKI="PS","12345678",1,,,,,"260160000000374"  
OK
```

3. Query for network entry:

```
AT%CULCKI="PN","12345678",1,  
%CULCKI: 0,1,"310410"  
OK
```

4. Query for IMSI entry:

```
AT%CULCKI="PS","12345678",1,  
%CULCKI: 0,1,,,,,"260160000000374"  
OK
```

5. Test command:

```
AT%CULCKI=?  
%CULCKI: "PN","PS"  
OK
```

6. Setting Network subset lock PLMN 310/410 and Network subset of "01"

```
AT%CULCKI="PU","12345678",1,"310410","01"  
OK
```

7. Query the NW subset on index 1:

```
AT%CULCKI="PU","12345678",1,?  
%CULCKI: 0,1,"310410","01"  
OK
```

8. Set 11 new IMSI entries:

```
AT%CULCKI="PS","12345678",1,,,,,"260160000000374",11  
OK
```

%CUSATP

Command	Possible response(s)
%CUSATP=<mode>[,<pr_cmd>[,<pr_cmd>...]]	OK or ERROR
%CUSATP?	ERROR (this command is not supported)
%CUSATP=?	%CUSATP: (list of supported <mode>s), (list of supported <pr_cmd>s)

Description:

This AT command enables selective proactive commands routing by +CUSATP and proactive processing finish indication by +CUSATEND.

The +CUSATP and +CUSATEND enabled by this AT are part of confirmable proactive commands routing procedure, which expects Host confirmation sent via AT+CUSATT.

This proprietary AT provides also opportunity to reduce proactive commands confirmation phase to non-confirmable +CUSATP notification only. If this notification mode is selected, no any Host response (AT+CUSATT) and CAT finish indication (+CUSATEND URC) are expected.

The disabling of proactive commands routing (<mode>=0) is provided by this AT exclusively.

Default command call of AT%CUSATP=1 is equivalent to the standard AT+CUSATA=1 call.

If mandatory operation required in proactive command cannot be executed because of proactive command routing disabled by this AT, MT will return: "Terminal currently unable to process command" (20) in TERMINAL RESPONSE to UICC.

The filters selected by AT%CUSATP command using <pr_cmd> parameters are always "ORed". Command accepts with OK any overlapping or inclusive filters configuration.

Defined values:

<mode> - integer type:

- 0 - disable +CUSATP & +CUSATEND
- 1 - enable +CUSATP & +CUSATEND in confirmable mode
- 2 - enable +CUSATP only in non-confirmable mode

<pr_cmd> - integer type; if all <pr_cmd>s are omitted for <mode>=1, the default proactive set is enabled (see <pr_cmd>=100) .

- 0-9 - REFRESH type 0-9
- 10-19 - Reserved for future REFRESH types
- 20 - REFRESH of all types
- 21 - OPEN CHANNEL
- 22 - CLOSE CHANNEL
- 23 - RECEIVE DATA
- 24 - SEND DATA
- 25 - SEND SHORT MESSAGE
- 26 - RUN AT COMMAND
- 27 - SET UP EVENT LIST, TE-only list
- 28 - SET UP EVENT LIST, full event list
- 29-98 - Reserved (TBD, individual TE proactive commands will be added on customer demand)
- 99 - enable all TE-only proactives
- 100 - enable all proactives in a default proactive set: 20-27 & 99
- 101 - enable all proactives (regardless of type)

Examples:

1. Configure that only REFRESH type 4 and OPEN CHANNEL proactives will be routed:

AT%CUSATP=1,4,21

2. Configure that all proactives (MT & TE) will be routed:

AT%CUSATP=1,101

3. Apply normal (compliant to 3GPP) proactive routing rules:

AT%CUSATP=1

4. The IoT CAT Application may define min proactive set (ignore confirmation phase for most MT-only proactives) to reduce power consumptions:

AT%CUSATP=1,99,21

Implementation Notes:

Routing filters defined for <pr_cmd> parameter are not exclusive. Some of them contains a subset of proactive filters.

Since <pr_cmd> parameters are always "ORed", any filters misconfiguration (overlapping or inclusive subsets) will be always accepted (command returns OK) using next rules:

- On any attempt to define 2 overlapping filter subsets, AT command will always select the wider one. For example, if <pr_cmd>=100 and <pr_cmd>=101 will be commanded together, the wider <pr_cmd>=101 will be applied.
- Similar mechanism is applied to very special handling of "SET UP EVENT LIST" defined in TS 31.111. 3GPP requires to erase MT events from this proactive command and route TE-only events to TE. If <pr_cmd>=27 and <pr_cmd>=28 will be commanded together, the wider <pr_cmd>=28 will be applied.

%D

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

Description: This command initiates end to end PPP session with the LTE network on specific PDN which is set by the <ext_sessionID> parameter.

Defined values:

<ext_sessionID> - integer type. See definition in AT%PDNSET

%DATACMD

Command	Possible response(s)
AT%DATACMD=<cmd>>	OK/ERROR
AT%DATACMD?	%DATACMD: <general_flag>, <roaming_flag>
AT%DATACMD=?	OK

Description: This 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"	"DISABLE ROAM"	"ENABLER OAM"	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

%DEVCFG

Command	Possible response(s)
AT%DEVCFG=<cmd>,<object>[,<storage_type>][,<value1>[,<value2>...]] >	For "RD" command: %DEVCFG:<value1>[,<value2>...]
AT%DEVCFG?	ERROR (not supported)
AT%DEVCFG=?	%DEVCFG: (list of supported <cmd>s), (list of supported <objects>s), (list of supported <storage_type>s)

Description:

AT command provides configuration parameters (i.e. IMEI) storage abstraction. In the case that only single storage is expected, the <storage_type> parameter may be set to SW default (0) or omitted. Any attempt to store parameter to the unsupported storage type will return ERROR.

With the help of this command, any parameter with more than one storage option may be stored into more than one storage location. At run-time safely stored parameter (write-once) has a preference over any other storage types. The "RD" command with <storage_type>=0 or omitted will return the parameter value currently in use. If parameter is not stored yet, the "RD" command will return ERROR.

The read "RD" command may return ERROR due to some security access limitations. Most of the parameters stored into write-once memory cannot be reverted back to zero value once filled with non-zero value.

Any "WR" command is going to modify some NV stored parameter(s) or NV stored set of parameters (pre-defined params macro-set). To make new settings active and operational, device reboot shall be executed.

Defined values:

<cmd> - string type:

- "WR" - Write new configuration parameter value(s)
- "RD" - Query current configuration parameter value(s)

<object> - string type:

- "IMEI"
- "PBON" - power button ON parameters
- "SECBOOT" - secure boot enabler. Feature is disabled by default
- "DDMODE" - data delivery mode.
- "MCUISOLEN" - enable MCU from Modem security isolation and protection
- "IUICC" - enable/disable iUICC. Not applicable to ALT1250.
- "MCU" - disable MCU. Not applicable to ALT1255.
- "SECFOTA" - secure FOTA enabler. Feature is disabled by default.

<storage_type> - integer type:

- 0 - SW default
- 1 - write-once
- 2 - persistent

For "IMEI"

<value1> - string type; IMEI value (15 bytes).

For "PBON"

<value1> - integer type; feature enable state:

- 0 - disable
- 1 - enable

<value2> - integer type; debounce timeout in ms:

- 1-31

<value3> - integer type; threshold value in ms:

- 0-16383

For "SECBOOT":

<value1> - integer type; feature enable state. Currently command is write-only due to security limitations:

- 1 - enable uBoot Secure Boot procedure
- 2 - enable Modem Secure Boot procedure

For "DDMODE" <value1> - string type; data delivery mode selector:

- "IP"
- "NIDD"

For "IUICC" <value1> - integer type; iUICC enable state:

- 0 - disable
- 1 - enable

For "MCU" <value1> - integer type; MCU enable state:

- 0 - disable
- 1 - enable, value is used in "RD" command only, FFU for "WR" command.

For "SECFOTA" <value1> - integer type; optional feature enable state. If omitted, primary set of credentials will be enabled. Command is write-only due to security limitations:

- 1 - enable Secure FOTA procedure with primary set of credentials (default)
- 2 - enable Secure FOTA procedure with secondary set of credentials (FFU)

Examples:

Configure Power Button ON parameters: 1 sec pressing time, 10 ms debounce:

```
AT%DEVCFG="WR","PBON",0,10,1000
```

OK

%DEVCMD

Command	Possible response(s)
AT%DEVCMD=<cmd>,<param1>[,<param2>.. ..]]	OK or ERROR
AT%DEVCMD?	ERROR (not supported)
AT%DEVCMD=?	%DEVCMD: (list of supported <cmd>s)

Description: This execution command is used to trigger some device manipulation or some run-time device parameters changes.

If parameters are changed, they will be applied immediately without reboot.

The command is compound, which means that <paramX> parameters content is <cmd> specific.

Defined values:

<cmd> - string type; operation to be applied:

- "PSMAX" - max power save mode limit

For "PSMAX":

< param1> - string type:

- "DH0" - stateless deep hibernation type 0
- "DH1" - deep hibernation type 1
- "DH2" - deep hibernation type 2
- "DS" - deep sleep

%DEVINFO

Command	Possible response(s)
%DEVINFO=<type>	%DEVINFO: <value1>[,<value2>...]
%DEVINFO?	%DEVINFO: <type>,<value1>[,<value2>...] <CR><LF>%DEVINFO: <type>, <value1>[,<value2>...] ... <CR><LF>%DEVINFO: <type>,<value1>[,<value2>...]
%DEVINFO=?	%DEVINFO (list of supported <reqID>s)

Description: This command is used to get device identification and device characterization values from different types of persistent memory. If the field is not configured yet, the command returns ERROR. Read command returns a list of configured values.

Defined values:

<type> - string parameter:

- "DeviceSerialNumber" - returns string: the serial number of the board.
- "ModelNumber" - returns string: the vendor model ID number.
- "SiliconPartNumber" - returns string: silicon part number of ALT1250.
- "SiliconID" - returns hexadecimal 16-byte individual silicon identifier of ALT1250.
- "OtpVersion" - returns integer value of OTP version.
- "TestProgramRev" - returns integer value of test program revision.
- "SiliconLotId" - returns string: physical location of the silicon on die: lot ID.
- "SiliconWaferId" - returns integer value: physical location of the silicon on die: wafer ID.
- "SiliconXLoc" - returns integer value: physical location of the silicon on die: X location.
- "SiliconYLoc" - returns integer value: physical location of the silicon on die: Y location.
- "MinActiveVoltage" - returns integer value of minimal voltage for digital core operation (VDD min in active mode) in mV.
- "MinRetentionVoltage" - returns integer value of minimal voltage for retention mode (logic and memory) in mV.
- "McuIsolation" - reports boolean value for MCU from Modem security isolation and protection, "true" if enabled.
- "RomSecureBoot" - reports boolean value for ROM Secure Boot feature, "true" if enabled.
- "ModemSecureBoot" - reports boolean value for Modem Secure Boot feature, "true" if enabled.
- "McuSecureBoot" - reports boolean value for MCU Secure Boot feature, "true" if enabled.
- "FlashPartNumber" - returns string: flash part number.

If it is not defined specially, command returns for majority of <type>s:

<value1> - integer without quotes or string/hex parameter in quotes.

Example:

```
AT%DEVINFO="DeviceSerialNumber"
%DEVINFO: "123456789"
OK
```

```
AT%DEVINFO="SiliconPartNumber"
%DEVINFO:"ALT1250DC0_TG"
OK
```

```
AT%DEVINFO="SiliconID"
```

%DEVINFO:"5B390FA810000F1278A4056B643E957"
OK

AT%DEVINFO="OtpVersion"
%DEVINFO: 10
OK

AT%DEVINFO="SiliconLotId"
%DEVINFO: "UAFT26001"
OK

AT%DEVINFO="MinActiveVoltage"
%DEVINFO: 970
OK

AT%DEVINFO="McuIsolation"
%DEVINFO: "true"
OK

AT%DEVINFO="RomSecureBoot"
%DEVINFO: "true"
OK

AT%DEVINFO="ModemSecureBoot"
%DEVINFO: "false"
OK

AT%DEVINFO="McuSecureBoot"
%DEVINFO: "false"
OK

AT%DEVINFO="FlashPartNumber"
%DEVINFO: "MTQU128ABA"
OK

AT%DEVINFO?
%DEVINFO: "DeviceSerialNumber","123456789"
%DEVINFO: "ModelNumber","XTR1250S21"
%DEVINFO: "SiliconPartNumber","ALT1250DC0_TG"
%DEVINFO: "SiliconID","5B390FA810000F1278A4056B643E957"
%DEVINFO: "OtpVersion",10
%DEVINFO: "OtpSecVersion",0
%DEVINFO: "TestProgramRev",156
%DEVINFO: "SecTestProgramRev",0
%DEVINFO: "SiliconLotId","UAFT26001"
%DEVINFO: "SiliconWaferId",3
%DEVINFO: "SiliconXLoc",14
%DEVINFO: "SiliconYLoc",19
%DEVINFO: "MinActiveVoltage",970
%DEVINFO: "MinRetentionVoltage",880

```
%DEVINFO: "McuIsolation","false"  
%DEVINFO: "RomSecureBoot","false"  
%DEVINFO: "ModemSecureBoot","false"  
%DEVINFO: "McuSecureBoot","false"  
%DEVINFO: "FlashPartNumber","MTQU128ABA"  
OK
```

%DNSRSLV

Command	Possible response(s) +
AT%DNSRSLV=<SessionID>[,<domain_name>[,<addr_ip_type>[,<async>]]]	[%DNSRSLV: <ip_type>,<ip_addr> [%DNSRSLV: <ip_type>,<ip_addr>[...]] OK
AT%DNSRSLV?	ERROR (not supported)
AT%DNSRSLV=?	OK +
(unsolicited)	%DNSRSLVU:<event>[,<ip_type>,<ip_addr> [,<ip_type>,<ip_addr>[...]]

Description: This command is 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. The <SessionID>=0 is used to indicate general (not per-PDN) DNS servers selection for any AT command operation.

If execution command is called with <SessionID> parameter only (no any <domain_name> specified), it becomes to work as a query command. For query command call the command response represents DNS servers IP address list (per-PDN or general) instead of <domain_name> resolved IP address list.

Execution command with DNS resolution (not query) request may be used in 2 modes:

- Synchronous, command is blocked up to complete command execution (DNS resolution).
- Asynchronous, command returns OK/ERROR immediately. Command in this mode triggers single DNSRSLVU URC, which indicates that DNS resolution has been finished. Any new DNS resolution requests using AT%DNSRSLV are rejected (with ERROR) before previous resolution has been finished.

Defined values:

<SessionID> - integer type; a numerical PDN identifier defined in APN Table configuration file.

<SessionID> points to the PDN on which the IP address should be resolved or DNS server address list will be reported.

If <SessionId>=0, required operation will be executed using all already known DNS servers.

<domain_name> - string type; domain name to resolve.

- Maximum string size is 253 Bytes

<addr_ip_type> - integer type; optional parameter defining the IP address type to resolve.

- 0 - IPv4
- 1 - IPv6
- 2 - IPv4v6 (default)

<ip_type> - type of IP address:

- 0 - IPv4
- 1 - IPv6

<ip_addr> - string type:

- IPv4 or IPv6 resolved address, if <domain_name> is defined
- IPv4 or IPv6 address of DNS server, if <domain_name> is not defined

<async> - integer type; optional parameter. Synchronous or asynchronous resolution command processing method:

- 0 - sync (default)
- 1 - async

<event> - integer type; the result of DNS resolution. It is applicable to <async>=1 only:

- 0 - DNS resolution success
- 1 - DNS resolution failure, no any IP found

Examples:

1. Resolve IP using per-PDN assigned or configured DNS server(s):

```
ATDNSRSLV=1,"www.google.com"
DNSRSLV: 0,"172.217.27.132"
DNSRSLV: 1,"2404:6800:4012:1:0:0:0:2004"
OK
ATDNSRSLV=2,"www.google.com"
DNSRSLV: 0,"172.217.160.100"
DNSRSLV: 1,"2404:6800:4008:803:0:0:0:2004"
OK
```

2. Resolve IP using all known DNS server(s):

```
ATDNSRSLV=0,"www.google.com"
DNSRSLV: 0,"172.217.27.132"
DNSRSLV: 1,"2404:6800:4012:1:0:0:0:2004"
DNSRSLV: 0,"172.217.160.100"
DNSRSLV: 1,"2404:6800:4008:803:0:0:0:2004"
OK
```

3. Report per-PDN assigned or configured DNS server(s):

```
ATDNSRSLV=1
DNSRSLV: 0,"8.8.8.8"
DNSRSLV: 1,"2001:4860:4860::8888"
OK
ATDNSRSLV=2
DNSRSLV: 0,"8.8.4.4"
DNSRSLV: 1,"2001:4860:4860::8844"
OK
```

4. Report all known DNS server(s):

```
ATDNSRSLV=0
DNSRSLV: 0,"8.8.8.8"
DNSRSLV: 1,"2001:4860:4860::8888"
DNSRSLV: 0,"8.8.4.4"
DNSRSLV: 1,"2001:4860:4860::8844"
OK
```

5. Resolve IP using asynchronous method:

```
ATDNSRSLV=1,"www.google.com",,1
OK
```

```
DNSRSLVU: 0,0,"172.217.27.132",1,"2404:6800:4012:1:0:0:0:2004"
```

%DTLOG

Command	Possible response(s)
%DTLOG =<mode>[,<ttd_interval>]	In case the TTI interval cannot be supported.
%DTLOG?	ERROR (OPERATION_NOT_ALLOWED)
%DTLOG=?	OK

Description:

This Execution command is used to enable/disable Drive test Logs.

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

Read command is not supported.

Defined values:

<mode>:

- 0 - Disables Drive Test logs
- 1 - Enables Drive Test logs

<TTI_interval>:

Optional, the TTI periodicity of some of the PHY trace messages.

Value should be 1-10240.

%EARFCN

Command	Possible response(s)
%EARFCN=[<earfcn>[,<earfcn>...]] (up to 8)	OK or ERROR
%EARFCN?	%EARFCN: <earfcn> Currently camped EARFCN.
%EARFCN=?	%EARFCN: (list of <earfcn>s found in scan)

Description:

This command is intended to create, update and delete the EARFCN favorite list.

This command is not supported if the RAT in use is 2G, the command returns ERROR in such a case.

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

In case the <earfcn> value is not in range, the command returns ERROR.

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

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

Defined values:

<earfcn> - integer type; as defined in 3GPP.

%EMGCMD

Command	Possible response
AT%EMGCMD=<cmd>[,<param1>[,<param2>]...]	OK or ERROR
AT%EMGCMD?	%EMGCMD:<emgstate>
AT%EMGCMD=?	%EMGCMD: (list of supported <cmd>s)

Description:

This command should be used by NP to request activation of the emergency procedure in the MAC FW.

Note: Command is non-blocking command.

Defined values:

<cmd>:

- "EMGSTART" - Request FW to enter "emergency mode" (Start RRC Emergency: PLMN selection criteria, RRC connect flags)
- "EMGEND" - Request LTE FW to exit "emergency mode". The LTE FW should disconnect emergency PDN (if in home PLMN) or detach from Emergency Roaming PLMN.
- "CALLSTART" - Indication that Emergency call has started (If ECBM timer was active, then it is cancelled). This indication is required by firmware to handle loss of service during call (e.g. section 3.1.2.4 of [1])
- "CALLEND" - Indication that the call has ended (and ECBM timer is activated).
- "PLMN_NA" - Can't execute IMS on this PDN. Firmware should mark this PLMN as not good and will wait for the next "CONNECT" command.
- "SET_DEFAULT_PDN" - Set the CID of the default PDN for default attach - this command is currently not supported.

<param1>:

For "PLMN_NA":

- 0 - Permanent failure (Current use case: Normal IMS doesn't support voice)
- 1 - Temporary failure (Current use case: SIP failure in Emergency voice call)

For "SET_DEFAULT_PDN":

- The CID of the Default PDN

<param2>:

For "PLMN_NA":

- A string representing MCC/MNC. The format is as specified in AT+COPS when using numeric format (i.e. format = 2)

<emgstate>: integer type:

- 0 - Normal mode
- 1 - Emergency mode,

%EMUXCFG

Command	Possible response
AT%EMUXCFG=<type>,<mode> [,<ch0>,<ch1>,<ch2>,<ch3> [,<baudrate>]]	OK or ERROR
AT%EMUXCFG?	%EMUXCFG=<type>,<mode> [,<ch0>,<ch1>,<ch2>,<ch3>[,<baudrate>]] <CR><LF>%EMUXCFG=<type>,<mode> [,<ch0>,<ch1>,<ch2>,<ch3>[,<baudrate>]]
AT%EMUXCFG=?	%EMUXCFG: (list of supported <type>s), (list of supported <mode>s),(list of supported <ch*>s),(list of supported <baudrate>s)

Description:

The command sets eMUX configuration. It allows enabling and disabling of debug_emux over DEBUG COM port, enabling and disabling of mcu_emux between MAP core to internal MCU core. It also allows the user to select which types of communication/application will run over each of the maximum 4 logical channels available over a single eMUX physical connection.

If eMUX physical channel is enabled (<mode>=1), all 4 logical channels (<ch0/1/2/3>) shall be defined in execution command call.

Read command returns current configuration for all physical and logical channels.

Defined values:

<type> - integer type; type of eMUX channel:

- 0 - debug_emux
- 1 - mcu_emux (only when internal MCU is enabled)

<mode> - integer type; status of eMUX channel:

- 0 - disabled (default)
- 1 - enabled

<ch0> - integer type; optional parameter used for <mode>=1. Parameter is used to assign the application running over this channel. Possible values:

- 0 - channel not used
- 1 - MAC & PHY FW logs
- 2 - RTOS FW logs
- 3 - AT port
- 4 - CLI application
- 5 - TCP dump
- 6 - AT_PPP port
- 7 - C-API

<ch1> - integer type; optional parameter used for <mode>=1. Parameter is used to assign the application running over this channel. Possible values are the same as for <ch0>. Unless value is set to 0, value cannot repeat a value set of previous channels.

<ch2> - integer type; optional parameter used for <mode>=1. Parameter is used to assign the application running over this channel. Possible values are the same as for <ch0>. Unless value is set to 0, value cannot repeat a value set of previous channels.

<ch3> - integer type; optional parameter used for <mode>=1. Parameter is used to assign the application running over this channel. Possible values are the same as for <ch0>. Unless value is set to 0, value cannot repeat a value set of previous channels.

<baudrate> - integer type; optional parameter. eMUX physical channel baud rate:

- 0 - (default), use default baud rate configuration set in the device
- 1 - 460800 baud
- 2 - 921600 baud
- 3 - 3000000 baud

Example:

1. Enable debug_emux using: CLI application, AT port, RTOS FW logs and MAC & PHY FW logs over 3,000,000 baud:

```
AT%EMUXCFG=0,1,4,3,2,1,3
```

OK

2. Enable mcu_emux using: AT_PPP port and AT port over default baud:

```
AT%EMUXCFG=1,1,6,3,0,0
```

OK

3. Disable debug_emux:

```
AT%EMUXCFG=0,0
```

OK

%EXE

Command	Possible response(s)
AT%EXE=<clcmd_name>[,<param1>[,<param2>]]	<output> OK/ERROR
AT%EXE?	ERROR (not supported)
AT%EXE=?	OK

Description: This command executes script file in NP. The command is intended for Factory Production and Debug purposes only. It is strictly recommended to disable it for end user on commercial devices.

Defined values:

<clcmd_name> - CLI command to be executed.

<param1> - The first CLI command's parameter

<param2> - The second CLI command's parameter

<output> - CLI command's output

Example:

```
AT%EXE="ifconfig"  
lo: flags=5<UP,RUNNING> mtu:0 ipv6 mtu:0  
inet: 127.0.0.1 netmask 255.0.0.0 GW 127.0.0.1  
inet6 ::1 <local-link>  
RX ucastPcts 0 uncastPcts 0 bytes 0  
RX errors 0 dropped 0 unkProro 0  
TX ucastPcts 0 uncastPcts 0 bytes 0  
TX errors 0 dropped 0  
OK
```

%FILECMD

Command	Possible response(s)
AT%FILECMD =<cmd>[,<param1>[,<param2>[,<param3>[,<param4>]]]]	For "GET" command: %FILECMD: <length>,<crc32> For "DIR" command: [%FILECMD: <entry_type>,<entry_name>[, <size>]][<CR><LF>%FILEC MD: <entry_type>,<entry_name>[, <size>]][...]] For "DINFO" command: %FILECMD: <drive>,<mem_total>,<mem_ free>,<mem_used>,<mem_ba d>, <ent_total>,<ent_free>,<ent_f older_used>,<ent_file_used>[<CR><LF>%FILECMD: <drive>
AT%FILECMD?	ERROR (not supported)
AT%FILECMD=?	%FILECMD: (list of supported <cmd>s)
(unsolicited)	%FILECMDU:<event>

Description:

AT command to read/write/delete a file to/from the device storage. The file will be stored on preconfigured path. Upon execution, the command return OK/ERROR immediately. Command provide opportunity for "out-of-band" binary file transfer, which invokes file transfer protocol (implementation specific) and deliver file between host and the device. Once "out-of-band" file delivery is started, the AT command path is not accessible by the host. Furthermore, the delivery process can't be aborted. The AT command path become available only after completion of file delivery (with success or failure) which is notified by FILECMDU: <event>.

For "GET", "PUT", "COPY", "RENAME", "DIR" and "DEL" drive access depends on the mode (Debug or Commercial) on ALT1250:

- If AT%SRVCHANGE? returns "DEBUG", the <param1> is the full path, which shall include drive name ("b:/" or "d:/" or "c:/" for "DIR"). If only relative path or filename is used, the drive "b:/" is selected as a default drive.
- If AT%SRVCHANGE? returns "COMM", the <param1> is the relative path without drive name. If full path is used, it may contain only drive "b:/".

Similar policy is applied to "PREERASE" command. Drive "d:/" is not available for pre-erase operation when device is in Commercial mode.

There are additional file validation logic added to AT%FILECMD="PUT" followed by AT%FILEDATA="WRITE":

- If optional <param3> is used in AT%FILECMD="PUT":
 - Apply check of enough flash space for file download. Return ERROR if no enough memory.
- If both optional <param3> and <param4> are used:
 - Apply check of enough flash space for file download. AT%FILECMD returns ERROR if no enough memory.
 - Apply CRC checking at the end of file download by AT%FILEDATA="WRITE". Report success or failure in AT%FILEDATA response.
- If both <param3> and <param4> are omitted:

- No memory and CRC check is applied.
-

Defined values:

<cmd> - string type:

- "PUT" - Initiate file transfer protocol between host and device and write a file to the device

<param1> - string type; the name of the file (with or without path) to be transferred. The name of the file itself is limited by 29 bytes.

<param2> - integer type; type of file transfer:

- 0 - "out-of-band" default value.
- 1 - "inband", usage of AT%FILEDATA is expected. Default value, if omitted.

<param3> - integer type; the length of the file to be transferred.

<param4> - string type; calculated CRC32 value in decimal encoding of the file to be transferred.

<cmd> - string type:

- "GET" - Initiate file transfer protocol between host and device and read a file from the device

<param1> - string type; the name of the file (with or without path) to be retrieved. The name of the file itself is limited by 29 bytes.

<param2> - integer type; type of file transfer:

- 0 - "out-of-band" default value, if omitted for all chipsets other than ALT1250.
- 1 - "inband", usage of AT%FILEDATA is expected

<cmd> - string type:

- "DEL" - Delete a file from the device.

<param1> - string type; the name of the file (with or without path) to be deleted. The name of the file itself is limited by 29 bytes.

<cmd> - string type:

- "NOTIFY" - command to enable/disable notification about "out-of-band" file transfer protocol completion.

<param1> - integer type:

- 0 - notification disabled (default)
- 1 - notification enabled

<cmd> - string type:

- "COPY" - copy file between two locations on Altair file system.

<param1> - string type; the name of the file (with or without path) to be copied. The name of the file itself is limited by 29 bytes.

<param2> - string type; the name of the file (with or without path) where the file will be copied. The name of the file itself is limited by 29 bytes. If file with specified name already exist, it will be overridden.

<length> - integer type; file length in bytes.

<cmd> - string type:

- "PREERASE" - Apply FLASH erase operations to unused blocks of FFS. Command call is recommended just before file download, file copy or audio file recording to avoid any run-time flash erase operations. Command is blocking.

<param1> - string type; drive name

- "b"
- "d" - conditional access, see command definition.

<cmd> - string type:

- "RENAME" - rename file on Altair file system.

<param1> - string type; the name of the file (with or without path) to be renamed. The name of the file itself is limited by 29 bytes on ALT125x.

<param2> - string type; the new name of the file (without path) to be assigned. The name of the file itself is limited by 29 bytes on ALT125x. If file with specified name already exist, it will be overridden.

<cmd> - string type:

- "DIR" - Expose drive or folder content.

<param1> - string type; the name of the drive or folder (with path), which content will be reported. Access to drive c: and d: is conditional and depends on operation mode.

- "c" - conditional access, see command definition.
- "b"
- "d" - conditional access, see command definition.

<cmd> - string type:

- "DINFO" - Expose drive memory and folder/file content information.

<param1> - string type; optional parameter. The name of the drive, which content information will be reported. Drive total entries is a number of folders and files. The total numbers of drive memory and entries depends on the drive and its purpose. If <param1> is omitted information about all drives is reported. Name values:

- "c"
- "b"
- "d"

<length> - integer type; file length in bytes. For ALT125x only.

<crc32> - string type; CRC32 value in decimal encoding. For ALT125x only.

<event> - integer type:

- 0 - File transferred successfully
- 1 - File transfer failure

<entry_type> - integer type; type of entry contained in specified drive/folder:

- 0 - folder
- 1 - file

<entry_name> - string type; name of entry contained in specified drive/folder.

<size> - integer type; optional parameter. Size of file in bytes. Parameter is inapplicable to folders.

<drive> - string type; drive name:

- "c"
- "b"
- "d"

<mem_total> - integer type; drive total memory.

<mem_free> - integer type; drive free memory.

<mem_used> - integer type; drive used memory.

<mem_bad> - integer type; drive bad memory.

<ent_total> - integer type; drive total entries.

<ent_free> - integer type; drive free entries.

<ent_folder_used> - integer type; drive entries used for folders.

<ent_file_used> - integer type; drive entries used for files.

%FILEDATA

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

Description: This command is used for a simple file chunk-by-chunk read/write operation via local interface. Continuous (chunk-by-chunk) read operation, which is interrupted before EOF, requires new mandatory AT%FILECMD="GET" call (even with the same filename) to restart the read process from the beginning of the file.

Defined values:

<cmd>:

- "WRITE" - Write data to NV

<param1>: integer

- 0 - This is the last "WRITE" transaction
- 1 - More pending "WRITE" transactions

<param2>: integer; length of transmitted data in ASCII string length units, which is twice longer than transmitted data length in bytes:

- 2 to 3000

<param3>: hexadecimal: The file chunk data, in HEX format (in quotes)

<cmd>:

- "READ" - Read data from NV

<param1>: integer; the maximal length of data in bytes which requested to be read in this transaction; the length of data in ASCII string length units, which is twice longer than received data length in bytes:

- 2 to 3000

<param2>: integer; the offset from the start of reading file. This is actual byte offset. If this parameter is not included in AT request, it implies that the offset may be one of:

- Initial file pointer for the first file read after AT%FILECMD="GET" file selection
- Next position for continuous read

<more2read> - integer:

- 0 - No more data to read
- 1 - More data to read

<rlength> - integer; the actual received data length in ASCII string length units, which is twice longer than received data length in bytes:

- 2 to 3000

<rdata> - hexadecimal; the read data, in HEX format (in quotes).

<wlength> - integer; the actual transmitted data length in ASCII string length units, which is twice longer than transmitted data length in bytes:

- 2 to 3000
- 2 to 6000 for other chipsets

<res> - integer type; file writing CRC verification result. Optional parameter, it is omitted if CRC check is not applied:

- 0 - passed the CRC32 checking
- 1 - failed the CRC32 checking

Examples:

1. Read whole file from file beginning:

```
AT%FILECMD="GET","update.ua",1
OK
```

```
AT%FILEDATA="READ",1000 -> start from file offset 0
```

```
%FILEDATA:1,1000,"D4C3B5..."
OK
```

```
AT%FILEDATA="READ",1000 -> continue from file offset 500
```

```
%FILEDATA:1,1000,"57E13A..."
OK
```

...

```
AT%FILEDATA="READ",1000 -> continue from file offset 500*n
%FILEDATA:0,808,"55673E..." -> EOF indicated by <more2read>=0
OK
```

2. Read file portion from the middle of the file:

```
AT%FILECMD="GET","update.ua",1
OK
```

```
AT%FILEDATA="READ",1000, 40960 -> start from file offset 0xA000
```

```
%FILEDATA:1,1000,"D4C3B5..."
OK
```

```
AT%FILEDATA="READ",1000 -> continue from file offset 0xA000+500
```

```
%FILEDATA:1,1000,"57E13A..."
OK
```

...

```
AT%FILEDATA="READ",1000 -> continue from file offset 0xA000+500*m
%FILEDATA:1,1000,"69834AE..." -> read interrupted before EOF.
OK
```

%FLTSMS

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

Description:

This command handles 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>: integer type:

- 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 type:

- Number of filtered SMS in the dedicated storage.

<cmd>:

"GETSMS" - Command to get the latest SMS stored in the dedicated storage

<param1>: integer type:

- 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 should 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:

1. Define filter list:

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

2. Clear filter list:

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

3. Get SMS text Base64:

```
AT%FLTSMS="GETSMS",1,1  
%FLTSMS: "REC UNREAD","+358507654321","Mr. Jones","95/07/03,17:38:15+04"  
TWFuIGlzIGRpc3Rpbmd1aXNoZWQsIG5vdCBvbmx5I  
OK
```

%FWUPGCMD

Command	Possible response(s)
AT%FWUPGCMD=<cmd>,<param1>[,<param2>]	OK or ERROR
AT%FWUPGCMD?	%FWUPGCMD: <state>[,<rep1>[,<rep2>]
AT%FWUPGCMD=?	%FWUPGCMD: (list of supported <cmd>s)

Description: This command is used to manage firmware/software upgrade over the air. It is intended to communicate with external Host involved into FOTA process.

Defined values:

<cmd> - string type:

- "DLRSP" - Host response for pending Download event
- "UPRSP" - Host response for pending Update event
- "HOSTUPRES" - Host result reporting for Host Update
- "DLSUS" - Download Suspend. FOTA Manager will ask LWM2M to suspend download (applicable for HTTP/S PULL method only)
- "DLRES" - Download Resume. Resume download that previously suspended by "DLSUS"
- "SETVER" - Host FW version reported to the LWM2M server through the LWM2M resource 3/0/3.

For "DLRSP"/"UPRSP":

<param1> - integer type, Host confirmation code:

- 0 - accept
- 1 - cancel

<param2> - integer type; optional <result>, if cancelled.

For "HOSTUPRES":

<param1> - integer type; Host update result, see <result> values defined below.

<state> - integer type:

- 0 - Idle
- 1 - Waiting for download confirmation
- 2 - Download precondition
- 3 - During download
- 4 - Download completed
- 5 - Waiting for update confirmation
- 6 - Update precondition
- 7 - Waiting for reboot
- 8 - Waiting for host result
- 9 - FOTA finished
- 10 - Download suspended

For <state>= 3 (During download)

<rep1> - integer type; currently downloaded size of image in bytes for download in progress

<rep2> - integer type; total size of image to download

For <state>= 9 (FOTA finished)

<rep1> - integer type; final <result> value, see <result> values definition below

For "SETVER":

<param1> - string type;

Current Host FW version reported to the server as a part of <ALT1250 FW version>_<Host FW version> format

<result> - integer type:

- 0 - Initial value
- 1 - Success
- 2 - Not enough flash memory during download
- 3 - Out of RAM during download
- 4 - Connection lost during download
- 5 - Integrity check failure
- 6 - Unsupported package type
- 7 - Invalid URI
- 8 - Image update failed
- 9 - Unsupported protocol
- 101 - Insufficient battery

%FWUPGEV

Command	Possible response(s)
AT%FWUPGEV=<mode>	OK or ERROR
AT%FWUPGEV?	ERROR (not supported)
AT%FWUPGEV=?	%FWUPGEV: (list of supported <mode>s)
(unsolicited)	%FWUPGEVU:<ev_type>[,<res1>]

Description: This unsolicited command notifies the Host about the events of firmware upgrade. It is also used to request the Host's confirmation to continue with the download/update process.

Defined values:

<ev_type> - string type:

- "DLPENDING"
- "DLDONE"
- "UPPENDING"
- "REBOOTNEEDED"
- "FAILURE"

<mode> - integer type; status of unsolicited result response presentation:

- 0 - disabled (default)
- 1 - enabled

For "DLDONE"/"UPPENDING":

<res1> - integer type; images to download/update:

- 1 - Modem FW
- 2 - Host SW
- 3 - Both host SW and modem FW

For "FAILURE":

<res1> - integer type; download/update failure result value:

- 0 - Reserved
- 1 - Reserved
- 2 - Not enough flash memory during download
- 3 - Out of RAM during download
- 4 - Connection lost during download
- 5 - Integrity check failure
- 6 - Unsupported package type
- 7 - Invalid URI
- 8 - Image update failed
- 9 - Unsupported protocol
- 100 - RAT Switch failed

%GETACFG

Command	Possible response(s)
AT%GETACFG=<config_file_name.section_name.field_name>	%GETACFG: <field_value>[,<lock>] OK/ERROR
AT%GETACFG?	ERROR (OPERATION_NOT_ALLOWED)
AT%GETACFG=?	%GETACFG: (list of supported configuration files)

Description: This command gets a value of configuration parameter from MAP configuration file. A path to the configuration parameter is composed as "config_file_name.section_name.field_name".

Examples:

1. Get IP Type configuration:

```
AT%GETACFG="APNTable.Class1.IP_Type"  
"IPV4V6"  
OK
```

2. Get UartA baud rate configuration:

```
AT%GETACFG="manager.uartA.baudrate"  
115200  
OK
```


%GETCFG

Description: Get configuration from NV memory.

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

Purpose	Param1	Param2	Returns
Reads device's log module severity from NV	"LOG"	"SYS", "L1A", "MAC", "MACGN", "MACUL", "MACDL", "RLC", "RLCGN", "RLCUL", "RLCDL", "PDCP", "PDCPGN", "PDCPUL", "PDCPDL", "RRC", "VL1", "NAS", "USIM", "FRM", "ROHC", "PROF0", "PROF1", "PROF2", "PROF4", "PROF6", "PACKET_CLASS", "OSAL", "SERV", "DT", "SIMLOCK", "SMS", "EXCEPTION_MANAGER", "AMA", "AT", "PMP", "PWR", "SMSMNGR", "CAT"	"DEBUG", "INFO", "NOTICE", "WARN", "ERROR", "EMRG"
Reads device's log severity of all modules from NV	"LOG"	"ALL"	"DEBUG", "INFO", "NOTICE", "WARN", "ERROR", "EMRG"
Read bands defined in DOP/MDOP file, these bands are the ones to be calibrated (all chips except of ALT1250) and scanned at full scan	"BAND"		
Read the device's USIM simulator enable/disable in NV	"USIM_SIMULATOR"		0 - disabled. 1 - enabled
Read the device's stored cell feature state (enable/disable) in NV	"SC_STATE"		0 - disabled. 1 - enabled
Reads if the device should disable the reset on assert feature in MAC CPU	"DISABLE_RESET"		0 - enabled. 1 - disabled
Reads min pause interval between unsuccessful scanning	"REPOSE_MIN"		Time in seconds

Reads max pause interval between unsuccessful scanning	"REPOSE_MAX"		Time in seconds
Reads incremental step interval between unsuccessful scanning	"REPOSE_STEP"		Time in seconds for linear mode. -1 for exponent mode
Reads power save mode for Idle/Connected RRC state. Reads also power save mode for not in service states.	"PW_MODE"		10 - Disabled 20 - Only PHY 30 - Nap 40 - Light sleep 50 - Deep sleep 60 - Deep hibernation 2 70 - Deep hibernation 1 80 - Deep hibernation 0.5 90 - Deep hibernation 0
Reads 3GPP release number	"LTE_RELEASE_NUM"		LTE Release SW default, LTE Release 13, LTE Release 14
Get IMEI from DOP (only if OTP is not locked)	"DEBUG_IMEI"		"IMEI value"
Reads if PHY logger mechanism is disabled	"PHY_LOG_DISABLE"		0 - enabled. 1 - disabled
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.	enabled (0 or 1), band, EARFCN start, EARFCN end, EARFCN step
Reads if device IPv4 source filtering is disabled	"IPV4_SRC_FILTER_DIS"		0 - enabled. 1 - disabled
Reads if device IPv6 source filtering is disabled	"IPV6_SRC_FILTER_DIS"		0 - enabled. 1 - disabled
Reads device stateless DHCPv6 configuration	"STATELESS_DHCPV6"		0 - SW default 1 - enabled in proxy mode 2 - enabled in tunnel mode 3 - disabled
Reads NW Operator Mode flag used to enable operator-specific features	"NW_OPER_MODE"		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 13 - CTC 14 - Vodafone 15 - Telstra
Reads if scan plan "Verify BW" feature is enabled	"SP_CELL_BW_EN"		0 - disabled 1 - enabled
Reads if 32KHz clock correction mechanism is enabled	"DS_32K_CORR_EN"		0 - disabled 1 - enabled
Reads scan plan mode	"SP_MODE"		0 - SW Default 1 - Limited 2 - Mixed
Reads scan plan scheduling scheme	"SP_SCHED_SCHEME"		0 - Periodic regular 1 - Periodic triggered by max repose timer
Reads scan plan scheduling counter	"SP_SCHED_COUNTER"		0 - 255
Reads SIM RX-TX delay	"SIM_RX_TX_DELAY"		0 - SW default, 1-254 - delay in msec 255 - no delay
Reads scan plan PLMN selection method	"SP_PLMN_SELECTION"		0 - domestic PLMN only 1 - any PLMN selected
Reads MRU table update disabled status	"MRU_UPD_DIS"		0 - enabled 1 - disabled
Reads MRU table used entries	"MRU_ENT_USED"		0 - SW default, 1 - 254, 255 - unlimited
Reads MRU table NBS usage disable status	"MRU_NBS_DIS"		0 - enabled 1 - disabled
Reads MRU table entry aging disable status	"MRU_AGING_DIS"		0 - enabled 1 - disabled
Reads LTE DL Category settings -Not valid in NB-	"LTE_DL_CATEGORY"		101 - CAT-M1
Reads LTE UL Category settings -Not valid in NB-	"LTE_UL_CATEGORY"		101 - CAT-M1
Reads PPI capability settings -Not valid in NB-	"PPI_CAP_EN"		0 - disabled, 1 - enabled
Reads autonomous gap capability setting -Not valid in NB-	"AUTO_GAP_CAP"		0 - SW default 1 - enabled 2 - disabled
Reads the device VLISM mode	"IP_VLISM_MODE"		0 - SW default 1 - enabled 2 - disabled

Reads ROHC profile status	"ROHC"	"PROF0" "PROF1" "PROF2" "PROF0101" "PROF0102"	0 - disabled, 1 - enabled
Reads max number of ROHC contexts	"ROHC_MAX_CT_NUM"		0 - SW default 2, 4, 8, 12, 16, 24, 32, 48, 64, 128, 256, 512, 1024
Reads MAC severity override value	"MAC_LOG_SEV"		0 - SW default 1 - Debug 6 - Informational 7 - Notice 8 - Warning 9 - Error 12 - Emergency 255 - Disable
Reads power save debug and field trial parameters	"PS_DBG_PARM"		0 - SW default Binary value in quotes
Reads the device SIM pool suspend mode	"SIM_POLL_SUSP_MODE"		0 - SW default 1 - enabled 2 - disabled
Reads FGI bit reporting filter -Not valid in NB-	"FGI_REPORT_FILTER"		[b1[,b2[,...[,b16]...]] bit (b) values: 1-(max FGI#)
Reads CE mode A enable flag -Not valid in NB-	"CE_MODE_A_EN"		0 - disabled, 1 - enabled
Reads CE mode B enable flag -Not valid in NB-	"CE_MODE_B_EN"		0 - disabled, 1 - enabled
Reads the scan scheduling schema used for wakeup/reset	"SC_POST_NON_OPER"		0 - old regular scheme 1 - schema #1 2 - schema #2 3 - schema #3
Reads the scan scheduling schema used for exit flight mode	"SC_IN_LIMITED_SERV"		0 - old regular scheme 1 - schema #1 2 - schema #2 3 - schema #3
Reads the scan scheduling schema used for after unrecovered RLF	"SC_POST_RLF"		0 - old regular scheme 1 - schema #1 2 - schema #2 3 - schema #3
Reads scan scheduling repose scheme#1	"REPOSE_SCHEME 1"		[minT1,maxT1,step1,rep1 [,...[,minT8,maxT8,step8,rep8]]
Reads scan scheduling repose scheme#2	"REPOSE_SCHEME 2"		[minT1,maxT1,step1,rep1 [,...[,minT8,maxT8,step8,rep8]]
Reads scan scheduling repose scheme#3	"REPOSE_SCHEME 3"		[minT1,maxT1,step1,rep1 [,...[,minT8,maxT8,step8,rep8]]

			ep8, rep8]]
Reads MO TC1M timeout value	"SMS_TC1M_TOUT_MO"		0, 1-45
Reads MT TC1M timeout value	"SMS_TC1M_TOUT_MT"		0, 1-45
Reads TR1M timeout value	"SMS_TR1M_TOUT"		0, 35-45
Reads TRAM timeout value	"SMS_TRAM_TOUT"		0, 25-35
Reads TR2M timeout value	"SMS_TR2M_TOUT_MO"		0, 12-20
Reads (AT+CMMS) timeout value	"SMS_CMMS_TOUT"		0, 1-5
Reads Maximum number of CPDATA message retransmissions	"SMS_MAX_CPDATA_RET"		0, 1-3
Reads dual SIM configuration	"SIM_DUAL_CONFIG"		0 - SW default 1 - single SIM 2 - dual SIM
Reads wakeup SIM selection policy	"SIM_INIT_SELECT_POLICY"		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 if normal attach in roaming is disabled	"NA_ROAM_DIS"		0 - enabled 1 - disabled
Reads if capability reporting of Specific Reference Signal is disabled -Not valid in NB-	"CAP_REF_SIG_SUP_DIS"		0 - enabled 1 - disabled
Reads if capability reporting of RACH Report from SON-Parameters is disabled -Not valid in NB-	"CAP_SON_RACH_REP_DIS"		0 - enabled 1 - disabled
Reads device mobility type flag	"PS_DEV_MOB_TYPE"		0 - SW default 1 - mobile 2 - static
Reads rich scan enable flag	"RICH_SCAN_EN"		0 - disabled, 1 - enabled
Reads PMP severity override value	"PMP_LOG_SEV"		0 - SW default 1 - Debug 6 - Informational 7 - Notice 8 - Warning 9 - Error 12 - Emergency 255 - Disable

Reads the device eCP mode -Not valid in NB-	"DL_ECP_MODE"		0 - SW default 1 - enabled 2 - disabled
Reads Connected mode DRX capability setting	"DRX_CAPABILITY_MODE"		0 - SW Default 1 - Disabled 2 - Long DRX 3 - Long and short DRX
Reads Idle mode DRX special paging cycle negotiated value	"DRX_SPEC_PAGING_CYCLE"		0 - not applied 1 - 320 ms 2 - 640 ms 3 - 1280 ms 4 - 2560 ms
Reads FGI filter bit/technology reporting list -Not valid in NB-	"FGI_REPORT_LIST"		[b1,t1[,b2,t2[,...[,b16,t16]...]] bit (b) values: 1-(max FGI#) tech (t) values: 0 - both 1 - FDD 2 - TDD
Reads device LPA presence flag	"DEV_LPA_MODE"		0 - SW default 1 - enabled 2 - disabled
Reads TE LPA Terminal Capability (TC)	"TE_LPA_TC"		(hex value)
Reads modem failure fast recovery flag	"MD_FAILURE_FAST_RECOVERY"		0 - SW default 1 - enabled 2 - disabled
Reads capability override flag for NW-based power consumption optimizations -Not valid in NB-	"CAP_DEV_TYPE"		0 - SW default 1 - no NW-based power consumption optimisation
Reads PHY TX indication override flag	"PHY_TX_IND_OVERRIDE"		0 - SW default 1 - enabled 2 - disabled
Reads modem CAT operating mode flag	"MT_CAT_MODE"		0 - SW default 1 - enabled 2 - disabled
Reads power save cell selection optimization flag	"PS_CELL_SELECTION_OPT"		0 - SW default 1 - enabled 2 - disabled
Reads iUICC startup init mode	"ISIM_STARTUP_MODE"		0 - SW Default 1 - Standard init flow 2 - Altair APDU init flow
Reads NB-IOT category	"NB_CATEGORY"		0 - SW Default, 1 - NB1
Reads country scan optimization mode	"COUNTRY_SCAN_MODE"		0 - SW default 1 - enabled 2 - disabled
Reads country scan	"COUNTRY_SCAN_"		0 - disabled

optimization counter	COUNT"		1 - 255
Reads the type of reset on assert and exception failure	"FAIL_RESET_TTYPE"		0 - SW default 1 - warm reset 2 - cold reset
Reads RFBP override flag for external VBAT control	"VBAT_FEM_EXT_CTRL"		0 - SW default 1 - enabled 2 - disabled
Reads RFBP override flag for external VBAT GPIO pin	"VBAT_FEM_EXT_GPIO"		0 - SW default, 1-78
Reads data (RLC TX/RX) inactivity timeout value	"DATA_INACTIVITY_TOUT"		0 - timer is disabled 1-255 - 1-255 sec
Reads optimization flag to continue PLMN selection, in the case of bad PLMN Attach failure	"OPT_CONT_PLMN_SELECT"		0 - SW default 1 - enabled 2 - disabled
Reads optimization flag to execute new PLMN search when T3402 is running on current PLMN	"OPT_RESTART_PLMN_SEARCH"		0 - SW default 1 - enabled 2 - disabled
Reads NB-IOT band edge power reduction flag	"NB_BE_EN"		0 - disabled 1 - enabled
Reads NB-IOT band edge reduced max TX power	"NB_BE_TX_PWR"		value in 100*dBm
Reads band edge EARFCN removal	"NB_BAND_EDGE_CENTL"	"0" - Disable "1" - enable	
Reads CE maximum UL TBS Mode -Not valid in NB-	"CE_MAX_UL_TBS_MODE"		0 - SW default 1 - enabled 2 - disabled
Reads CE HARQ ACK Bundling Mode -Not valid in NB-	"CE_HARQ_ACK_BUNDLING_MODE"		0 - SW default 1 - enabled 2 - disabled
Reads CE 10 DL HARQ Processes Mode -Not valid in NB-	"CE_TEN_DL_HARQ_PROCESSES_MODE"		0 - SW default 1 - enabled 2 - disabled
Reads CE Number retuning symbols Override Enable -Not valid in NB-	"CE_NUM_RETUN_SYM_OVERRIDE_ENABLE"		0 - disabled 1 - enabled
Reads CE Number retuning symbols -Not valid in NB-	"CE_NUM_RETUN_SYM"		0-2
Reads CE PDSCH PUSCH Enhancement mode -Not valid in NB-	"CE_PDSCH_PUSCH_ENH_MODE"		0 - SW default 1 - enabled 2 - disabled
Reads CE Scheduling	"CE_SCHED_ENH"		0 - SW default

Enhancement mode -Not valid in NB-	MODE"		1 - enabled 2 - disabled
Reads restriction on use of enhanced coverage disable flag	"RESTRICT_EC_DI S"		0 - enabled 1 - disabled
Reads MAC RAI support mode	"MAC_RAI_SUP_M ODE"		0 - SW Default 1 - enabled 2 - disabled
Reads CP back-off timer support disable flag	"NB_CP_BACKOFF _DIS"		0 - enabled 1 - disabled
Reads Data Inactivity disable flag	"DATA_INACTIVIT Y_DIS"		0 - inactivity timer is enabled 1 - disabled
Reads Customer Product ID	"CUST_PRODUCT_ ID"		0 - SW default - no product defined 1 - Altair Smart Label
Reads consecutive RRC establishment barring mode	"CONN_EST_BARR ING_MODE"		0 - SW default 1 - enable 2 - disable

Note: In the "LOG" sub-command, the following module abbreviations: "MAC", "RLC" and "PDCP" work similar to the wildcard and do not have their own severity to report, and will report all logs related to each layer:

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

Note: "GSM_LOG" and "GSM_BAND" sub-commands are available only when 2G is supported and running.

%GETID

Command	Possible response(s)
AT%GETID=<requestedID>	%GETID:id1[,id2[...]]
AT%GETID?	ERROR (OPRATION_NOT_SUPPORTED)
AT%GETID=?	list of supported ID values

Description:

This command is used to get the identification values of the chip, board and board's components from NV memory.

Supported ID values :

<requestedID>:

- "BoardType" - returns Board Type, which is used to differentiate SW behavior per board of same customer.
- "Customer_Id" - returns assigned by Altair Customer ID, which is used to differentiate SW behavior per customer.
- "IMEISV" - returns IMEISV value reported over the air.
- "ChipID" - returns unique Chip Id (Lot ID, Wafer ID, X-pos and Y-pos

Examples:

AT%GETID="ChipID"

%GETID: "KP1080","20",2,15

OK

%GETLOG

Description: This command is used to get log severity for currently running SW per module.

Use: AT%GETLOG=<param1>

Purpose	Param1	Returns
Reads device's log module severity from RAM	"SYS", "L1A", "MAC", "MACGN", "MACUL", "MACDL", "RLC", "RLCGN", "RLCUL", "RLCDL", "PDCP", "PDCPGN", "PDCPUL", "PDCPDL", "RRC", "VL1", "NAS", "USIM", "FRM", "ROHC", "PROF0", "PROF1", "PROF2", "PROF4", "PROF6", "PACKET_CLASS", "OSAL", "SERV", "DT", "SIMLOCK", "SMS", "EXCEPTION_MANAGER", "AMA", "AT", "PMP", "PWR", "SMSMNGR", "CAT"	"DEBUG", "INFO", "NOTICE", "WARN", "ERROR", "EMRG"
Reads device's log severity of all modules from RAM	"ALL"	"DEBUG", "INFO", "NOTICE", "WARN", "ERROR", "EMRG"
Reads device's log 2G module severity from RAM (when GSM is supported and running)	"FCM", "GRR", "HAC", "HWL", "HWL2", "L1C", "L3CC", "L3GMM", "L3MM", "L3RR", "L3SM", "L3SMG", "L3SS", "LAPD", "LLC", "MSR", "RLD", "RLU", "SEQ", "SIM", "SNDP", "SPV", "GSYS"	"DEBUG", "INFO", "ERROR"
Reads device's log severity of all 2G modules from RAM (when GSM is supported and running)	"GSM_ALL"	"DEBUG", "INFO", "ERROR"

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"

%GETPROP

Command	Possible response
AT%GETPROP=<fname>[,<param1>...]	<res1>[,<res2>...] OK or ERROR
AT%GETPROP?	ERROR (not supported)
AT%GETPROP=?	%GETPROP: (list of supported <fname>s)

Description:

This command is used to get the configuration from the PROP file stored into the NV memory.

<fname> - string format; name of a parameter in the PROP file. See a list of possible parameter names below.

<param1>-<paramN> - additional parameters to get the value. See <param#> format and range specific for each <fname> in the table below.

<res1>-<resN> - value of <fname>. See <res#> format and range specific for each <fname> in the table below.

Purpose	<fname>	<param1>...	<res1>...
Reads SVN stored value	"SVN"		0 - 98
Reads IMEI stored value	"IMEI"		String (15 digits) in quotes

%GETSPN

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

Description:

This command intended to retrieve the 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 commands, if needed.

If a 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. The "Optional" policy reflects the 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.

Example:

```
AT%GETSPN
%GETSPN: 1,"","Cellcom IL"
OK
```

%GETSYSCFG

Command	Possible response(s)
AT%GETSYSCFG=<obj>	%GETSYSCFG: <obj>,<value1>[,<value2>...] OK/ERROR For tabular objects with wildcard "*": [%GETSYSCFG: <obj>,<value1>[,<value2>...] [<CR><LF>%GETSYSCFG: <obj>,<value1>[,<value2>...] ...]]
AT%GETSYSCFG?	ERROR (not supported)
AT%GETSYSCFG=?	OK

Description: This command is used to get value(s) from system configuration files HW_CFG, SW_CFG, and ANT_CFG.

The <obj> parameter contains file and parameter names. If file is completely missed, AT command returns ERROR. If parameter or tabular row is missed in the file, the AT command returns ERROR too. The empty "" value is considered as valid parameter value and will be returned in AT command response.

If a tabular object is called using a wildcard "*" instead of an index, the AT command returns all table entries defined in the table. If the table is empty, the command returns OK only.

Defined values:

<obj> - string type; pathname of parameter in config file, where filename is the part of the path. Path components are separated by '.'.

<value1>-<valueN> - string format; value(s) of <obj>. Any data type, including integer values, is returned in quotes.

The table below contains the list of currently supported SW_CFG <obj>s and <value>s:

<obj>	Complete list for possible <value>s
"sw_cfg.cfg_version.version"	"xx.xx"
"sw_cfg.catm_band_table.band#1"- "sw_cfg.catm_band_table.band#40"	"DISABLE"/"ENABLE" "1"/"2"/"3"/"4"/"5"/"8"/"12"/"13"/"14"/"18"/"19"/"20"/"26"/"27"/"28" (band)
"sw_cfg.nb_band_table.band#1"- "sw_cfg.nb_band_table.band#40"	"DISABLE"/"ENABLE" "1"/"2"/"3"/"4"/"5"/"8"/"12"/"13"/"14"/"17"/"18"/"19"/"20"/"25"/"26"/"28"/"66"/"70" (band)
"sw_cfg.catm_vendor_scan_plan.activate"	"DISABLE"/"ENABLE"
"sw_cfg.catm_vendor_scan_plan.verify_bw"	"DISABLE"/"ENABLE"
"sw_cfg.catm_vendor_scan_plan.mode"	"SW_DEFAULT"/"LIMITED"/"MIXED"
"sw_cfg.catm_vendor_scan_plan.sched_scheme"	"0"/"1"
"sw_cfg.catm_vendor_scan_plan.sched_counter"	"0"- "255"
"sw_cfg.catm_vendor_scan_plan.plmn_sel"	"DOMESTIC"/"STANDARD"

mode"	
"sw_cfg.catm_scan_list.entry#1"- "sw_cfg.c atm_scan_list.entry#64"	"DISABLE"/"ENABLE" "1"/"2"/"3"/"4"/"5"/"8"/"12"/"13"/"14"/"18 "/"19"/"20"/"26"/"27"/"28" (band) "-1"- "68585" (start EARFCN) "-1"- "68585" (stop EARFCN) "1"- "255" (EARFCN step)
"sw_cfg.nb_vendor_scan_plan.activate"	"DISABLE"/"ENABLE"
"sw_cfg.nb_vendor_scan_plan.verify_bw"	"DISABLE"/"ENABLE"
"sw_cfg.nb_vendor_scan_plan.mode"	"SW_DEFAULT"/"LIMITED"/"MIXED"
"sw_cfg.nb_vendor_scan_plan.sched_sche me"	"0"/"1"
"sw_cfg.nb_vendor_scan_plan.sched_count er"	"0"- "255"
"sw_cfg.nb_vendor_scan_plan.plmn_sel_m ode"	"DOMESTIC"/"STANDARD"
"sw_cfg.nb_scan_list.entry#1"- "sw_cfg.nb_ scan_list.entry#64"	"DISABLE"/"ENABLE" "1"/"2"/"3"/"4"/"5"/"8"/"12"/"13"/"14"/"17 "/"18"/"19"/"20"/"25"/"26"/"28"/"66"/"70" (band) "-1"- "68585" (start EARFCN) "-1"- "68585" (stop EARFCN) "1"- "255" (EARFCN step)
"sw_cfg.scan_time_schedule.rep_min_inter val"	"0"- "32767"
"sw_cfg.scan_time_schedule.rep_max_inter val"	"0"- "32767"
"sw_cfg.scan_time_schedule.rep_step"	"-1"- "1000"
"sw_cfg.3gpp.plmn_roaming"	"DISABLE"/"ENABLE"
"sw_cfg.sim.rx_tx_delay_ms"	"0"- "255"
"sw_cfg.sim.dual_config"	"SINGLE_SIM"- "DUAL_SIM"
"sw_cfg.sim.dual_init_select"	"NA"/"SIM1_ONLY"/"SIM2_ONLY"/"D UAL_SIM2_FALLBACK"/"DUAL_SIM1 _FALLBACK"
"sw_cfg.power_save_flags.ps_device_mobi lity_type"	"MOBILE"/"STATIC"
"sw_cfg.gsm_band_table.band#1"- "sw_cfg. gsm_band_table.band#4"	"DISABLE"/"ENABLE" "850"/"900"/"1800"/"1900" (band)

The table below contains the list of currently supported HW_CFG <obj>s and <value>s:

<obj>	Complete list for possible <value>s
"hw_cfg.cfg_version.version"	"xx.xx"
"hw_cfg.sim1.activate"	"DISABLE"/"ENABLE"
"hw_cfg.sim1.detect_mode"	"DISABLE"/"GPIO"
"hw_cfg.sim1.detect_pin"	"1"- "78"
"hw_cfg.sim1.detect_pull"	"DISABLE"/"PULL_UP"/"PULL_DOWN "
"hw_cfg.sim1.detect_polarity"	"POSITIVE"/"NEGATIVE"
"hw_cfg.sim1.ldo_select"	"SIM_LDO"/"AUX_LDO"

"hw_cfg.sim2.activate"	"DISABLE"/"ENABLE"
"hw_cfg.sim2.detect_mode"	"DISABLE"/"GPIO"
"hw_cfg.sim2.detect_pin"	"1"-"78"
"hw_cfg.sim2.detect_pull"	"DISABLE"/"PULL_UP"/"PULL_DOWN"
"hw_cfg.sim2.detect_polarity"	"POSITIVE"/"NEGATIVE"
"hw_cfg.sim2.ldo_select"	"SIM_LDO"/"AUX_LDO"
"hw_cfg.vbat_fem_ext_ctrl.activate"	"DISABLE"/"ENABLE"
"hw_cfg.vbat_fem_ext_ctrl.gpio"	"1"-"78"
"hw_cfg.tx_indicator.activate"	"DISABLE"/"ENABLE"
"hw_cfg.tx_indicator.gpio"	"1"-"78"
"hw_cfg.tx_indicator.time_on_offset_us"	"(-150)-0"
"hw_cfg.antenna_tunning_ctrl.type"	"DISABLE"/"STATIC"
"hw_cfg.antenna_tunning_ctrl.interface"	"MIPI"/"GPIO"
"hw_cfg.antenna_tunning_ctrl.mipi_ant_switch"	"1"/"10"/"14"
"hw_cfg.antenna_tunning_ctrl.mipi_vio_gpio"	"1"-"78"
"hw_cfg.antenna_tunning_ctrl.gpio_ctrl#0"- "hw_cfg.antenna_tuning_ctrl.gpio_ctrl#3"	"1"-"78"
"hw_cfg.internal_gnss.activate"	"DISABLE"/"ENABLE"
"hw_cfg.internal_gnss.antenna_fem_aux_select"	"NONE"/"AUX1"/"AUX2"
"hw_cfg.internal_gnss.lna_control"	"DISABLE"/"ENABLE"
"hw_cfg.internal_gnss.lna_control_gpio"	"1"-"78"
"hw_cfg.external_gnss.activate"	"DISABLE"/"ENABLE"
"hw_cfg.external_gnss.gnss_reset_ind_gpio"	"1"-"78"
"hw_cfg.external_gnss.gnss_data_ready_gpio"	"1"-"78"
"hw_cfg.system_component_config.anti_tamper"	"DISABLE"/"ENABLE"

The table below contains the list of currently supported ANT_CFG <obj>s and <value>s:

<obj>	Complete list for possible <value>s
"ant_cfg.antenna_tuning.antenna_range_tenth_mhz#1"- "ant_cfg.antenna_tuning.antenna_range_tenth_mhz#56"	"ENABLE"/"DISABLE; 4000-38000; 4000-38000; 0-255"

Example:

```
AT%GETSYSCFG="sw_cfg.sim.dual_config"
%GETSYSCFG: "sw_cfg.sim.dual_config","DUAL_SIM"
OK
```

%H

Command	Possible response(s)
AT%H=<cmd>	OK/ERROR
AT%H?	ERROR (not supported)
AT%H=?	ERROR (not supported)

Description:

This command is used to halt PPP daemon on the device side (for PPP session between host and device). The command is used also to enable/disable notification on PPP disconnection by the device.

The AT%H is used for requesting the device to halt the PPP daemon.

%HTTPCFG

Command	Possible response(s)
AT%HTTPCFG=<obj>,<profile_id>[,<param1>,<param2>,...]]	OK or ERROR
AT%HTTPCFG?	ERROR (not supported)
AT%HTTPCFG=?	%HTTPCFG: (list of supported <cmd>s), (list of supported <profile_id>s)

Description: AT command to configure HTTP connection parameters.

To start new HTTP connection the "NODES" parameters shall be defined at least.

Other configurations may be omitted, default settings are used:

- If "TLS" layer is not configured, unsecured connection will be established by default. It will be considered as misconfiguration if "NODES" URL requires security (https), but "TLS" layer is not configured. Any data access via AT%HTTPCMD/READ/SEND will be rejected for such misconfiguration.
- If "IP" layer is not configured, default PDN will be used.
- If "TIMEOUT" parameters are not configured, default parameters will be selected.

To make this omission confidentially working, it is strictly recommended to call "CLEAR" sub-command before entering new configuration for previously used <profile_id>.

Profile ID parameter is introduced to handle multiple pre-defined HTTP configuration settings.

The unique ID for multi-profile configuration is assigned by user and then used for all following profile configurations via same AT%HTTPCFG, for data transfer and other operations

(AT%HTTPSEND, AT%HTTPREAD, AT%HTTPCMD) and for events

(AT%HTTPEV/%HTTPEVU).

Default "FORMAT" configuration is:

- Text or pseudo-text raw data transfer
- Automatic HTTP request header generation
- The AT response HTTP header is present in response to observed errors (AT%HTTPREAD).

This default configuration may be overridden by explicit "FORMAT" settings and will be applied to any data transfer via same <profile_id>. The response format for specific "GET" operation may be also overridden in AT%HTTPCMD="READ" itself.

Defined values:

<obj>:

- "NODES" - configure client & server nodes parameters.
- "TLS" - configure TLS layer security parameters.
- "IP" - configure IP layer parameters.
- "FORMAT" - configure HTTP data/header representation.
- "TIMEOUT" - configure timeouts: server and host (switch)
- "CLEAR" - clear profile: stop session, release all resources and clear all previous configuration settings for specified <profile_id>
- "ABORT" - stop session and clear all unread data from incoming buffer for specified <profile_id>
- "RELEASE" - release profile resources keeping all "profile_id" configuration parameters untouched.

<profile_id> - integer type; new or previously assigned <profile_id>:

- 1-5

For "NODES":

- <param1> - string type; URI or IP address.

- <param2> - string type; optional authentication user identification string for HTTP.
- <param3> - string type; optional authentication password for HTTP.
- <param4> - integer type; optional format of user/password. 0-plain text(default) 1-B64 format

For "TLS":

<param1> - string type; TLS authentication mode:

- 0 - mutual authentication (default)
- 1 - authenticate client side only
- 2 - authenticate server side only
- 3 - no authentication

<param2> - integer type; TLS predefined authentication context (profile) previously configured by AT%CERTCFG.

<param3> - integer type; optional parameter to enable TLS session resumption. If this flag is configured to enable, a TLS resumption will be used instead of full TLS handshake in case of TLS session expiry or when reopening a socket due to LTE connectivity loss or similar issue. The TLS and TCP sessions are released together only after "CLEAR" commands will be applied to specified HTTP <profile_id>

- 0 - disable (default value)
- 1 - enable

<param4> - integer type; optional cipher suite filtering option to be applied to the default list of supported ciphers for negotiation with server

- 0 - disable (default value)
- 1 - enable

<param5> - string type; optional cipher suite list (white or black) as per

<https://www.iana.org/assignments/tls-parameters/tls-parameters.xhtml> definition.

All cipher suites in the list are encoded into single string using hexadecimal cipher suite ID separated by ";",

i.e. "C02C;C0AD...C003".

The list of permitted values to be inserted into string (refer to IANA site for exact definition).

- C02C
- C030
- 009F
- C0AD
- C09F
- C024
- C028
- 006B
- C00A
- C014
- 0039
- C0AF
- C0A3
- C02B
- C02F
- 009E

- C0AC
- C09E
- C023
- C027
- 0067
- C009
- C013
- 0033
- C0AE
- C0A2
- C008
- C012
- 0016
- 00AB
- C0A7
- C038
- 00B3
- C036
- 0091
- C0AB
- 00AA
- C0A6
- C037
- 00B2
- C035
- 0090
- C0AA
- C034
- 008F
- 009D
- C09D
- 003D
- 0035
- C032
- C02A
- C00F
- C02E
- C026
- C005
- C0A1
- 009C
- C09C
- 003C
- 002F
- C031
- C029
- C00E
- C02D
- C025
- C004
- C0A0
- 000A

- C00D
- C003
- 00AD
- 00B7
- 0095
- 00AC
- 00B6
- 0094
- 0093
- 00A9
- C0A5
- 00AF
- 008D
- C0A9
- 00A8
- C0A4
- 00AE
- 008C
- C0A8
- 008B

For "IP":

<param1> - integer type; Optional session ID - numeric PDN identification defined in APN table for specified PDN. If Session ID=0 or omitted default data PDN is used.

- 0 - use default data PDN
- 1-max value defined in NP config file

<param2> - integer; optional IP type used to configure preferred IP type for connection.

- 0 - IPv4v6
- 1 - IPv4
- 2 - IPv6 (default)

<param3> - integer type; optional destination (server) TCP port number. If omitted default HTTP port number is used. Range:

- 1 - 65535

<param4> - integer type; optional source (local) TCP port number. If omitted default HTTP port number is used. Range:

- 1 - 65535

For "FORMAT":

<param1> - integer type; data transfer technique:

- 0 - Data text mode (default value)
- 1 - Data PDU (ASCII encoded hex) mode

<param2> - integer type; AT response header presence as part of <data> parameter in AT%HTTPREAD:

- 0 - disable
- 1 - enable (default value)

<param3> - integer type; AT request header presence as a part of <data> parameter in AT%HTTPSEND.

If feature is enabled, all HTTP header override parameters in AT%HTTPSEND are irrelevant and ignored:

- 0 - disable (default value)
- 1 - enable

For "TIMEOUT":

- <param1> - integer type; server response timeout. The default value is 120 sec (2 min). If server response is not arrived during this time, server timeout error will be reported via URC. Unit: seconds:
- 1 - 65535

%HTTPCMD

Command	Possible response(s)
AT%HTTPCMD=<cmd>,<profile_id>,[<uri>][<param1>,...]	OK or ERROR
AT%HTTPCMD?	ERROR (not supported)
AT%HTTPCMD=?	%HTTPCMD: (list of supported <cmd>s), (list of supported <profile_id>s)

Description: AT command to communicate with HTTP server. All sub-commands are unblocking. The information about command success or fail will be provided in %HTTPEVU URC.

Defined values:

<cmd>:

- "GET" - Trigger HTTP GET.
- "DELETE" - Trigger HTTP DELETE.

<profile_id> - integer type; previously assigned <profile_id>:

- 1-5 - multi-profile mode.

<uri> - string type; optional resource (URI) or requested object. If omitted the default IP/URI defined in AT%HTTPCFG will be used.

For "GET":

<param1> - integer type; optional parameter. Override the format/technique of downloaded data transfer (default or as defined by AT%HTTPCFG="FORMAT"):

- 0-Data text mode (default value)
- 1-Data PDU (ASCII encoded hex) mode

<param2> - integer type; optional parameter. Override response header presence (default or as defined by AT%HTTPCFG="FORMAT"):

- 0 - disable
- 1 - enable (default)

<param3>-<paramN> - string type; optional HTTP extra header line. Number of extended headers is limited only by overall AT command buffer size of 3KB.

%HTTPEV

Command	Possible response(s)
AT%HTTPEV=<ev_type>,<mode>	OK/ERROR
AT%HTTPEV?	ERROR (not supported)
AT%HTTPEV=?	%HTTPEV: (list of supported <ev_type>s),(list of supported <mode>s)
unsolicited	%HTTPEVU:<ev_type>,<profile_id>,<state>[,<res1> [,<res2>,...]]

Description: The command is intended to notify about HTTP events.

Default HTTP mode is URC disabled for all event types.

Most of the events are related to asynchronous operation triggered by AT%HTTPCMD/HTTPSEND.

Such acknowledgment may be normally disabled if message body of server response is not used.

The "%GETRCV" event provides notification about data received from the server.

The "GETRCV" and "PRSPRCV" events are also issued if HTTP session has been paused, but new additional data is already available for retrieval by ATHTTTPREAD.

Note: if TCP session is disconnected because of link lost, no URC is sent.

Defined values:

<ev_type> - string type:

- "PUTCONF" - PUT procedure confirmation status
- "POSTCONF" - POST procedure confirmation status
- "DELCONF" - Delete procedure confirmation status
- "GETRCV" - GET procedure data arrival event
- "PRSPRCV" - paused PUT/POST response renewal event
- "SESTERM" - Session terminated remotely or locally
- "ALL" - All events, used only in execution command

<mode> - status of unsolicited result response presentation:

- 0 - disabled (default)
- 1 - enabled

<profile_id> - integer type; previously assigned <profile_id>:

- 1-5

<state> - integer type; result code:

- 0 - success, relevant for "xxxCONF"/"GETRCV".
- 1 - GET/POST/PUT/DELETE HTTP transaction failure, relevant for "xxxCONF"/"GETRCV".
- 2 - Session terminated by server, relevant for "SESTERM".
- 3 - Session terminated locally due to session initiation or handling failures. Relevant for "SESTERM".
- 4 - Session terminated locally due to timeout waiting for the respond to be received. Relevant for "SESTERM".
- 5 - Session terminated locally due to TLS authentication failure. Relevant for "SESTERM".

For any <ev_type> except of "GETRCV", successful use-case (<state>=0):

<res1> - integer type; optional status or error code:

For <state>=0,1 (HTTP protocol success or error status):

- HTTP status code as defined in RFC 7231, sec.8.2.3

For <state>=3 (HTTP client local error):

- 1 - Wrong parameter like value out of range
- 2 - Buffer allocation fail
- 3 - Failed to create socket
- 4 - Failed to convert the IP address
- 6 - Failed to send message
- 7 - Failed to receive message
- 8 - URL translation error or certification files not exist on path
- 10 - DNS client could not retrieve IP address from DNS server
- 11 - HTTP header version not supported by http client
- 12 - HTTP header not include the length of file download

For <state>=5 (TLS error):

- 255 - Other TLS errors
- 256 - An invalid SSL record was received.
- 257 - The server has no ciphersuites in common with the client.
- 258 - No client certification received from the client, but required by the authentication mode.
- 259 - The own certificate is not set, but needed by the server.
- 260 - No CA Chain is set, but required to operate. 261 - A fatal alert message was received from our peer.
- 261 - A fatal alert message was received from our peer
- 262 - Verification of our peer failed.

For "PUTCONF" and "POSTCONF":

<res2> - string type; optional error reason.integer type; actual data size in bytes received from server until now. More data may be received before data retrieval by ATHTTPREAD. Length depends on read mode (with or without header).

<res3> - integer type; optional "Content length" from HTTP header, if present.

For "GETRCV", successful use-case(<state>=0):

<res1> - integer type; actual data size in bytes received from server until now. More data may be received before data retrieval by AT%HTTPREAD. Length depends on read mode (with or without header).

<res2> - integer type; optional "Content length" from HTTP header, if present.

%HTTPREAD

Command	Possible response(s)
AT%HTTPREAD=<profile_id>[,<max_len>]	%HTTPREAD: <data_len>,<rcv_len> <CR><LF><data> OK or ERROR
AT%HTTPREAD?	[%HTTPREAD: <profile_id>,<rcv_len> [<CR><LF>HTTPREAD: <profile_id>,<rcv_len> [...]]]
AT%HTTPREAD=?	%HTTPREAD: (list of supported <profile_id>s)

Description: AT command is used to read the body of HTTP response.

Once URC %HTTPEV informs about some operation confirmation or data received, this AT can be used to retrieve data provided by server.

If <max_len> is less than actual <data_len>, the message will be transferred chunk-by-chunk.

The <rcv_len> different from <data_len> in AT command response indicates that there is more data waiting to be read by this AT.

User shall call AT%HTTPREAD again to get more data.

Such chunk-by-chunk read may be finished or paused (by HTTP server) when <rcv_len>==<data_len>.

If paused, any additional data waiting to be read will be indicated by new %HTTPEV: "GETRCV" URC or by %HTTPEV: "PRSPRCV" URC.

If the data is not present for specified <profile_id>, command returns ERROR.

Only single GET operation response is stored internally per Profile ID.

If it will not be retrieved by user after "GETRCV" URC(s) arrival, next incoming HTTP data will override previous one.

Use "Content length" (if present) provided in first "GETRCV" URC arrived after AT%HTTPCMD="GET" operation to estimate HTTP GET response size.

Defined values:

<profile_id> - integer type; previously assigned <profile_id>:

- 1-5

<max_len> - integer type; max number of bytes of host allocated buffer to read:

- 1 - 3000 in Data text mode
- 1 - 1500 in Data PDU (hex) mode

<data_len> - integer type; data size in bytes returned by AT. It could be shorter than actual received data if it is fragmented to chunks by max buffer size:

- 1 - 3000 in Data text mode
- 2 - 1500 in Data PDU (hex) mode

<rcv_len> - integer type; actual data size in bytes received from server and present in the RX buffer.

<data> - HTTP plain payload without quotes.

%HTTPSEND

Command	Possible response(s)
AT%HTTPSEND=<cmd>,<profile_id>,[<data_len>], [<uri>],[<param1>,...] <CR><data>	OK or ERROR
AT%HTTPSEND?	[%HTTPSEND: <profile_id>,<busy_len>,<free_len> [<CR><LF>%HTTPSEND: <profile_id>,<busy_len>,<free_len>...]]
AT%HTTPSEND=?	%HTTPSEND: (list of supported <cmd>s), (list of supported <profile_id>s)

Description: AT command performs a POST or PUT request to HTTP server and triggers sending data to the server. The <data_len> parameter may be omitted in the human debug mode of AT usage. In this use-case data end should be signaled by Ctrl+Z pressing. The information about command success or fail will be provided in %HTTPEVU URC.

Defined values:

<cmd>:

- "PUT" - Trigger HTTP PUT.
- "POST" - Trigger HTTP POST.

<profile_id> - integer type; previously assigned <profile_id>:

- 1-5

<data_len> - integer type; actual data size in bytes to send:

- 1 - 3000 in Data text mode
- 1 - 1500 in Data PDU (hex) mode

<uri> - string type; resource (URI) or requested object.

- Optional. If omitted the default IP/URI defined in AT%HTTPCFG will be used.

For <param3>=0 of AT%HTTPCFG="FORMAT" (<data> does not contain HTTP header)

<param1> - string type; optional HTTP Content Type identifier. This parameter may be omitted, if default text/plain content is transferred.

For <param3>=1 of AT%HTTPCFG="FORMAT" (HTTP header is part of <data> content)

<param1> - string type; optional HTTP security definition. This parameter indicates the security level for this specific data transfer.

- "http"
- "https"

<param2> - integer type; optional parameter. More pending data indication, which is waiting to be sent using the same POST/PUT sub-command.

- 0 - This is the last POST/PUT chunk (default value)
- 1 - and more - Size of more pending data to send chunk by chunk within the next AT%HTTPSEND.

<param3> - integer type; optional parameter. Override the format/technique of uploaded data transfer (default or as defined by AT%HTTPCFG="FORMAT")

- 0 - Data text mode (default value)
- 1 - Data PDU (ASCII encoded hex) mode

<param4>-<param11> - string type; optional HTTP extra header line. Number of extended headers is limited by 8 or by overall AT command buffer size of 3KB (the one that happens first). If this AT is used with an essential number of extended headers, the size of <data> shall be decreased in such a way that overall AT string will not exceed 3KB.

<data> - HTTP plain payload without quotes.

%IGNSSACT

Command	Possible response(s)
AT%IGNSSACT=<cmd>[,<param1>]	
AT%IGNSSACT?	%IGNSSACT: <active_mode>
AT%IGNSSACT=?	%IGNSSACT: (list of supported <cmd>s), (range of supported <param1>)

Description:

This command activates GNSS hardware functionality.

Defined values:

<cmd> - integer type; activation/deactivation mode:

- 0 - Stop GNSS.
- 1 - Start GNSS -Starting GNSS until RF usage is disallowed or stopped by user. Outputs NMEA sentences at a 1 second periodicity. Returns OK if RF usage is currently allowed and ERROR if RF usage is not allowed.
- 2 - Delayed start of GNSS with tolerance delay. Same as start, but returns OK even if RF usage is not currently allowed and tries to start GNSS within tolerance delay provided by user.

For <cmd>=1 (Start)

<param1> - integer type; optional activation mode.

- 1 - Cold start. This will enforce GNSS to not use any assistance data.
- 2 - Hot start (default mode). GNSS receiver will use every assistance data available.

For <cmd>= 2 (Delayed Start)

<param1> - integer type; tolerance delay in seconds:

- 0-99999

<active_mode> - integer type:

- 0 - GNSS is not active
- 1 - GNSS is active

%IGNSSASST

Command	Possible response(s)
AT%IGNSSASST=<operation>,<category> [,<param1>[,<param2>...]]	For "GET": [%IGNSSASST: <param1>[,<param2>...]]
AT%IGNSSASST?	ERROR (not supported)
AT%IGNSSASST=?	%IGNSSASST: (list of supported <operation>s), (list of supported <category>s),(list of supported <params>s)

Description:

This command allows inputing and querying GNSS assistance data.

Defined values:

<operation> - string type:

- "SET" - set the <category> configuration. If this command is used when GNSS is active, new settings will be applied only after GNSS deactivation. This run-time setting overrides the configuration file static setting and/or default SW functionality.
- "GET" - get the <category> configuration.

<category> - string type:

- "LOCATION" - Current approximate location
- "LEAPSECONDS" - The number of leap seconds offset between GPS Time and UTC

<param1>-<paramN> - string type:

For "LOCATION" - The param body is of double type as following:

<latitude>,<longitude>;

<latitude> - string type, which contains double value latitude position;

- (-90) - 90

<longitude> - string type, which contains double value longitude position;

- (-180) - 180

For "LEAPSECONDS" - The param body is of int type as following:

<leapseconds>;

<leapseconds> - string type, which contains int value of the number of leap seconds;

- (-127) - 127

%IGNSSCEP

Command		Possible response(s)		
AT%IGNSSCEP= <op>[<days>	[<timeout>]]	For "DLD" %IGNSSCEP: [<http_ret>]	For "STAT" %IGNSSCEP: <status>[,<rem_ days>,<rem_hou rs>,<rem_minute s>]
AT%IGNSSCEP?		ERROR (not supported)		
AT%IGNSSCEP=?		%IGNSSCEP:(list of supported <op>s),(range of supported <days>)		

Description:

This command allows the host to download, erase, or query about CEP data file saved in memory.

Defined values:

<op> - string type:

- "DLD" - Download CEP file. In case the server URL and credentials are configured in locsrv file, they will be used and <days> will be ignored.
- "ERASE" - Erase CEP file from memory
- "STAT" - Query for CEP validity status.

In case of CEP valid, returns also the number of days/hours and minutes which will remain valid.

<days> - integer type; valid values are as following:

- 1
- 2
- 3
- 7
- 14
- 28

<timeout> - integer type; timeout of download request in seconds.

<http_ret> - integer type; HTTP error code in case DLD command failed due to the HTTP request. Error code values will appear as described in ATHTTPEV section.

<status> - integer type; status of CEP file

- 0 - No valid CEP file
- 1 - Valid CEP file found

<rem_days> - integer type; remaining number of days for CEP validity.

<rem_hours> - integer type; remaining number of hours for CEP validity.

<rem_minutes> - integer type; remaining number of minutes for CEP validity.

%IGNSSCFG

Command	Possible response(s)
AT%IGNSSCFG=<operation>,<category> [,<param1>[,<param2>...]]	For "GET": [%IGNSSCFG: <param1>[,<param2>...]]
AT%IGNSSCFG?	ERROR (not supported)
AT%IGNSSCFG=?	%IGNSSCFG: (list of supported <operation>s), (list of supported <category>s),(list of supported <type>s)

Description:

This command is used to set and get GNSS run-time mode configuration.

Defined values:

<operation> - string type:

- "SET" - set the <category> configuration. If this command is used when GNSS is active, new settings will be applied only after GNSS deactivation. The SET command is not persistent, i.e. configurations are lost after power-cycle. This run-time setting overrides the configuration file static setting and/or default SW functionality.
- "GET" - get the <category> configuration.

<category> - string type:

- "SAT" - satellite systems used in the calculation.
- "NMEA" - enabled NMEA sentences.
- "SKYLO" - configures SKYLO's internal GNSS notification.
- "BLANKING" - configures RF blanking.
- "ALG" - configures internal GNSS algorithm.
- "ROLLOVER" - configures week rollover value.

<param1>-<paramN> - string type:

For "SAT" - satellite system types:

- "GPS"
- "GLONASS"

By default, satellite system type is configured to "GPS".

One or more types can be used (separated by ","), i.e - for HYBRID mode: "GPS","GLONASS".

For "NMEA"- NMEA sentence types:

- "GGA"
- "GLL"
- "GSA"
- "GSV"
- "GNS"
- "RMC"
- "VTG"
- "ZDA"
- "GST"
- "PIDX"

One or more types can be used (separated by ","). Empty list means no enabled NMEA sentences.

For "SKYLO" - Internal GNSS notifications configuration:

- "MODE" - "0" for disable, "1" for enable
- "GPSTIME" - "0" for disable, "1" for enable
- "2DFIX" - Value between "0" to "99999"
- "2DFIXTIMEOUT" - Value between "0" to "99999"
- "NOFIX" - Value between "0" to "99999"

For "BLANKING" -Blanking configuration :

- "ENABLE" - "0" for disable, "1" for enable
- "GURAD_TIME" - Blanking guard time value between "0" to "9999". Once Guard timer expires, GNSS operation will be terminated.
- "ACTIVATE_UPON_DISALLOWED" - "0" for disable, "1" for enable. When enabled, blanking will be activated once PHY wake up to prevent immediate GNSS shutdown.

For "ALG" - configures internal GNSS algorithm:

- <earlySync> - Shortens the time required for GNSS-clock status adjustment 0 - Disable 1 - Enable

For "ROLLOVER" - configures week rollover value.

- Week Number Rollover is not saved in persistent memory unless there's a following GNSS activation and deactivation in order to reduce flash wear.
- This command deletes currently retained GPS time (Time of Week and Week-Number) to avoid a miss-calculation of UTC and GPS time. "(0-6)"

%IGNSSEV

Command	Possible response(s)
AT%IGNSSEV=<event>,<mode>	
AT%IGNSSEV?	%IGNSSEV: <event>,<mode>[,<event>,<mode>...]
AT%IGNSSEV=?	%IGNSSEV: (list of supported <event>s),(list of supported <mode>s)
(unsolicited report)	In general: %IGNSSEVU: <event>,<event body> For "BLANKING": %IGNSSEVU: "BLANKING",<status>[,<rfActiveTimeMsec>] For "FIX": %IGNSSEVU: "FIX",<fix_status>,<time>,<date>,<latitude>,<longitude>,<altitude>,<utc>,[<accuracy>],[<speed>,<eph_type>]

Description:

This command enables GNSS unsolicited notification events.

The unsolicited command is used to deliver information from GNSS to the application.

Defined values:

<event> - string type:

- "NMEA" - NMEA sentence report.
- "SESSIONSTAT" - Status event reported upon GNSS session status change.
- "ALLOWSTAT" - Status event reported upon GNSS allowed status change.
- "FIX" - Status event reported upon GNSS fix status change. Note that GGA NMEA must not be disabled (using ATIGNSSCFG) for "FIX" come out reliably.
- "EPHUPD" - Status event reported when GNSS session has started and ephemeris has expired.
- "COLDSTART" - Status event reported when GNSS session has started and cold start is initiated.
- "BLANKING" - Status event reported when blanking is toggled on and off due to RF usage by LTE.
- "ALL" - Report all events.

<mode> - integer type:

- 0 - Disable <event>
- 1 - Enable <event>

<event body> :

For "NMEA" - The event body is of string type representing the NMEA sentence (using quote before and after the sentence).

For "SESSIONSTAT" - The event body is of integer type as following:

- 1 - SESSION_BEGIN (GNSS started)
- 2 - SESSION_END (GNSS stopped)

For "ALLOWSTAT" - The event body is of integer type as following:

- 0 - GNSS is not allowed.
- 1 - GNSS is allowed.
- 2 - GNSS started automatically, when auto-restart is enabled in the configuration file or when GNSS starts working in delay when tolerance is given.

For "FIX" - The event body is of integer type as following:

<fix_status> - integer type:

- 0 - Fix has been lost
- 1 - Fix acquired

<time> - string type; last fix time, in format hh:mm:ss.

<date> - string type; last fix date, in format dd/mm/yyyy.

<latitude> - string type, which contains floating value; value is omitted if unknown.

- Latitude as defined and returned by NMEA command GGA. Positive values represent "North", negative values represent "South".

<longitude> - string type, which contains floating value; value is omitted if unknown.

- Longitude as defined and returned by NMEA command GGA. Positive values represent "East", negative values represent "West".

<altitude> - string type, which contains floating value; value is omitted if unknown.

- Altitude as defined and returned by NMEA command GGA.

<utc> - integer type:

- The UTC timestamp of the position (in 1ms units counted since January 1, 1970).

<accuracy> - floating type; radius accuracy in meters

<speed> - string type, which contains floating value; speed in m/sec

<eph_type> - string type:

- "B" - BEP ephemeris
- "C" - CEP ephemeris

For "EPHUPD" - The event body is of integer type as following:

- 1 - Ephemeris update is required.

For "COLDSTART" - The event body is of integer type as following:

- 1 - Cold-start is taking place.

For "BLANKING" - The event body of blanking unsolicited reports blanking status and GNSS RF active time in msec.

<status>- integer type: -0 - blanking is deactivated -1 - blanking is activated -2 - blanking guard time expired

<rfActiveTimeMsec>- integer type: -Time in msec that GNSS RF was active.

%IGNSSINFO

Command	Possible response(s)
AT%IGNSSINFO=<type>	For "SAT": %IGNSSINFO: <num_of_sat> [%IGNSSINFO: <PRN>,<elevation>,<azimuth>,<SNR>] [...] For "FIX" and "LASTFIX": %IGNSSINFO: <fix_type>,<time>,<date>,<latitude>,<longitude>,<altitude>,<utc> ,[<accuracy>],[<speed>],<eph_type> For "TTFF": %IGNSSINFO: <ttff> For "EPH": %IGNSSINFO: <eph_status>
AT%IGNSSINFO?	ERROR (not supported)
AT%IGNSSINFO=?	%IGNSSINFO: (list of supported <type>s)

Description:

This command is a query for GNSS information.

Defined values:

<type> - string type:

- "SAT" - returns log of satellite in view. Note that GSV NMEA must not be disabled (using ATIGNSSCFG) for data come out reliably.
- "FIX" - returns information of current location acquired by the device. Note that GGA and RMC NMEA must not be disabled (using ATIGNSSCFG) for data come out reliably.
- "TTFF" - returns the Time-To-First-Fix of the most recent GNSS activation.
- "EPH" - indicates if the last stored Ephemeris is valid or not.
- "LASTFIX" - returns the last location on the last fix. Used when fix cannot be obtained and the last location is needed.

<num_of_sat> - integer type; number of satellites in view.

<PRN> - integer type; pseudo-random noise code of the satellite:

- 1-37 for GPS
- 38-61 for GLONASS

<elevation> - integer type; satellite elevation:

- 0-90

<azimuth> - integer type; satellite azimuth:

- 0-360

<SNR> - integer type; signal strength of the satellite:

- 0-10 - No signal
- 10-15 - Very low signal
- 15-25 - Low signal
- 25-40 - Good signal

- >40 - Excellent signal

<fix_type> - integer type:

- 0 - No fix
- 1 - MSA
- 2 - MSB

<time> - string type; last fix time, in format hh:mm:ss .

<date> - string type; last fix date, in format dd/mm/yyyy.

<latitude> - string type, which contains floating value; value is omitted if unknown.

- Latitude as defined and returned by NMEA command GGA. Positive values represent "North", negative values represent "South".

<longitude> - string type, which contains floating value; value is omitted if unknown.

- Longitude as defined and returned by NMEA command GGA. Positive values represent "East", negative values represent "West".

<altitude> - string type, which contains floating value; value is omitted if unknown.

- Altitude as defined and returned by NMEA command GGA.

<utc> - integer type:

- The UTC timestamp of the position (in 1ms units counted since January 1, 1970).

<accuracy> - floating type; radius accuracy in meters

<speed> - string type, which contains floating value; speed in m/sec

<eph_type> - string type:

- "B" - BEP ephemeris
- "C" - CEP ephemeris

<ttff> - string type, which contains floating value; time-to-the-first-fix of the most recent GNSS activation (in milliseconds).

<eph_status> - integer type:

- 0 - Last stored ephemeris is not valid.
- 1 - Last stored ephemeris is valid.

%IGNSSMEM

Command	Possible response(s)
AT%IGNSSMEM=<op>,<bitmask>	
AT%IGNSSMEM?	ERROR (not supported)
AT%IGNSSMEM=?	%IGNSSMEM: (list of supported <op>s),(range of supported <bitmask>)

Description:

This command allows the host to delete specific data from the GNSS storage. It must be sent when Internal-GNSS isn't active.

Defined values:

<op> - string type:

- "ERASE"

<bitmask> - hexadecimal type; The data which is required to be deleted. Bitmask can contain any combination of the bits reflected below:

- "0" - DELETE_ALL
- "0001" - EPHEMERIS
- "0002" - ALMANAC
- "0004" - POSITION
- "0008" - TIME
- "10000" - TCXO

%IGNSSTST

Command	Possible response(s)
AT%IGNSSTST=<op>[,<param1>...]	%IGNSSTST: [,<res1>...]
AT%IGNSSTST?	ERROR (not supported)
AT%IGNSSTST=?	%IGNSSTST: (list of supported <op>s),(range of supported <sat_id>s),(range of supported <threshold>s),(range of supported <insp_time>)

Description:

This command provides some GNSS test modes for future use.

Defined values:

<op> - string type:

- "INSP" - Measures GNSS frequency offset, writes it to GNSS flash and checks if the CNO criteria passed.
- "GNSSALLOWED" - Returns the current status of GNSSALLOWED flag
- "GETAMP" - Get ADC Amplitude
- "GETAMPDBG" - Get Amplitude DBG flag
- "SETAMPDBG" - Set Amplitude DBG flag

For "INSP":

<param1>: integer type; satellite ID:

- 1-32
- <param2>: integer type; CN0 required threshold:
- 20-50
- <param3>: integer type; the inspection time in seconds (when CNO is lower then CNO_threshold):
- 1-10

<res1>: integer type:

- 0 - success
- 1 - error
- <res2> - integer type; actual carrier-to-noise-density ratio in dB:
- 20-50
- <res3> - integer type; Doppler shift in Hz:
- -800 - 800
-

For "GNSSALLOWED":

<res1>: integer type:

- 0 - GNSS is not allowed
- 1 - GNSS is allowed
-

For "GETAMP":

<res1>: integer type, ADC Amplitude:

- 0 - 181
-

For "GETAMPDBG":

<res1>: integer type, Amplitude DBG flag:

- 0 - Amplitude DBG is off
- 1 - Amplitude DBG is on
-

For "SETAMPDBG":

<param1>: integer type, Amplitude DBG flag:

- 0 - Set Amplitude DBG off
- 1 - Set Amplitude DBG on
-

%IGNSSVER

Command	Possible response(s)
AT%IGNSSVER	%IGNSSVER: <fw version_num>,<sw_version_number>
AT%IGNSSVER?	ERROR (not supported)
AT%IGNSSVER=?	OK

Description:

This command returns GNSS Firmware and Software version number.

Defined values:

<fw_version_num> - hexadecimal type; GNSS firmware version number

<sw_version_number> - string type; GNSS software version number

%ISIMCFG

Command	Possible response(s)
AT%ISIMCFG=<op>,<type>[,<value>]	For <op>="GET": %ISIMCFG:<type>,<value> OK or ERROR
AT%ISIMCFG?	ERROR (not supported)
AT%ISIMCFG=?	%ISIMCFG: (list of supported <op>s), (list of supported <type>s)

Description:

This Execution command is used to modify run-time parameter settings to work with iUICC.

Defined values:

<op> - string type; operation to be applied:

- "SET"
- "GET"

<type> - string type; iUICC parameter type to be set or get:

- "WTEXTOUT"

<value> - timeout in msec:

- 0 - max 2^{32}

%ISIMTST

Command	Possible response(s)
AT%ISIMTST=<mode>[,<param1>[,<param2>...]]	OK or ERROR
AT%ISIMTST?	[AT%ISIMTST: <mode>[,<mode>...]] OK
AT%ISIMTST=?	%ISIMTST: (list of supported <mode>s)

Description:

This execution command used to apply special iUICC test mode(s) at the production or debugging stage.

Read command returns a list of currently enabled test modes.

Defined values:

<mode> - string type:

- "IGNORESTAT" - allow communication with SIM regardless of returned status

<param1> - integer type:

- 0 - disable
- 1 - enable

<param2> - hexadecimal type; status to ignore. Optional parameter, if omitted, any error status is ignored. If present, status is encoded as a 2-byte value:

- "6A82" - ignore indication that ISIM does not contain any MF

<mode> - string type:

- "APDUTUN" - test mode of APDU tunneling without any additional internal APDU processing. This is a special continuous test mode, which is applied all the time while it is enabled.

<param1> - integer type:

- 0 - disable
- 1 - enable

Examples: Read command example:

```
AT%ISIMTST?
```

```
%ISIMTST: "IGNORESTAT", "APDUTUN"
```

```
OK
```

%LBSCMD

Command	Possible response
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:

This command allows a 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 should 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

<sfm>: 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: - Not applicable for NB-IoT

- 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

%LDOCMD

Command	Possible response(s)
AT%LDOCMD=<cmd>,<ldo>[,<pwr_consumption>]	OK or ERROR
AT%LDOCMD?	ERROR (not supported)
AT%LDOCMD=?	%LDOCMD: (list of supported <cmd>s), (list of supported <ldo>s)

Description:

This Execution command is used to activate/deactivate LDO output.

Defined values:

<cmd> - string type; LDO operation:

- "ON" - activate LDO output
- "OFF" - disable LDO output

<ldo> - integer type; the ID of LDO to manipulate:

- 2 - AUX_LDO ID

<pwr_consumption> - integer type:

For "ON": optional parameter:

- 0 - low power consumption, up to 1mA
- 1 - high power consumption (default), up to 50mA

%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.

Note1: If overridden parameter is part of capability negotiation with Network, it will be applied after next re-attach only.

Note2: 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.

<param1> - integer type; 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

<param1> - integer type:

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

<param2> - integer type:

- 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. $\text{GPS time} - \text{leapSeconds} = \text{UTC time}$

<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)

<param1>:

CAT-M specific paging transmission window values:

- 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

NB-IoT specific paging transmission window values:

- 0 - 2,56 seconds
- 1 - 5,12 seconds

- 2 - 7,68 seconds
- 3 - 10,24 seconds
- 4 - 12,8 seconds
- 5 - 15,36 seconds
- 6 - 17,92 seconds
- 7 - 20,48 seconds
- 8 - 23,04 seconds
- 9 - 25,60 seconds
- 10 - 28,16 seconds
- 11 - 30,72 seconds
- 12 - 33,28 seconds
- 13 - 35,84 seconds
- 14 - 38,40 seconds
- 15 - 40,96 seconds

<lte_object>:

- "TXFAILPARAMS" - the object supports retry mechanism defined in txFailParams from SIB2

<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 should be used for "Qoffsettemp" from 36.304 (see 36.331)

- 0 - 255 dB

<lte_object>:

- "INACTTMR" - Inactivity Timer for RRC state mismatch recovery

<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

<param1>:

- 0 - disabled
- 1 - enabled

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

- 1-max 3GPP value from latest releases

<lte_object>:

- "S1UCAP" - Enable/disable NW S1U and Multi-DRB capability in NAS and RRC level (NB-IOT only).

<param1>:

- 0 - disabled
- 1 - enabled (default)

<lte_object>:

- "SMSWOCOMBINED" - Enable/disable SMS transfer without combined procedure capability as defined in 24.301 (NB-IOT only).

<param1>:

- 0 - disabled
- 1 - enabled (default)

<lte_object>:

- "PCOTYPE" - Selects the type of PCO encoding: PCO or/and ePCO

<param1>:

- 0 - forces UE (in NB-IoT or CAT-M mode) to use PCO
- 1 - forces UE (in NB-IoT or CAT-M mode) to use ePCO (default)
- 2 - forces UE (in NB-IoT or CAT-M mode) to use simultaneously PCO and ePCO

<lte_object>:

- "EXTMOBILITY" - Set dynamically and non-persistently the device mobility type configuration

<param1>:

- 0 - SW Default
- 1 - Mobile
- 2 - Static
- 3 - Mobile power optimized
- 4 - Static power optimized

<lte_object>: "PDCPDISCARDTMR" - PDCP discard timer value (CATM only)

<param1> - integer type; timeout in msec. If enabled, the timer value used in PDCP is selected as max value between network and user settings:

- 0 - disabled, use network setting
- 1 - set PDCP discard timer with "infinity" value
- 50, 100, 150, 300, 500, 750, 1500

<lte_object>: "APNRATECNTL" - Enable/disable APN Rate control.

<param1> - integer type

- 0 - disabled
- 1 - enable

<lte_object>: "RAIMACCAP" - Enable/disable UE capability report about Rel14 (MAC) RAI support as specified in TS 36.331 and 36.32.

<param1> - integer type

- 0 - disabled
- 1 - enable

%LTEINFO

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

Description:

This command is used to get information about LTE protocol layer/sub-system parameters.

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

If selected <type> parameter is inapplicable or unsupported for some chipset or RAT (i.e. NB-IoT), command returns ERROR.

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:

- 0-63 - 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 - Not supported for NB-IoT -

<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-IntraSearchP-13 or s-IntraSearchP-v1360 reselection threshold as per 36.331

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

<type>:

- "CRSIB3NB" - SIB3NB cell reselection parameters for NB-IoT

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

<info2> - s-IntraSearch reselection threshold as per 36.331

<layer>:

- "MAC"

<type>:

- "CRSIB5" - SIB5 cell reselection parameters - Not supported for NB-IoT -

<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 - Not supported for NB-IoT -

<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>:

- "T3412" - Returns T3412 or T3412_extended value from Attach Accept or TAU Accept messages sent by the network when the UE is in registered state.

<info1> - string type; one byte in an 8 bit format. Optional parameter:

- T3412 value from ATTACH ACCEPT or TRACKING AREA UPDATE ACCEPT message. The value is provided only when T3412 extended value is not included in ATTACH ACCEPT or TRACKING AREA UPDATE ACCEPT. The value is coded as one byte (octet 3) of the GPRS Timer 2 information element coded as bit format (e.g. "00100100" equals 4 minutes). For the coding and the value range, see the GPRS Timer 2 IE in 3GPP TS 24.008 Table 10.5.163/3GPP TS24.008.

<info2> - string type; one byte in an 8 bit format. Optional parameter:

- T3412 extended value from ATTACH ACCEPT or TRACKING AREA UPDATE ACCEPT message. The value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. "01000111" equals 70 hours). For the coding and the value range, see the GPRS Timer 3 IE in 3GPP TS 24.008.

<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"

<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

<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 is used for accessing the cell during RACH, optional parameter is omitted when the UE is not camped on the cell:

- 0 - CE level 0
- 1 - CE level 1
- 2 - CE level 2
- 3 - CE level 3 - Not applicable for NB-IoT

<info3> - current CE mode, optional parameter is omitted when the UE is not camped on the cell (will be CE mode A, as long as CE mode B not supported)

- Not applicable for NB-IoT
- 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"

<type>:

- "RPLMN" - retrieve RPLMN value numeric format

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

<layer>:

- "NAS"

<type>:

- "CIOT"

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

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

<layer>:

- "RRC"

<type>:

- "BAND" - retrieve band table actually in use (MDOP filtered by SW_CAP or overridden by SW_CFG and filtered by 3GPP Release band table, etc.).

<info1> - integer type; band number in numeric value.

...

<infoN> - integer type; bandN.

<layer>:

- "RPM"

<type>:

- "VER" - read value of implemented RPM version

<info1> - integer type; RPM version value:

- 0 - no version information
- 1-255

<layer>:

- "RPM"

<type>:

- "HLC"- read HLC (High Level Contents) values

<info1> - integer type; RPM Flag:

- 0 - disabled
- 1 - enabled

<info2> - integer type; N1 defines the number of resets per hour:

- 0 - disabled
- 1-255

<info3> - integer type; T1 defines in 6 min increments the time to reset after receiving a permanent EMM reject:

- 0 - disabled
- 1-255

<info4> - integer type; F1 - the max attempts allowed following a PDP Activation Ignore Scenario:

- 0 - disabled
- 1-255

<info5> - integer type; F2 - the max attempts allowed following a "Permanent" PDP Activation Reject:

- 0 - disabled
- 1-255

<info6> - integer type; F3 - the max attempts allowed following a "Temporary" PDP Activation Reject:

- 0 - disabled
- 1-255

<info7> - integer type; F4 - the max attempts allowed of PDP Activation/Deactivation Requests per Hour:

- 0 - disabled
- 1-255

<layer>:

- "RPM"

<type>:

- "LR"- read LR (Leak Rate) values

<info1> - integer type; LR1 - defines number of hours before C-BR-1 is decremented by 1:

- 0 - C-BR-1 shall not be decremented
- 1-255

<info2> - integer type; LR2 - defines number of hours before C-R-1 is decremented by 1:

- 0 - C-R-2 shall not be decremented
- 1-255

<info3> - integer type; LR3 - defines number of hours before C-PDP-1 TO C-PDP-4 is decremented by 1:

- 0 - C-PDP-1 TO C-PDP-4 shall not be decremented
- 1-255

%LWM2MBSCMD

Command	Possible response(s)
AT%LWM2MBSCMD=<cmd>[,<param1>[,<param2>...]]	OK or ERROR
AT%LWM2MBSCMD?	%LWM2MBSJCMD: <bs_owner_name>
AT%LWM2MBSCMD=?	%LWM2MBSJCMD: (list of supported <cmd>s)

Description:

This command is used to handle LWM2M bootstrap process.

Defined values:

<cmd> - string type, LWM2M operation:

- "START" - start bootstrap.
- "CREATE" - create new object instance.
- "DELETE" - delete whole object or it's instance. The parameter-less command deletes all objects security and server.
- "DONE" - finish bootstrap.

<bs_owner_name> - string type; Bootstrap owner name.

<value> - string type; resource value. Max size 510 bytes:

Type	Values
Boolean	"TRUE", "FALSE"
Integer/float/text	String within " "
Buffer (opaque field)	Hexadecimal opaque data is represented as ASCII hex string. The length of hex string is twice longer than actual binary data length in bytes: each hex byte is encoded into 2 ASCII bytes. Actual binary data length is limited by 255 Bytes.

For "START":

<param1> - string type; Same as <bs_owner_name>.

For "DELETE":

<param1> - integer type; object ID

<param2> - integer type, optional object instance ID.

For "CREATE":

<param1> - integer type; object ID. Object ID valid values for bootstrap are limited to 0 or 1.

<param2> - integer type; object instance ID.

<param3> - integer type; resource ID

<param4> - string type; Same as <value> defined above.

<param5> - integer type; resource ID

<param6> - string type; Same as <value> defined above.

...

For "DONE\":

<param1> - integer type; optional parameter. In case of multiple configuration BS and DM, the DM server is selected by default if parameter is omitted:

- 0 - DM (default)
- 1 - BS

Examples:

BS server NOSEC:

```
ATLWM2MBSCMD="START"
```

```
ATLWM2MBSCMD="DELETE"
```

```
ATLWM2MBSCMD="CREATE",0,0,0,"coap://selftest.iot.nokia.com:5683",1,"true",2,3,10,0
```

```
ATLWM2MBSCMD="DONE"
```

BS server SEC:

```
ATLWM2MBSCMD="START"
```

```
ATLWM2MBSCMD="DELETE"
```

```
ATLWM2MBSCMD="CREATE",0,0,0,"coap://selftest.iot.nokia.com:5684",1,"true",2,0,3,"6d69646173",5,"316d69646173",10,0
```

```
ATLWM2MBSCMD="DONE"
```

DM server NOSEC:

```
ATLWM2MBSCMD="START"
```

```
ATLWM2MBSCMD="DELETE"
```

```
ATLWM2MBSCMD="CREATE",0,0,0,"coap://leshan.eclipseprojects.io:5683",1,"false",2,3,10,0
```

```
ATLWM2MBSCMD="CREATE",1,0,0,0
```

```
ATLWM2MBSCMD="DONE"
```

%LWM2MCMD

Command	Possible response(s)
AT%LWM2MCMD=<cmd>[,<param1>[,<param2>[,<param3>]]]	<p>For "SERVERSINFO", list of server details: [%LWM2MCMD: <ServerUri>,<ServerID>,<Lifetime>,<binding>,<ServerStat>[,<LastRegDate>[,<regLocationPath>]] [<CR><LF>%LWM2MCMD: <ServerUri>,<ServerID>,<Lifetime>,<binding>,<ServerStat>[,<LastRegDate>[,<regLocationPath>]] [...]]</p> <p>For "GET_RESOURCE", list of details: %LWM2MCMD:<ObjectID>[,<ObjectInstanceID>[,<ResourceID>[,<ResourceInstanceID>[,<val>]]]] [<CR><LF>%LWM2MCMD:<ObjectID>[,<ObjectInstanceID>[,<ResourceID>[,<ResourceInstanceID>[,<val>]]]] [...]]</p> <p>For "DISCOVER", list of LWM2M client object(s), object instance(s) [and resource(s)]: [%LWM2MCMD: <res1>[,<res2>[.]]]</p> <p>For "PROGRESS", download progress: %LWM2MCMD: received=<CurDlSize>,total=<TotalImgSize></p> <p>For "GET_FOTA_STATE": %LWM2MCMD: <FotaState></p> <p>For "SENDSTART": %LWM2MCMD: <token></p> <p>For other commands: OK/ERROR</p>
AT%LWM2MCMD?	ERROR
AT%LWM2MCMD=?	OK

Description: This command is used to control LWM2M client. The command is used by FOTA Manager.

Note that the URI (<ObjectID>/<ObjectInstanceID>/<ResourceID>/<ResourceInstanceID>) used in some sub-commands may be incomplete. If some optional ID parameter is omitted, it shall be always the last parameters, not from the middle of URI, i.e.:

- <ObjectID>/<ObjectInstanceID>/<ResourceID>
- <ObjectID>/<ObjectInstanceID>
- <ObjectID>

Defined values:

<cmd>:

- "REGISTER" - Application initiated command to register with LWM2M server

<param1> - integer:

- Short Server ID as defined in section 6.2 of [1], If this param is missing, operation will be done to all servers

<cmd>:

- "DEREGISTER" - Application initiated command to de-register from LWM2M server

<cmd>:

- "STOP" - Stops LWM2M client activity and moves it to the "Client Off" state. The client can be re-initiated by either "REGISTER" or "BOOTSTRAP" commands

<param1> - integer:

- Short Server ID as defined in section 6.2 of [1], If this param is missing, operation will be done to all servers

<cmd>:

- "REGISTERUPD" - Application initiated command to Re-register LWM2M server

<param1> - integer:

- Short Server ID as defined in section 6.2 of [1], If this param is missing, operation will be done to all servers

<cmd>:

- "BOOTSTARP" - Initiate bootstrap procedure

<param1> - integer, post bootstrap mode :

- 0: continue to registration normally after bootstrap (default)
- 1: avoid registraion after bootstrap

<cmd>:

- "COAPDUMP" - enable lwm2m coap dump. local ip: 11.11.11.11 destination server ip: 22.<sec obj short id>.22.22

<param1> - mode

- "DISABLE": disable
- "CLI": print to cli
- "LOG": print to logger

<param2> - persistence

- 0: non
- 1: persist
- <param3> - integer. logger size(default 16K), relevant for LOG mode

<cmd>:

- "UPDATEREP" - FOTA manager report of the update result

<param1> - string:

- "SUCCESS": Firmware updated successfully
- "FAIL": Firmware update failed

<param2> - integer. For <param1> = "FAIL", provides FOTA Update Result (resource 5/0/5) as defined in section E.6 of [10].

<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

<param2> - integer. For <param1>="CANCEL". Provides FOTA Update Result (resource 5/0/5) as defined in section E.6 of [10].

<cmd>:

- "RESUME" - Resume download after internal download error (e.g. out of coverage, reboot etc.).

<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" - Cancel the request to update firmware

<param2> - integer. For <param1>="CANCEL". provides FOTA Update Result (resource 5/0/5) as defined in section E.6 of [10].

<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. This command is not applicable for Host resources.
- "GET_RESOURCE" - Get resource value from LwM2M tree. This command is not applicable for Host resources. This command is not applicable for security resources: /0/x/3, /0/x/5... This can be a multiline reply (each describing single resource value) when query is sent with omitted optional parameter::
 - <ObjectInstanceID> omitted - return all the resource values of of that Objectinstance ID
 - <ResourceID> omitted - return all the multi-resource values of of that Resource ID
- "DEL_RESOURCE_INSTANCE" - Delete specific resource instance of multi-resource instance.
- "EXEC_RESOURCE" - Execute resource value to LwM2M tree

Note: All the above operation cannot be done on "host" related resource.

<param1> - integer:

- See definition of <ObjectID>

<param2> - integer:

- See definition of <ObjectInstanceID>, may be optional for "GET_RESOURCE"

<param3> - integer:

- See definition of <ResourceID>, may be optional for "GET_RESOURCE"

<param4> - integer:

- See definition of <ResourceInstanceID>, may be optional

<param5> - string type:

- See definition of <val>

<cmd>:

- "SETINSTANCES" - to update the list of object instances at run-time (currently limited to Host Objects). This command completely override previously defined object instance list.

<param1> - integer:

- See definition of <ObjectID>

<param2>-<param...> - integer; optional parameters. If no <param2> at all, there won't be any instances of this object:

- See definition of <ObjectInstanceID>

<cmd>:

- "DISCOVER" - to discover object/object instances/object resources.

<cmd>:

- "CLEARCACHE" - CLEAR THE LWM2M CLIENT IP CACHE.

<param1> - integer:

- Short Server ID as defined in section 6.2 of [10], If this param is missing, operation will be done to all servers

<param1> - string type; the path to the object or object instance tree to discover. Optional parameter.

- if path is missing, command reports the list of all discovered objects with their instance IDs
- if path is "/object", command reports the list of all instance IDs located on the path
- if path is "/object/instance ID", command reports the list of all resource IDs located on the path
- if object_version is defined for the objectID, the version is added before the object data in the format: "/objectID";ver="x.x"

<cmd>:

- "GET_FOTA_STATE" - return FOTA state

<cmd>:

- "PROGRESS" - return download progress

<cmd>:

- "PORTFOLIO" - Perform operations on object 16 (portfolio), resource 0 (Identity) - Data Storage extension for other Object Instances.

<cmd>:

- "DLSUS" - Download suspend (applicable for HTTP/S PULL method only).

<param1> - string type; Operation:

- "SETINSTANCE" - Create new instance of object portfolio and set resource 0 values
- "READ" - Read portfolio object parameters
- "DELETE" - Delete portfolio instance

For "SETINSTANCE":

<param2> - integer type:

- See definition of <ObjectInstanceID>

<param3 >- integer type:

- See definition of <ResourceID>, currently supports only resource ID 0.

<param4> - integer type:

- See definition of <ResourceInstanceID>

<param5> - string type:

- See definition of <val>. Only last written values are saved in the object instance file. Previous values are deleted.

Note: <param3>-<param5> may be repeated few times

For "SENDSTART":

<param2> - hexadecimal type;

- token; Optional parameter, if omitted will be generated by LWM2M client. Up to 8 bytes

<param3 >- integer type;

- LWM2M Short Server ID;. Parameter can be omitted is single server is in use. If parameter is omitted for multiple servers use-case, command returns ERROR.

<param4> - integer type;

- Content format : 110- SenML JSON ; 112- SenML CBOR

<param5> -<paramN> - string type;

- Resource URI path: <Obj ID>[<Obj Inst>[<Resource ID>[<Resource Inst>]]]

For "READ":

<param2> - integer type:

- See definition of <ObjectInstanceID> (Optional parameter)

For "DELETE":

<param2> - integer type:

- See definition of <ObjectInstanceID>

<ServerUri> - string type without quotes:

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

<ServerID> - integer:

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

<Lifetime> - integer:

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

<binding> - integer:

binding value	Description	LWM2M Ver 1.0	LWM2M Ver 1.1
0	Unknown	Supported	Supported
1	UDP (U)	Supported	Supported
2	UDP queue mode	Supported	N/A

	(UQ)		
3	SMS (S)	Not Supported	Not Supported
4	SMS queue mode (SQ)	Not Supported	N/A
5	UDP with SMS (US)	Supported (SMS only for triggering)	Not Supported
6	UDP queue mode with SMS (UQS)	Supported (SMS only for triggering)	N/A
7	NIDD mode (N)	N/A	Supported

Notes:

- In LWM2M spec version 1.1 Queue mode is no longer part of server binding mode
- In LWM2M spec version 1.1 there is a differentiation between SMS binding and SMS Triggering (wakeup SMS). Since Altair supports SMS only for triggering, binding mode with SMS is not supported.

<ServerStat> - integer:

- 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> - integer:

- The UTC time in 10msec units counted since 00:00:00 on 1 January, 1970.

<regLocationPath> - String, range per option is 0-255 bytes:

- Concatenation of Server Coap Location-Path Options, which indicate the path to use for updating or deleting the registration.

<ObjectID> - integer:

- Specifies the LWM2M Object ID

<ObjectInstanceID> - integer:

- Specifies the LWM2M Instance ID of the object (Optional parameter for some sub-commands)

<ResourceID> - integer:

- Specifies the LWM2M resource ID of the object instance (Optional parameter for some sub-commands)

<ResourceInstanceID> - integer:

- Specifies the LWM2M resource Instance ID of the object instance (Optional parameter for some sub-commands)

<val> - string type; max size 511 bytes:

- Specifies the value of the resource (Optional parameter)

Type	Values
Boolean	"TRUE", "FALSE"
Integer	signed 64 bits integer format.String within " "
float	double float format.String within " "
text	String within " "
Buffer (opaque field)	Hexadecimal opaque data is represented as ASCII hex string. The length of hex string is twice longer than actual binary data length in bytes: each hex byte is encoded into 2 ASCII bytes. Data length is limited by 255 Bytes.
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.

<res1>-<res...> - string type; shortened textual representation of the discovered LWM2M tree/sub-tree structure located on the path (<param1> of "DISCOVER"):

- if path is missing, <res...> params report the list of all discovered objects with their instance IDs in form of: "/object/instance ID"
- if path is "/object", <res...> params report the list of all instance IDs located on the path in form of: "/object/instance ID"
- if path is "/object/instance ID", <res...> params report the list of all resource IDs located on the path in form of: "/object/instance ID/resource ID"

<CurDlSize> - integer; currently downloaded size in bytes

<TotalImgSize> - integer; total image size in bytes

<FotaState> - integer:

- 0 - Idle
- 1 - Pending download
- 2 - During download
- 3 - Download failed
- 4 - Download completed
- 5 - Pending update
- 6 - Update confirmed

/TextEmphasis{ Examples: }

1. Discover Object ID=16 structure (list of object instances):

```
AT%LWM2MCMD="DISCOVER","/16"
```

```
%LWM2MCMD: "/16/0","/16/1"
```

```
OK
```

2. Discover Object ID=2 structure, no instance is found for this object:

AT%LWM2MCMD="DISCOVER","/2"
OK

3. Discover Object ID=3 structure, object is disabled:

AT%LWM2MCMD="DISCOVER","/3"
ERROR

4. Discover Object ID=16 & Instance ID=0 structure (list of resources):

AT%LWM2MCMD="DISCOVER","/3/0"
%LWM2MCMD: "/3/0/0", "/3/0/1", "/3/0/2", "/3/0/3", "/3/0/4", "/3/0/5", "/3/0/6", "/3/0/10", "/3/0/11", "/3/0/12", "/3/0/13", "/3/0/14", "/3/0/16", "/3/0/17", "/3/0/18", "/3/0/19", "/3/0/21"
OK

5. Discover all existed Object IDs & Instance IDs:

AT%LWM2MCMD=="DISCOVER"
%LWM2MCMD: "/0/0", "/1/0", "/3/0", "/4/0", "/5/0", "/7/0", "/15/0", "/16/0", "/16/1"
OK

"PORTFOLIO" examples:

6. Set Portfolio instance ID 0:

AT%LWM2MCMD="PORTFOLIO","SETINSTANCE",0,0,0,"HUID",0,1,"HMAN",0,2,"HMOD",0,3,"HSW"
%LWM2MCMD: 0
OK

7. Read Portfolio instance ID 3:

AT%LWM2MCMD="PORTFOLIO","READ",3
%LWM2MCMD: 16,3,0,3,"HSW3"
%LWM2MCMD: 16,3,0,2,"HMOD3"
%LWM2MCMD: 16,3,0,1,"HMAN3"
%LWM2MCMD: 16,3,0,0,"HUID3"
OK

8. Delete Portfolio instance:

AT%LWM2MCMD="PORTFOLIO","DELETE",3
OK

%LWM2MEV

Command	Possible response(s)
AT%LWM2MEV=<mode>	OK/ERROR
AT%LWM2MEV?	ERROR (not supported)
AT%LWM2MEV=?	%LWM2MEV: (list of supported <mode>s)
(unsolicited)	%LWM2MEV:<event>,[<package_size>], [<reserved>],[<package_name>][,<error_type>] >][,<package_type>]

Description: AT Command to enable/disable %LWM2MEV URC to host.

The URC notifies the status of firmware upgrade process

Defined values:

<mode> - integer type; status of unsolicited result response presentation:

- 0 - disabled (default for external Host)
- 1 - enabled (default for internal App)

<event> - integer type:

- 0 - PENDING DOWNLOAD
- 1 - PENDING UPDATE
- 2 - DOWNLOAD COMPLETED
- 3 - DOWNLOAD FAILED
- 4 - FOTA CANCELLED BY LWM2M SERVER
- 5-9 - Reserved

<package_size> - integer type:

For PENDING UPDATE

- The package size in bytes.

<package_name> - string type:

For PENDING DOWNLOAD

- The file name of download package

For PENDING UPDATE

- The file name of update package

<error_type> - integer type: For DOWNLOAD FAILED

- 0 - NON FATAL - Download can be resumed by FOTA manager
- 1 - FATAL - Download resume is not possible, FOTA manager shall move to idle

<package_type> - integer type; optional parameter. Applicable only to PENDING UPDATE (1) event. If omitted, default modem ALT1250 package (0) is reported:

- 0 - Modem ALT125x package
- 1 - Host package
- 2 - Modem ALT125x and Host package together

%LWM2MOBJCMD

Command	Possible response(s)
AT%LWM2MOBJCMD=<mode>	OK or ERROR
AT%LWM2MOBJCMD?	%LWM2MOBJCMD: <mode>
AT%LWM2MOBJCMD=?	%LWM2MOBJCMD: (list of supported <mode>s)
(unsolicited)	%LWM2MOBJCMDU: <command>,<seq_num>,<server id>,[<uri>,<value>[<uri>,<value>[...]]]
(unsolicited)	%LWM2MOBJCMDU: "OBSERVE_START",<seq_num>,<server id>,<token>,<format>,<uri>,<min_period>,<max_period> [,<greater than>][,<less than>][,<step>]]]
(unsolicited)	%LWM2MOBJCMDU: "OBSERVE_STOP",<seq_num>,<server id>,<token>,<format>,<uri>
(unsolicited)	%LWM2MOBJCMDU: "WRITE_ATTR",<seq_num>,<server id>,<token>,<uri>,<min_period>,<max_period> [,<greater than>][,<less than>][,<step>]]]

Description: Command enables/disables %LWM2MCMDU URC command that forwards LWM2M server operation on host related object.

Defined values:

<mode> - integer type:

- 0 - disable
- 1 - enable

<command> - string type, LWM2M operation:

- "READ" - read object/resource(s)
- "WRITE" - write into single/multi instance resource. For multi-instance resource case, instances that are not included in the command should be deleted
- "WRITE_PARTIAL" - write into multi-resource. Resource instances that are not included in the command should be left unchanged (currently not supported)
- "EXE" - execute resource
- "OBSERVE_START" - start observation
- "OBSERVE_STOP" - stop observation
- "WRITE_ATTR" - write new attributes to observation

Note: LWM2MOBJCMDU:"WRITE_ATTR" will be sent to the host only if configuration flag "HostEnableWriteAttrURCMode" is set to "true"

<seq_num> - integer type, used for this URC and "%LWM2MOBJRSP" AT command synchronization:

- 1-1000 (with wrap around)

<server_id> - integer type, LWM2M Short Server ID:

- 1-65535

<format> - integer type; content format:

- 0 - text
- 40 - link
- 42 - OPAQUE
- 11542 - TLV
- 11543 - JSON

<uri> - string type, resource URI path: /<Obj ID>[/<Obj Inst>[/<Resource ID>[/Resource Inst >]]<value> - string type; resource value. Max size 3000 bytes:

Type	Values
Boolean	"TRUE", "FALSE"
Integer/float/text	String within " "
Buffer (opaque field)	Hexadecimal opaque data is represented as ASCII hex string. The length of hex string is twice longer than actual binary data length in bytes: each hex byte is encoded into 2 ASCII bytes. Data length is limited by 1500 Bytes.
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.

<token> - hexadecimal type; token of CoAP message in observation message. The corresponding AT%LWM2MOBJEV notification should have the same token value. Up to 8 bytes:

- "0"- "FFFFFFFFFFFFFFFF"

<min_period> - integer type, the minimum time in seconds between two notifications<max_period> - integer type, the maximum time in seconds between two notifications<greater_than> - high threshold value of resource for notification. Represented as floating value in format: xx[.xx] without quotes.<less_than> - low threshold value of resource for notification. Represented as floating value in format: xx[.xx] without quotes.<step> - a minimum change value of resource between two notifications. Represented as floating value in format: [xx.xx] without quotes.

%LWM2MOBJDEF

Command	Possible response(s)
AT%LWM2MOBJDEF=<cmd>,<object_id> [,<resource_id>,<operation>, <instance_type>,<data_type> [,<resource_id>,<operation>, <instance_type>,<data_type>[...]]]	For "GET": %LWM2MOBJDEF:<object_id>, <resource_id>,<operation>, <instance_type>,<data_type> [,<resource_id>,<operation>, <instance_type>,<data_type>[...]] OK or ERROR
AT%LWM2MOBJDEF?	ERROR
AT%LWM2MOBJDEF=?	OK

Description:

This command sets and gets resources definition of Host Objects. Set operation creates new resource and store it into NV.

Defined values:

<cmd> - string type:

- "GET" - Read Resources definition of Host Object
- "SET" - Define Resources definition of Host Object and create it storing into NV

<object_id> - integer type; specifies the LWM2M Object ID:

- 0-65534

<resource_id> - integer type; specifies the LWM2M Resource ID:

- 0-65535

<operation> - string type; the type of operation that may be performed on the resource:

- "R" - Read-only
- "W" - Write-only
- "RW" - Read and Write
- "X" - Execute

<instance_type> - integer type:

- 0 - single resource
- 1 - multi resource

<data_type> - string type:

- "NONE" - Data Type is not relevant (in case if <operation> is "EXE").
- "STR" - String
- "INT" - Integer
- "UINT" - Unsigned integer (supported from LWM2M ver 1.1 only)
- "FLT" - Float
- "BOOL" - Boolean
- "OPQ" - Opaque
- "TIME" - Time
- "OL" - Object Link

Examples:

1. Define object 3305 (Power Measurement) resources 5800, 5806 and 5822:

```
AT%LWM2MOBJDEF="SET",3305,5800,"R",0,"FLT",5680,"W",0,"FLT",5822,"X",0,"NONE"  
OK
```

2. Read object 3305 resources definition

```
AT%LWM2MOBJDEF="GET",3305  
%LWM2MOBJDEF: 3305,5800,"R",0,"FLT",5680,"W",0,"FLT",5822,"X",0,"NONE"  
OK
```

%LWM2MOBJEV

Command	Possible response(s)
AT%LWM2MOBJEV=[<token>],[<serverId>],[<confirmation>],[<fragment_info>],[<uri>,<value>],[<uri>,<value>[...]]	OK or ERROR
AT%LWM2MOBJEV?	ERROR (not supported)
AT%LWM2MOBJEV=?	OK

Description: This command is used by Host application to send "NOTIFY" or "SEND" (starting LWM2M v1.1 support) with resource/s value.

Note: The <uri>s in the command can be single or/and multi-resource instance. All <uri> must be from the same object instance, meaning /<Obj ID>/<Obj Inst> must be the same for all resources.

Defined values:

<token> - hexadecimal type; This omitted <token> triggers "SEND" message. Up to 8 bytes:

- "0" - "FFFFFFFFFFFFFFFF"

<server_id> - integer type, LWM2M Short Server ID. Parameter can be omitted is single server is in use. If parameter is omitted for multiple servers use-case, command returns ERROR:

- 1-65535

<confirmation> - integer type; optional. Default value is defined in LWM2M configuration file in "ConfirmNotify" parameter.

- 0, 3-65535 - Notify confirmation default configuration value
- 1 - Notify confirmation is NOT required from the server
- 2 - Notify confirmation is required from the server

<fragment_info> - integer type; fragment event information:

- 0 - Single AT Command for event notification. (default)
- 1 - AT Command is part of group AT commands event and contains a fragment of event message.
- 2 - AT Command is part of group AT commands event and contains the last fragment of event message.

Notes:

- All AT commands in a group of AT commands sent with <fragment_info>=1/2 must be for the same Object ID
- Object Instance ID must be not repeated in a group of AT commands sent with <fragment_info>=1/2

<uri> - string type, resource URI path: /<Obj ID>[/<Obj Inst>[/<Resource ID>[/Resource Inst>]]<value> - string type; resource value. See <value> parameter definition of AT%LWM2MOBJCMD.

%LWM2MOBJRSP

Command	Possible response(s)
AT%LWM2MOBJRSP=<seq_num>,<ret_code>[,<uri>,<value>[,<uri>,<value>[...]]]	OK or ERROR
AT%LWM2MOBJRSP?	ERROR (not supported)
AT%LWM2MOBJRSP=?	OK

Description: This command is used to provide Host application response for %LWM2MCMDU URC.

Defined values:

<seq_num> - integer type, used for this URC and "%LWM2MOBJRSP" AT command synchronization:

- 1-1000 (with wrap around)

<ret_code> - string type, CoAP response code:

- "2.04" - Changed - operation completed successfully
- "2.05" - Content - operation completed successfully
- "4.00" - Bad Request - Undetermined error occurred/The format of data to be written is different
- "4.01" - Unauthorized - access right permission denied
- "4.04" - Not Found - URI not found
- "4.05" - Method Not Allowed - Target is not allowed for such operation
- "4.06" - Not Acceptable - None of the preferred Content-Formats can be returned
- "4.15" - Unsupported Content-Format - The specified format is not supported
- "5.00" - Internal Server Error (this is also the default value if ret_code value is not supported)

<value> - string type; resource value. See <value> parameter definition of AT%LWM2MOBJCMD.

%LWM2MOPEV

Command	Possible response(s)
AT%LWM2MOPEV=<mode>,<event>	OK/ERROR
AT%LWM2MOPEV?	ERROR (not supported)
AT%LWM2MOPEV=?	%LWM2MOPEV: (list of supported <mode>s), (list of supported <event>s)
(unsolicited result code)	%LWM2MOPEV:<event>[,<serverShortId>],[<ObjectID>],[<ObjectInstanceID>],[<ResourceID>],[<ResourceInstanceID>],[<val>][,<MsgId>]]

Description: This unsolicited command notifies the host about operations performed by the server on the LWM2M tree.

Note:

- In both command and response, a parameter which is not specified will be written as ",,"
- URC will not notify security object events.

Defined values:

<mode> - integer type:

- 0 - Disable unsolicited "server operation" event indications
- 1 - Enable unsolicited "server operation" event indications

<event> - integer type:

- 0 - "Write" operation was received
- 1 - "Execute" operation was received
- 2 - Reserved
- 3 - Reserved
- 4 - "Write Attributes" operation was received
- 5 - "Discover" operation was received
- 6 - "Read" operation was received
- 7 - "Observe" operation was received
- 8 - "Cancel observation" operation was received
- 9 - Client is offline.
- 10 - Client is online.
- 11 - Client sent observation notification to a server.
- 12 - Client received wakeup SMS.
- 13 - Client received notification acknowledge.
- 14 - Client ON: LMM2M client exits Client OFF state and tries to re-connect server due to explicitly AT Command registration request.
- 15 - Client OFF: LWM2M client has exhausted server connection retries.
- 16 - Confirmable NOTIFY failed (no confirmation from server), Packet discarded.
- 17-19 - Reserved
- 20 - Bootstrap finished and completed successfully.
- 21 - Registration finished and completed successfully.
- all server observation requests are cleaned, the host should clean host objects observation rules too.
- 22- Register update finished and completed successfully.
- 23 - De-register finished and completed successfully.

- 24 - Notification send failed locally, packet discarded.
- 25 - Send operation succeeded
- 26 - Send failed locally, packet discarded
- 27 - Server returns SUCCESS on send event
- 28 - Server return failure on send event
- 29-99 - Reserved
- 100 - enable all notifications.

<serverShortId> - integer type; short server ID:

- 0-65535 /
- <ObjectID> - integer type:
- Specifies the LWM2M Object ID

<ObjectInstanceID> - integer type:

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

<ResourceID> - integer type:

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

<ResourceInstanceID> - integer type:

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

<val> - string type; max size 3000 bytes:

- Specifies the value of the resource (Optional parameter)

Type	Values
Boolean	"TRUE", "FALSE"
Integer	signed 64 bits integer format. String within " "
float	double float format. String within " "
text	String within " "
Buffer (opaque field)	Hexadecimal opaque data is represented as ASCII hex string. The length of hex string is twice longer than actual binary data length in bytes: each hex byte is encoded into 2 ASCII bytes. Data length is limited by 256 Bytes.
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.

<MsgId> - integer type; COAP message ID (for NOTIFY event):

- 0-65535

Examples:

1. Enable notification for "Write"

AT%LWM2MOPEV=1,0

OK

2. Notification arrival on writing "security object" instance 0 resource 0 by server short ID 1
%LWM2MOPEV=0,1,0,0,0,"coaps://183.25.34.22:81"

%MACADDR

Command	Possible response(s)
%MACADDR	%MACADDR: <MAC address> Returns device MAC Address stored in NV.
%MACADDR?	ERROR (OPRATION_NOT_ALLOWED) Operation is not supported
%MACADDR=?	OK

Description:

This Execution command retrieves the MAC Address from the device.

%MASTERKEY

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

Description:

This command was added due to the customer request for the purpose of the recovery process without the need for a 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 that is 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.

%MEAS

Command	Possible response(s)
%MEAS=<measurement type>	<p>For RSRP, SINR: %MEAS: <measurement type>:Reported=<measurement value>, Rx0Tx0=<measurement value>, Rx0Tx1=<measurement value>, Rx0Tx2=<measurement value>, Rx0Tx3=<measurement value>, Rx1Tx0=<measurement value>, Rx1Tx1=<measurement value>, Rx1Tx2=<measurement value>, Rx1Tx3=<measurement value></p> <p>For RSRQ, RSSI: %MEAS: <measurement type>:Reported=<measurement value>, Rx0Tx0=<measurement value>, Rx0Tx1=<measurement value>, Rx1Tx0=<measurement value>, Rx1Tx1=<measurement value></p> <p>For Temperature, Pathloss: %MEAS: <measurement type>:<measurement value></p> <p>For TX Power: %MEAS: <measurement type>:PUSCH=<measurement value>, PUCCH=<measurement value>, PRACH=<measurement value>, SRS=<measurement value></p> <p>For Signal Quality: %MEAS: Signal Quality:RSRP=<measurement value>, RSRQ=<measurement value>, SINR=<measurement value>, RSSI=<measurement value></p> <p>For Antenna relative phase: %MEAS: <measurement type>:TX0=<measurement value>, TX1=<measurement value>, TX2=<measurement value>, TX3=<measurement value>, Rx0RSSI=<measurement value>, Rx1RSSI=<measurement value></p> <p>For RS_SNR: %MEAS: RS_SNR=<measurement value></p> <p>For RS_SINR: %MEAS: RS_SINR=<measurement value></p> <p>For Power Headroom: %MEAS: PHR=<measurement value>, PHR Level=<measurement value></p> <p>For Srxlev: %MEAS: SRXLEV=<measurement value></p> <p>For all NBS RSRP, RSRQ and RSSI (98-100):</p>

	<p>%MEAS: EARFCN=<EARFCN>,CellID=<cell ID>,<measurement type>=<measurement value> [<CR><LF>%MEAS: EARFCN=<EARFCN>,CellID=<cell ID>,<measurement type>=<measurement value> [...]] For all NBS simultaneous RSRP and RSRQ reporting (97): %MEAS: EARFCN=<EARFCN>,CellID=<cell ID>,RSRP=<measurement value>, RSRQ=<measurement value> [<CR><LF>%MEAS:EARFCN=<EARFCN>, CellID=<cell ID>,<RSRP>=<measurement value>, RSRQ=<measurement value> [...]] For NBS RSRP in compressed format (96): %MEAS: NBS RSRP:<EARFCN>,<cell ID>,<measurement value>[, <EARFCN>,<cell ID>,<measurement value>[...]] For E-CID (95) in compressed format: %MEAS: ECID:<gcid>[,<TimeDifIndex>,<ta>,<MCC>,<MNC>,<TAC>,<EARFCN>,<cell ID>,<SFN>,<RSRP>,<RSRQ>[,<EARFCN>,<cell ID>,<SFN>,<RSRP>,<RSRQ> [...]]] The Network Time correspond to SFN of serving cell(93): %MEAS: NWTIME:<networkTTI>,<networkUtcTime> For Positioning (92): %MEAS: <EARFCN>,<cell ID>,<RSRP>,<RSRQ>,<eci>,<MCC>,<MNC>[,<ta>] [<CR><LF>%MEAS: <EARFCN>,<cell ID>,<RSRP>,<RSRQ> [...]] For NBS simultaneous RSRP, RSRQ and RSSI reporting (101): %MEAS: <EARFCN>,<cell ID>,<RSRP>,<RSRQ>,<RSSI> [<CR><LF>%MEAS: <EARFCN>,<cell ID>,<RSRP>,<RSRQ>,<RSSI> [...]]</p>
%MEAS?	ERROR (OPRATION_NOT_ALLOWED) Operation is not supported
%MEAS=?	%MEAS: <list of supported measurements>

Description:

This command returns the measurement for the 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.

Only Temperature measurement type (5) is supported in 2G.

Defined values:

<Measurement type> - string type:

- "0" - RSRP
- "1" - RSRQ
- "2" - SINR
- "3" - RSSI
- "4" - TX Power - Not applicable for NB-IoT in RRC IDLE mode
- "5" - Temperature
- "6" - Pathloss
- "7" - CQI - Not applicable for NB-IoT
- "8" - Signal Quality (RSRP & RSRQ & SINR & RSSI)
- "10" - RSRP reported value only
- "11" - RSRQ reported value only
- "12" - SINR reported value only
- "13" - RS_SNR (reference signal signal-to-noise ratio)
- "14" - RS_SINR (reference signal signal-to-interference-plus-noise ratio)
- "15" - Power Headroom - Only supported for NB-IoT
- "16" - Srxlev as defined in 36.304
- "17" - "92" Reserved
- "93" - Network Time alignment with SFN
- "95" - Measurements for E-CID
- "96" - RSRP for all detected NBS (same as 98) in compressed format:
 - in single line
 - each eNB measurement data (<EARFCN>,<cell ID>,<measurement value>) is separated by additional space.
- "97" - RSRP & RSRQ for all detected NBS
- "98" - RSRP for all detected NBS

- "99" - RSRQ for all detected NBS
- "100" - RSSI for all detected NBS

<EARFCN> - integer type:
Decimal EARFCN value

<gcid> - hexadecimal type:
The Global cell ID hexadecimal value (See AT%PCONI)

<TimeDiffIndex> - integer type:
RxTxTimeDiff decimal index (as defined in 9.1.9.2 of 3GPP 36.133) of the measured cell. The value should 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 type:

- 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> string type:

- A three-digit value indicating mobile country code as defined in ITU-T Recommendation E.212 Annex A.

<mnc> string type:

- A three-digit or two-digit value indicating the mobile network code as defined in ITU-T Recommendation E.212 Annex A.

<TAC> hexadecimal type:

- Two byte tracking area code in hexadecimal format

<SFN> - integer type:

- The decimal system frame number (SFN) of the measured cell during which the measurement have been performed. Since there is averaging over multiple SFN, it is advised to supply the latest SFN. If value is not available at the time of the query, command returns N/A (without quotes)

<cell ID> - integer type:

- Decimal Physical Cell ID value

<measurement value> - integer type:
The measurement results are returned in native for each measurement units:

- dBm for RSRP, RSSI
- dB for RSRQ, SINR, Pathloss
- 0.1 dBm for TX Power (for example, 2.5 dBm = 25)
- Degrees (C) for Temperature
- Degrees (phase) & 256*dBm (RSSI) units for Antenna relative phase
- 0.1 dB for RS_SINR, RS_SINR, PHR (for example, 2.5 dB = 25)

Measurement range:

- -140 <= RSRP <= 0
- -60 <= RSRQ <=0 (for CatM)

- $-34 \leq \text{RSRQ} \leq 3$ (for NB-IOT)
- $-128 \leq \text{SINR} \leq 40$
- $-26 \leq \text{TX Power} \leq 40$
- $-128 \leq \text{Temperature} \leq 128$
- $0 \leq \text{CQI} \leq 15$
- $-12.0 \leq \text{RS_SNR}, \text{RS_SINR} \leq 40.0$
- $-23.0 \leq \text{PHR} \leq 40.0$

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.

Note: The reported range is wider than the range defined for Measurement Reporting in 3GPP spec. It is intended to report weak and abnormal measurements, especially for neighboring cells, for jamming detection.

<networkTTI> - integer type:

- The subframe counter of the serving cell corresponds to the network UTC time. The subframe counter is a decimal running from 0 to 10239 (i.e. rollover at 10240) also known as TTI (Transmission Time Interval) counter.

<networkUtcTime> - integer type:

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

Examples:

AT%MEAS="0"

%MEAS: RSRP: Reported = -90, Rx0Tx0 = -92, Rx0Tx1 = -88, Rx0Tx2 = -140, Rx0Tx3 = -140,
Rx1Tx0 = -140, Rx1Tx1 = -140, Rx1Tx2 = -140, Rx1Tx3 = -140
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

%MEASCMD

Command	Possible response(s)
AT%MEASCMD=<cmd>[,<param1>[]]	For "START": %MEASCMD: <meas_status> OK or ERROR
AT%MEASCMD?	ERROR (not supported)
AT%MEASCMD=?	%MEASCMD: (list of supported <cmd>s)
(unsolicited)	%MEASCMD: <event>

Description:

AT command is intended to trigger or abort immediate measurements especially in different sleep modes to provide fresh measurements. Command is mostly used just before communication renewal with the Network for data transfer. Command is accepted in AT+CFUN=1 mode only. Otherwise, it returns ERROR. Command provides measurement triggering in both synchronous and asynchronous modes depending on internal modem state. If modem has already fresh measurements, it reports this synchronously in <meas_status>="READY" and then measurement may be retrieved by AT%MEAS. If modem needs to camp of cell (in PSM mode) or start measurement with proper averaging (in eDRX mode), modem reports that asynchronous procedure is triggered in <meas_status>="STARTED". This asynchronous procedure is always finished by single %MEASCMDU URC reporting. In the case of %MEASCMDU: "READY" URC, measurement may be retrieved by AT%MEAS command.

WARNING: It is important to note that power consumption of the modem, which left sleep modes (especially PSM) for the purpose of measurements will be much more higher than in sleeping modes. Long stay in this mode can drain the battery. It is strictly recommended to call AT%MEASCMD="ABORT" to indicate to modem that no more measurements is needed and it can return to regular sleep mode. It is recommended to send "ABORT" regardless of synchronous or asynchronous command behavior. Any other internal reasons (incoming or outgoing data transfer, etc.) may cause that modem will move to non-sleeping mode and such "ABORT" command could be redundant in some scenarios. This situation is indicated by %MEASCMDU: "ABORTED" URC.

Defined values:

<cmd> - string type; command to execute:

- "START" - start measurement
- "ABORT" - abort measurement and all measurement preparation procedures

For <cmd>="START":

<param1> - integer type, optional timeout in sec to execute measurement preparation procedures (i.e. camp on cell), including measurement procedure itself. Default: 120 sec:

- 1-1200

<meas status> - string type; current status of measurements:

- "READY" - modem fresh measurement are already available
- "STARTED" - modem triggers measurement and its preparation procedures (if needed)

<event> - string type, asynchronous events for the "START" command:

- "READY" - measurements are already available
- "TOUT" - no measurements, process interrupted by timeout
- "ABORTED" - modem moved to normal operation due to internal logic

%MQTTCFG

Command	Possible response(s)
AT%MQTTCFG=<obj>,<conn_id>[,<param1>[,<param2>]...]	OK or ERROR
AT%MQTTCFG?	ERROR (not supported)
AT%MQTTCFG=?	%MQTTCFG: (list of supported <cmd>s)

Description: This command is used to configure MQTT connection parameters.

To start a new MQTT connection, at least the "NODES" parameters should be defined. Other configurations may be omitted; default settings that are used:

- If "TLS" layer is not configured, unsecured connection will be established by default.
- If "IP" layer is not configured, default PDN, IP type and default MQTT ports will be used.
- If "PROTOCOL" parameters are not configured, default protocol parameters will be selected.
- If "WILLMSG" parameters are not configured, no Will message will be used.

To make this omission confidentially working, it is strictly recommended to call "CLEAR" sub-command before entering new configuration for previously used or default <conn_id>.

Connection ID parameter is introduced to handle multi-connection MQTT. Use zero value for <conn_id> if single connection is expected. The ID for multi-connection is assigned by user and then used for all connection configuration in current AT%MQTTCFG, command (AT%MQTTCMD) and event (AT%MQTTEV/%MQTTEVU).

Defined values:

<obj> - string type:

- "NODES" - configure client & server nodes parameters.
- "TLS" - configure TLS layer security parameters.
- "IP" - configure IP layer parameters.
- "WILLMSG" - configure MQTT will message.
- "PROTOCOL" - configure MQTT protocol parameters.
- "CLEAR" - clear all previous settings for specified <conn_id>

<conn_id> - integer type; default or previously assigned <conn_id>:

- 1-5 - multi-connected mode.

For "NODES":

<param1> - string type; unique client ID used to connect to the broker. Range length supported 128 bytes.

<param2> - string type; broker URL or IP address. Range length supported 256 bytes.

<param3> - string type; optional username for broker authentication. Range length supported 256 bytes.

<param4> - string type; optional password for broker authentication. Range length supported 256 bytes.

For "TLS":

<param1> - string type; TLS authentication mode:

- 0 - mutual authentication (default value)
- 1 - authenticate client side only
- 2 - authenticate server side only
- 3 - no authentication

<param2> - integer type; TLS predefined authentication context (profile) previously configured by AT%CERTCFG. Default zero profile ID may be used for server authentication only and will apply root CAs stored into Root Trusted folder for authentication.

For "IP":

<param1> - integer type; optional Session ID - numeric PDN identification defined in APN table for specified PDN. If Session ID=0 or omitted default data PDN is used:

- 0 - use default data PDN (default value)
- 1 - max value defined in APN table config file

<param2> - integer; optional IP type used to configure which IP type (IPv4 / IPv6 or both) for connection:

- 0 - IPv4v6 (default value)
- 1 - IPv4
- 2 - IPv6

<param3> - integer type; optional destination (server) TCP/UDP port number. If omitted default MQTT port number is used. Range:

- 1-65535

For "WILLMSG":

<param1> - integer type; Will message presence:

- 0 - disable (default value)
- 1 - enable

<param2> - integer type; Will QoS value:

- 0 - at most once delivery (default value)
- 1 - at least once delivery
- 2 - exactly once delivery

<param3> - integer type; Will message retain - whether or not the Will Message will be retained across disconnects:

- 0 - (default value): the Will Message will not be retained at the MQTT server across disconnects from MQTT client
- 1 - the Will Message will be retained by the MQTT server across disconnects from MQTT client (until superseded by another message)

<param4> - string type; Will Topic - Standard MQTT Topic Name. It could include various Topic Separators "/" to form various Topic levels. Range length supported 128 bytes.

<param5> - string type; the Will message defines the content of the message that is published to the Will topic if the client is unexpectedly disconnected. Range length supported 128 bytes.

For "PROTOCOL":

<param1> - integer type; MQTT protocol type for connection:

- 0 - MQTT (default value)

<param2> - integer type; keep-alive time. The default value is 600 sec (10 min). Unit: second. It defines the maximum time interval between messages received from a client:

- 0 - no timeout, keep-alive deactivated
- 1 - 65535 (18 hours, 12 minutes and 15 seconds.)

<param3> - integer type; clean session type:

- 0 - the server must store the subscriptions of the client after it disconnects.
- 1 - the server must discard any previously maintained information about the client and treat the connection as "clean".(default value).

%MQTTCMD

Command	Possible response(s)
AT%MQTTCMD=<cmd>,<conn_id>[,<param1>,<param2>[,<param3>[,<param4>[,<param5>]]]]<CR><LF><data>]	For "SUBSCRIBE"/"UNSUBSCRIBE"/"PUBLISH": %MQTTCMD: <msg_id> OK or ERROR
AT%MQTTCMD?	ERROR (not supported)
AT%MQTTCMD=?	%MQTTCMD: (list of supported <cmd>s)

Description: AT command to communicate with MQTT server (broker). All commands are unblocking. The information about command success or fail will be provided in %MQTTEVU URC. The Will message used in "CONNECT" shall be predefined in AT%MQTTCFG.

The "PUBRCV" URC can provide incoming publication data in the <data> parameter only for textual or pseudo-textual data transfer (i.e. JSON, PEM, B64, etc.). The arbitrary binary data transfer is possible only to file. Use AT%MQTTCMD="SUBSCRIBE" to define filename for binary data download.

The "PUBLISH" command provides 2 mechanisms to publish data:

- Only textual or pseudo-textual (i.e. JSON, PEM, B64, etc.) data transfer is permitted for direct AT call using <data> parameter.
- The arbitrary binary data transfer is possible only from file.

For non-file "PUBLISH" operation the data size parameter <param4> may be omitted in human debug mode of AT usage. In this use-case Ctrl+Z pressing shall signal data end. The "SUBSCRIBE" with defined filename parameter will cause that all following server publications will be stored into the file and signaled by %MQTTEVU: "PUBRCV" URC. Use different filenames for different <conn_id> and topic names to prevent file override, if needed. The file for server publication will be always located on temporary storage disk b:/. User shall specify only filename for "SUBSCRIBE" sub-command. Any attempt to specify full path in this command will be rejected with ERROR.

Defined values:

<cmd> - string type:

- "CONNECT" - Start connection with endpoint.
- "DISCONNECT" - End connection with endpoint.
- "SUBSCRIBE" - Subscribe to a topic on the endpoint.
- "UNSUBSCRIBE" - Stop subscription to a topic on the endpoint.
- "PUBLISH" - Send publish packet to endpoint

<conn_id> - integer type; previously assigned <conn_id>:

- 1-5

<msg_id> - integer type; message ID:

- 1-65535

For "CONNECT"/"DISCONNECT": no <param>s

For "SUBSCRIBE":

<param1> - integer type; the QoS level at which the client wants to publish the message:

- 0 - at most once delivery (default value)
- 1 - at least once delivery
- 2 - exactly once delivery

<param2> - string type; the subscription topic name. Range length supported 256 bytes.

<param3> - string type; optional parameter. Filename to store received publications on b:/. Range length supported 256 bytes.

For "UNSUBSCRIBE":

<param1> - string type; the subscription topic name

For "PUBLISH":

<param1> - integer type; the QoS level at which the client wants to publish the message:

- 0 - at most once delivery (default value)
- 1 - at least once delivery
- 2 - exactly once delivery

<param2> - integer type; whether or not the server will retain the message after it has been delivered to the current subscribers:

- 0 - The server will not retain the message after it has been delivered to the current subscribers
- 1 - The server will retain the message after it has been delivered to the current subscribers

<param3> - string type; the publication topic name <param4> - integer type; actual data size in bytes for transfer to server:

- 0 - undefined, publish from file
- 1 - 3000 Bytes

<param5> - string type; optional parameter. Full path to file to publish from. The name of the file itself is limited to 29 bytes.

<data> - MQTT raw data payload without quotes.

Examples:

1. Configure connection:

```
AT+MQTTCFG="NODES",1,"ALTTest","a2gn98vggcm0y9.iot.us-west-2.amazonaws.com"
OK
```

2. Configure connection port:

```
AT+MQTTCFG="IP",1,,0,8883
OK
```

3. Configure connection TLS layer:

```
AT+MQTTCFG="TLS",1,0,0
OK
```

3. Enable events:

```
AT+MQTTCFG="ALL",1
OK
```

4. Establish connection:

```
AT+MQTTCMD="CONNECT",1
```

OK

5. Receive connection establishment confirmation URC:

%MQTTEVU:"CONCONF",1,0

6. Subscribe to broker publication:

AT%MQTTCMD="SUBSCRIBE",1,1,"TESTTopic"

%MQTTCMD: 1

OK

7. Receive subscription confirmation URC:

%MQTTEVU:"SUBCONF",1,1,0

8. Publish data to broker:

AT%MQTTCMD="PUBLISH",1,0,0,"TESTTopic",10

1234567890

%MQTTCMD: 2

OK

9. Receive published data back from broker:

%MQTTEVU:"PUBRCV",1,0,"TESTTopic",10

1234567890

10. Unsubscribe from broker publication:

AT%MQTTCMD="UNSUBSCRIBE",1,"TESTTopic"

%MQTTCMD: 3

OK

11. Receive unsubscription confirmation URC:

%MQTTEVU:"UNSCONF",1,3,0

12. Subscribe to broker publication, which will be stored into file:

AT%MQTTCMD="SUBSCRIBE",1,1,"TESTTopic","file"

%MQTTCMD: 4

OK

13. Receive subscription confirmation URC:

%MQTTEVU:"SUBCONF",1,4,0

14. Publish data to broker from file:

AT%MQTTCMD="PUBLISH",1,0,0,"TESTTopic",0,"b:/file1"

%MQTTCMD: 5

OK

15. Receive published data back from broker into file:

%MQTTEVU:"PUBRCV",1,0,"TESTTopic",0,9,"file"

%MQTTEV

Command	Possible response(s)
AT%% =<ev_type>,<mode>	OK/ERROR
AT%MQTTEV?	ERROR (not supported)
AT%MQTTEV=?	%MQTTEV: (list of supported <ev_type>s), (list of supported <mode>s)
(unsolicited)	MQTTEVU:<ev_type>,<conn_id>,<res1>[,<res2>[,<res3> [,<res4>,<res5>]]][<CR><LF><data>]

Description: This command is intended to notify about MQTT events.

Default MQTT mode is URC disabled for all event types except of "PUBRCV", which is enabled by first call of AT%MQTTCMD="SUBSCRIBE". Most of the events are related to asynchronous operation triggered by AT%MQTTCMD. Such acknowledgement may be normally disabled.

Only "PUBRCV" event provides the data from the topic, to which the client was pre-subscribed by AT%MQTTCMD="SUBSCRIBE".

The "PUBRCV" URC can provide incoming publication data in the <data> parameter only for textual or pseudo-textual (i.e. JSON, PEM, B64, etc.) data transfer. The arbitrary binary data transfer is possible only to file on b:/. Use AT%MQTTCMD="SUBSCRIBE" to define filename for binary data download.

Note that AT%MQTTCMD="PUBLISH" with QoS=0 will not send any acknowledge message and <ev_type>="PUBCONF" is not expected.

Defined values:

<ev_type> - string type:

- "CONCONF" - Connect procedure confirmation status
- "DISCONF" - Graceful disconnect procedure confirmation status
- "SUBCONF" - Subscribe procedure confirmation status
- "UNSCONF" - Unsubscribe procedure confirmation status
- "PUBCONF" - Outgoing publication procedure confirmation status
- "PUBRCV" - Incoming publication message received
- "CONNFAIL" - Connection failure
- "ALL" - All events, used only in execution command

<mode> - integer type; status of unsolicited result response presentation:

- 0 - disabled (default value)
- 1 - enabled

<conn_id> - integer type; default or previously assigned <conn_id>:

- 1-5

For "CONCONF"/"DISCONF":

<res1> - integer type; result code:

- 0 - success
- 1 - fail

<res2> - integer type; optional error code:

- 0 - no error
- 1 - error

For "UNSCONF":

<res1> - integer type; message ID:

- 1-65535

<res2> - integer type; result code:

- 0 - success
- 1 - fail

<res3> - integer type; optional error code:

- FFU

For "SUBCONF"/"PUBCONF":

<res1> - integer type; message ID:

- 1-65535

<res2> - integer type; result code:

- 0 - success
- 1 - fail

<res3> - integer type; optional error code:

- FFU

For "PUBRCV"/"PUBRCVSTORFAIL":

<res1> - integer type; message ID. It may be zero (undefined) for QoS=0:

- 0 - undefined
- 1-65535

<res2> - string type; the publication topic name.

<res3> - integer type; data size in bytes transferred by this URC. If this parameter is equal to zero, no any <data> arrival is expected in the same URC.

<res4> - integer type; optional data size in bytes stored into file.

<res5> - string type; optional parameter. Filename, where received publication has been stored (or attempted to be stored for "PUBRCVSTORFAIL") on b:/.

<data> - MQTT raw data payload without quotes.

%NETUPD

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

Description:

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

Defined values:

<cmd>: string type:

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

<param>:

For "NWNNAME ": integer type:

- 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.

%NOTIFYEV

Command	Possible response
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:

This command notifies Host about important events occurred in LTE device. 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.

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 following:

1. CCLK (highest priority - user set)
2. SIB16 (since it is more accurate than EMM)
3. 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>:

- "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.
- "SIMD" - SIM inserted/removed state change
- "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
- "EMMSTATE" - reports about any NAS EMM 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 "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":

- 0 - SIM deactivated
- 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.)

For "EMMSTATE":

- 1 - EMM_NULL
- 2 - EMM_DEREGISTERED_NORMAL_SERVICE
- 3 - EMM_DEREGISTERED_ATTEMPTING_TO_ATTACH
- 4 - EMM_DEREGISTERED_PLMN_SEARCH
- 5 - EMM_DEREGISTERED_NO_IMSI
- 6 - EMM_DEREGISTERED_ATTACH_NEEDED
- 7 - EMM_DEREGISTERED_NO_CELL_AVAILABLE
- 8 - EMM_DEREGISTERED_ATTACH_ACCEPT_RECEIVED
- 9 - EMM_DEREGISTERED_REGISTRATION_INITIATED

- 10 - EMM_DEREGISTERED_LIMITED_SERVICE
- 11 - EMM_REGISTERED_LIMITED_SERVICE
- 12 - EMM_REGISTERED_NORMAL_SERVICE
- 13 - EMM_REGISTERED_ATTEMPTING_TO_UPDATE
- 14 - EMM_REGISTERED_PLMN_SEARCH
- 15 - EMM_REGISTERED_UPDATE_NEEDED
- 16 - EMM_REGISTERED_NO_CELL_AVAILABLE
- 17 - EMM_REGISTERED_ATTEMPTING_TO_UPDATE_MM
- 18 - EMM_REGISTERED_IMSI_DETACH_INITIATED
- 19 - EMM_REGISTERED_NO_CELL_AVAILABLE_PSM_ACTIVE
- 20 - EMM_REGISTERED_DEREGISTRATION_INITIATED
- 21 - EMM_REGISTERED_TRACKING_AREA_UPDATING_INITIATED
- 22 - EMM_REGISTERED_SERVICE_REQUEST_INITIATED

<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:

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"

Examples:

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

```
%NOTIFYEV:"SIMREFRESH",1
```

%NVRESCFG

Command	Possible response(s)
AT%NVRESCFG=<cmd>,<type>,<object>[,<resistance>]	OK or ERROR
AT%NVRESCFG?	[NVRESCFG: <type>,<object>,<resistance> [<CR><LF>NVRESCMD: <type>,<object>,<resistance>...]]
AT%NVRESCFG=?	(list of supported <cmd>s)

Description:

Execution command is used to read/write/modify/delete specified RTOS config file settings, which needs to be protected against update by R2FD.

This AT is intended to extend a list of default hard coded resistant objects already embedded into code.

If combination of <type> and <object> missed in RTOS config files, the "GET" and "DEL" commands return ERROR.

The "SET" command creates new object, if it is currently missed or modifies already existed one. The read command returns the current settings for each defined resistant object.

Defined values:

<cmd>: string type; operation to be applied on nvres_config:

- "GET" - read the specified key setting
- "SET" - add or modify value of specified key setting
- "DEL" - delete the specified key setting

<type>: string type; type of the object to apply <cmd>:

- "FIELD" - read the specified key setting
- "FILE" - add or modify value of specified key setting
- "FOLDER" - not supported

<object>: string type; exact name of the field/file to be resistant over R2FD.

<resistance>: string type; define the type of operation to which specified <object> shall be resistant:

- "R2FD" - resistant to R2FD

Example:

To set the "admin.services.ftp_server" parameter to be retained after SW upgrade and soft restore defaults:

```
AT%NVRESCFG="SET","FIELD","admin.services.ftp_server","R2FD"
OK
```

Always kept parameters

In addition to the dynamic configuration, some parameters are always kept:

R2FD(soft mode AT&F0):

The following files/folders are saved:

d:/used/generic/certprofile

d:/used/generic/lwm2m_resources_info/

d:/used/generic/lwm2m_resources_info2/
d:/used/lwm2m_dir/
d:/used/lwm2m_dir2/
d:/static-config/HW_CAP
d:/static-config/SW_CAP

The following file kept unchanged only if device is in the commercial mode:
d:/userd/generic/admin

The following parameters are saved:

"LWM2M.Config.Name"
"LWM2M2.Config.Name"
"LWM2M.HostObjects.AutoEnableURCHost"
"LWM2M2.HostObjects.AutoEnableURCHost"

R2FD(soft mode AT&F0) and FOTA:

"manager.uartMapping.A"
"manager.uartMapping.B"
"manager.uartMapping.C"
"manager.uartMapping.MA_0"
"manager.uartMapping.MA_1"
"manager.uartMapping.MA_2"
"manager.uartMapping.MA_3"
"manager.uartMapping.MB_0"
"manager.uartMapping.MB_1"
"manager.uartMapping.MB_2"
"manager.uartMapping.MB_3"
"manager.uartA.baudrate"
"manager.uartA.flowcontrol"
"manager.uartA.data"
"manager.uartA.stop"
"manager.uartA.parity"
"manager.uartB.baudrate"
"manager.uartB.flowcontrol"
"manager.uartB.data"
"manager.uartB.stop"
"manager.uartB.parity"
"manager.uartC.baudrate"
"manager.uartC.flowcontrol"
"manager.uartC.data"
"manager.uartC.stop"
"manager.uartC.parity"
"manager.urcBootEv.enabled"

%NWOPER

Command	Possible response(s)
AT%NWOPER=<oper_name>	OK or ERROR
AT%NWOPER?	%NWOPER: <oper_name>[,<mode>
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. Read command separates operator name and operator selection mode:

- <oper_name> - current NW Operator settled or selected by MCC-MNC of IMSI if "AUTO" mode was commanded
- <mode> - indicates that "AUTO" mode is currently configured

Defined values:

<oper_name> - string type; 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
- "AUTO" - NW Operator mode is selected in accordance with IMSI value of currently used SIM
- "VZW" - Verizon Wireless
- "ATT" - AT&T
- etc.

In the AUTO mode, when new operator is identified, the configurations are set by the modem similar to "AT%NWOPER=<operator>" operation. This means all the operator configuration files will be restored to the new selected operator default values.

<mode> - string type; optional parameter, returned only "AUTO", if this mode was configured.

Examples:

```
AT%NWOPER=?
```

```
%NWOPER:
```

```
("DEFAULT","AUTO","VZW","CMCC","RJIL","KDDI","ATT","USCC","DOCOMO",  
"SOFTBANK","LGU+","KT","T-MOBILE","SKT","VODAFONE","TELSTRA","TRUPHONE")  
OK
```

ODIS

Command	Possible response(s)
Command	Possible response(s)
AT+ODIS=<instance_id>,<host_device_id>,<host_device_manufacturer>,<host_device_model>,<host_device_software_version>	OK or ERROR
AT+ODIS?	+ODIS:<instance_id>,<host_device_id>,<host_device_manufacturer>,<host_device_model>,<host_device_software_version>
AT+ODIS=?	OK

Description: This command is used to read, write and create the LWM2M ODIS fields of Portfolio LWM2M Object.

Defined values:

<instance_id> - integer type; instance ID of Portfolio object

<host_device_id> - string type; empty string for read command

<host_device_manufacturer> - string type;

<host_device_model> - string type;

<host_device_software_version> - string type;

/TextEmphasis{Examples:}

Read PORTFOLIO OBJECT:

AT+ODIS?

+ODIS: 0,"","HMOD0","HMAN0","HUID0"

+ODIS: 2,"","ODIS1","ODIS2","ODIS3"

OK

Add/Change PORTFOLIO Instance:

at+ODIS=2,"ODIS0","ODIS1","ODIS2","ODIS3"

OK

%OTDOACMD

Command	Possible response(s)
%OTDOACMD=<Cid>,<Gcid>,<mcc>,<mnc>,<Earfcn>,<AntPortCfg>,<CpLength>,<PrsBW>,<PrsCfg>,<PrsDIFrames>,<PrsMutLen>,<PrsMutInfo>[,<freqLayerIndx>,<Cid>,<Gcid>,<mcc>,<mnc>,<Earfcn>,<AntPortCfg>,<CpLength>,<PrsBW>,<PrsCfg>,<PrsDIFrames>,<PrsMutInfo>,<CrsSlotNoOffset>,<PrsSfOffset>,<PrsExpRSTD>,<PrsExpRSTDUNC> [,...]]	OK or ERROR
%OTDOACMD?	ERROR (not supported)
%OTDOACMD=?	OK
(unsolicited result code)	%OTDOAMEAS:<Cid>,<Gcid>,<Earfcn>,<RefQ>,<Sfn>[,<Cid>,<Gcid>,<Earfcn>,<RSTD>,<RSTDQ> [,...]]

Description:

This command is used to request OTDOA measurements from MAC.

This command supplies the assistance information for both reference cell and neighbor cells: the first set of parameters is the reference cell and the following sets are the neighbor cells.

Upon receiving this command, the LTE modem may request the LTE network to allocate OTDOA measurement gaps (Inter-frequency RSTD measurement indication Message)

This command enables single instance of unsolicited result code: %OTDOAMEAS. The result code includes the parameters of the selected reference cell (can be different from the reference cell in the assisted information) followed by measurements of the neighbor cells.

The sender of this command is required to not send additional AT%OTDOACMD until receiving the unsolicited result code.

In both command and unsolicited result code, a parameter which is not specified will be written as " , " .

Defined values:

<Cid>: integer type:

- The Physical Cell ID of the reference/neighbor cell

<Gcid>: hexadecimal type:

- The Global cell ID of the reference/neighbor cell

<mcc>: integer type:

- A three-digit value indicating mobile country code as defined in ITU-T Recommendation E.212 Annex A.

<mnc>: integer type:

- A three-digit or two-digit value indicating the mobile network code as defined in ITU-T Recommendation E.212 Annex A.

<Earfcn>: integer type:

- The EARFCN value of the reference/neighbor cell

<AntPortCfg>: integer type:

- The number of ports used by the reference/neighbor cell for Cell-specific Reference Signals (CRS)

<CpLength>: integer type:

- Cyclic prefix length of the reference/neighbor cell signal PRS/CRS

<PrsBW>: integer type:

- The bandwidth, expressed by the number of resource blocks that are used by reference/neighbor cell to configure the positioning reference signals.

<PrsCfg>: integer type:

- The positioning reference/neighbor cell signals configuration index IPRS as defined in 3GPP TS 36.211.

<PrsDlFrames>: integer type:

- The number of consecutive downlink subframes NPRS of the reference/neighbor cell with positioning reference signals, as defined in 3GPP TS 36.211

<PrsMutLen>: integer type:

- The number of PRS positioning occasions as defined in 3GPP 36.355 section 6.5.1.2

<PrsMutInfo>: hexadecimal type:

- The PRS muting bit sequence of the reference/neighbor cell. The first bit of the PRS muting sequence corresponds to the first PRS positioning occasion that starts after the beginning of the assistance data reference cell SFN=0, as defined in 3GPP TS 36.211.

<freqLayerIndx>: integer type:

- The frequency layer index as defined in 3GPP 36.355 section 6.5.1.2

<CrSslotNoOffset>: integer type:

- The CRS slot number offset at the transmitter between this neighbor cell and the reference cell.

<PrsSfOffset>: integer type:

- The offset between the first PRS subframe in the reference cell on the reference carrier frequency layer and the first PRS subframe in the closest subsequent PRS positioning occasion of this neighbor cell on the other carrier frequency layer

<PrsExpRSTD>: integer type:

- The PRS RSTD value that the target device is expected to measure between this neighbor cell and the reference cell. The resolution is 3Ts, with $T_s=1/(15000*2048)$ seconds.

<PrsExpRSTDUNC>: integer type:

- The uncertainty PRS RSTD value that the target device is expected to measure on the RSTD between this neighbor cell and the reference cell. The resolution is 3Ts, with $T_s=1/(15000*2048)$ seconds.

<RefQ>: hexadecimal

- The target device's best estimate of the quality of the OTDOA measurement from the RSTD reference cell, TSubframeRxRef , where TSubframeRxRef is the time of arrival of the signal from the RSTD reference cell.

<Sfn>: integer type:

- The SFN of the RSTD reference cell containing the starting subframe of the PRS/CRS positioning occasion

<RSTD>: integer type:

- The relative timing difference between this neighbour cell and the RSTD reference cell. The resolution is $3T_s$, with $T_s=1/(15000*2048)$ seconds.

<RSTDQ>: hexadecimal type:

- The target device's best estimate of the quality of the measured RSTD. The quality is a bit string as defined by OTDOA-MeasQuality in section 6.5.1.5 of 3GPP 36.355

%OTPCMD

Command	Possible response(s)
%OTPCMD=<cmd>[,<otp_object>[,<value>]]	For <cmd>="RD" (query): %OTPCMD: <otp_object>,<value> For <cmd>="GETLOCK": %OTPCMD: <otp_object>,<lock_state> OK or ERROR
%OTPCMD?	%OTPCMD: error=<error>
%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 "EN" command to enable OTP modification should be entered as pre-condition. This enabling command forces customer to send a sequence of 2 AT commands to initiate first OTP parameter write. For ALT1250, which has multi-locking opportunities within same area (Manufacturing, Modem, MCU), the lock operation should specify favorite <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> should be used.

Defined values:

<cmd>

- "EN" : Enable OTP writing. Once enabled, one or more OTP parameters may be written to non-locked OTP area.
- "DIS" - Disable OTP writing and locking.
- "WR" : Write new OTP parameter value
- "RD" : Query current OTP parameter value
- "LOCK" : Locks and disables further write operations.
- "GETLOCK" : Retrieves lock status for blocks identified by their favorite object.

<otp_objects>

String name of the field:

<otp_object>	Description	<value> type	<value> size/range	"WR"	"RD"	"LOCK" - "GETLOCK"

"IMEI"	IMEI value	hex	15 bytes	V	V	V
"MK"	IMEI value	hex	15 bytes	V	V	V
"CHIPID"	Chip ID	hex	40 bits	-	V	-
"ODM4"- ODM6"	Module ODM Customer data	hex	up to 128 bytes	V	V	V
"ODM7"	Module ODM Customer data	hex	up to 127 bytes	V	V	V
"OVERHEAT"	Enable/disable Temperature overheating Damage Protection feature	bin	3 bits	V	V	-
"OTPVER"	OTP version	Integer	0-255	-	V	-

<values> type as per table above:

- integer value
- hexadecimal format for byte memory blocks in quotes
- binary bit(s) value in quotes, see some binary fields explanation below.

For "OVERHEAT"

The position of the leading "1" in this 3-bits value dictate the enable/disable of Temperature Overheating Damage Protection feature. Read command (<cmd="RD") shows actual value stored into OTP.

The actual value, which is going to be written by write command (<cmd="WR") depends on current OTP value. Settled by AT value will be Ored with current OTP value and then it will be written back to OTP (read-modify-write). The "WR" values are limited only by 3 valid values (see below). The "WR" command may modify non-leading "1" too; such setting will not impact modem behavior.

For "RD":

- "000" - Disable
- "001" - Enable
- "010"- "011" - Disable
- "100"- "111" - Enable permanently

For "WR":

- "001" - Enable

- "010" - Disable
- "100" - Enable permanently

<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 MK, 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
```

%PBCMD

Command	Possible response
AT%PBCMD=<cmd> [,<param1> [,<param2>]]	For "DELALL": OK or ERROR For "GASR": AT%PBCMD:<cmd>,<index1>,<text>[<CR> <LF> %PBCMD: <index2>,<text>[...]] For "GASW": AT%PBCMD:<cmd>,<Windex>,<Wtext> 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>,<pbcs_size>,<pbcs_free> >,<ext1_free>, <mail_size>,<mail_free>,<mail_len>,<sec_na me_len>,<anr_size>, <anr_free>[,<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>,<pbcs_size>,<pbcs_free> >,<ext1_free>, <mail_size>,<mail_free>,<mail_len>,<sec_na me_len>,<anr_size>, <anr_free>[,<anr_size>,<anr_free>[,<anr_size> >,<anr_free>]]]
AT%PBCMD?	%PBCMD:<cachestat>
AT%PBCMD=?	%PBCMD:(<RminIndex> - <RmaxIndex>), (list of supported <Windex>s),<tlength>

Description:

This command handles the Phonebook commands.

Defined values:

<cmd>: string

- "DELALL" - this 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_ADN 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 type:

- The returned location number of each returned GAS entry

<text>: string type:

- The alphanumeric text associated to the entry

<RminIndex>: integer type:

- The minimum index number to read GAS

<RmaxIndex>: integer type:

- The maximum index number to read GAS

<Windex>: integer type:

- The Write index entry for GAS

<tlength>: integer type:

- The maximum text field length

<cachestat>: integer type:

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

%PCOINFO

Command	Possible response(s)
%PCOINFO=<mode>[,<cid>]	Mode 0,1: OK ERROR Mode 2: %PCOINFO:<mode>,<cid>[,<pcoid>[,<payload>]] OK ERROR Mode 3: %PCOINFO:<mode>,<cid>[,<pcoid>[,<payload>]] [<CR><LF>%PCOINFO: <cid>,<pcoid>,<payload>]...] OK ERROR
%PCOINFO?	%PCOINFO: <mode>,<cid>[,<pcoid>[,<payload>]] [<CR><LF>%PCOINFO: <cid>[,<pcoid>[,<payload>]]] ...
%PCOINFO=?	OK
(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 be 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 and 3:

- 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? returns the list of pre-configured user PCO information for the active PDNs.

The AT%PCOINFO command to disable/enable unsolicited indication (i.e. <mode>=0,1) should not specify <cid> because the setting is applicable for all CIDs.

The unsolicited indication mode (i.e. <mode>=0,1) is returned in all query commands.

Defined values:

<mode> - the mode of the command:

- 0 - disable unsolicited PCO notification
- 1 - enable unsolicited PCO notification for pre-configured user PCO

- 2 - query received pre-configured user PCO for specified cid
- 3 - query all received PCOs for specified cid

<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

Important Note: the <pcoid> parameter is implemented in hex format, but without quotes ("").

<payload> - PCO container payload received from LTE network for the specified <cid> and <pcoid>. The payload should be received in HEX format.

Important Note: the < payload > parameter is implemented in hex format, but without quotes ("").

Examples:

AT%PCOINFO: 2,1

%PCOINFO: 0,1,0010,0594 - where pcoid=0x0010 (MTU size), payload=0x0594=1428

OK

%PCONI

Command	Possible response(s)
%PCONI[=<format>[,<cell_type>]]	<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> For secondary cells: <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> For "COMPR": %PCONI: <duplexing mode>, <tm>, <bw>, <EARFCN>, <Global cell ID>, <Physical cell ID>, <HNBN>, <band>[,<nwo_femtocell_ind>[,<cell_index>]] [<CR><LF>%PCONI: <duplexing mode>, <tm>, <bw>, <EARFCN>, <Global cell ID>, <Physical cell ID>, <HNBN>, <band>[,<nwo_femtocell_ind>[,<cell_index>]]] ...
%PCONI?	ERROR (OPRATION_NOT_ALLOWED) Operation is not supported
%PCONI=?	%PCONI: (list of supported <duplexing mode>s), (list of supported <antenna mode>s), (list of supported <bw>s)

Description:

This command returns physical connectivity and eNB parameters info.

It returns ERROR if connection to eNB is not established yet.

It returns OK if secondary cell(s) are queried, but not in use.

To read primary cell only the <cell_type> parameter should 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 that 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" - Not supported in NB-IoT
- "FDD"

<antenna/TX mode> - string:

- "SISO" - (tm1)
- "Tx diversity" - (tm2) - Not supported in NB-IoT
- "Open loop MIMO" - (tm3) - Not supported in NB-IoT
- "Closed loop MIMO" - (tm4) - Not supported in NB-IoT
- "tmX" - for tm5 and more - Not supported in NB-IoT

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

<tm> - transmission mode, string:

- "tmX"

<bw>:

- 0 - 1.4 MHz - Not supported in NB-IoT
- 1 - 3 MHz - Not supported in NB-IoT
- 2 - 5 MHz - Not supported in NB-IoT
- 3 - 10 MHz - Not supported in NB-IoT
- 4 - 15 MHz - Not supported in NB-IoT
- 5 - 20 MHz - Not supported in NB-IoT
- 6 - 180 kHz - Supported only in NB-IoT

<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). - Not supported in NB-IoT

<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 - Not supported in NB-IoT
- 2-99 - Reserved FFU

Examples:

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:

a. Without CA:

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

b. 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
```

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.

%PDNACT

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

Description: This command is used by external Host to instruct eCM to expose and connect (disconnect) specific PDN to the Host. There may be more than one PDN exposed to Host.

There may be more than one PDN exposed to Host.

Session ID is Altair proprietary session identifier, which is defined for each session established over-the-air in NP config file named '/etc/config/ecm'.

User can use <apnname> or <sessionID> or both to identify PDN. If both are defined, PDN is identified byb <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>: integer type; indicates the required action:

- 0 - deactivate
- 1 - activate

<sessionID> - integer type; value of session identifier defined in NP config file

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

<stat> : integer type; indicates the actual PDN state

- 0 - non-active
- 1 - active

%PDNRDP

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

Description: This 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 type:

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.

%PDNSET

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

Description: This 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.

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.

Note:

- In both command and response, a parameter which is not specified will be written as ",,"
- Last parameters of the command which are not specified may not include the ",," notation. e.g.
AT%PDNSET=<ext_sessionID>,<apnname>,<ip_type>

Defined values:

<ext_sessionID> - integer type; 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"
- "Non-IP"

<ppp_auth> - string type; PPP authentication type:

- "NONE"
- "PAP"
- "CHAP"

- "AUTO" - Unknown authentication protocol. Attempts to use CHAP then PAP

<user>- string type; Optional, username used for authentication. If the parameter is omitted, blank username is used.

<passw> - string type; Optional, password used for authentication. If the parameter is omitted, blank password is used.

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

<pcscf_discovery>: integer type:

- 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

%PDNSTAT

Command	Possible Response(s)
AT%PDNSTAT=<cid>	%PDNSTAT:<cid>[,<start_time>[,<end_time>], <result>[,<reject_cause>]] [%PDNSTAT:<cid>[,<start_time>[,<end_time>], <result>[,<reject_cause>]]]
AT%PDNSTAT?	[%PDNSTAT:<cid>[,<start_time>[,<end_time>], <result>[,<reject_cause>]] [...]]
AT%PDNSTAT=?	%PDNSTAT: (list of supported <cid>s)

Description: This execution command returns PDN connectivity history statistic of pre-defined in APN table PDN.

This information is conditional and configured in "APNTable" configuration file. To retrieve this info:

- PDN with <cid> should exist in "APNTable" configuration file
- Statistic for this PDN should be enabled in "APNTable"

Command return ERROR if <cid> is not defined in "APNTable".

If command response is empty from any statistic info (only %PDNSTAT:<cid> is returned), this means that PDN is defined in "APNTable", but it is not configured to provide this information.

In the case of more than single connectivity attempt for pre-configured PDN, command returns multi-line response with connectivity history. The number of connectivity sessions for history storage is configurable in "Config" configuration file (default: "StatisticsDepth" value is 5 sessions to store).

Read command returns all PDNs, which are configured to provide connectivity statistic. Empty read command output means that feature is not enabled for any <cid>.

Defined values:

<cid> - integer type. The ID of the PDP context, same as used in 27.007, sec. 10.

- 1-15

<start_time> - integer type; UTC time of connectivity attempt (number of ms that have elapsed since 00:00:00, 1 January 1970.).

<end_time> - integer type; UTC time of connection release (number of ms that have elapsed since 00:00:00, 1 January 1970.).

<result> - string type. Connectivity attempt result:

- "ACCEPTED"
- "REJECTED".

<reject_cause> - integer type; error code if the PDN failed to connect.

Examples:

- Try to get statistic for PDN non-configured for statistic: AT%PDNSTAT=1 %PDNSTAT: 1 OK
- Get statistic for PDN with statistic supported AT%PDNSTAT=2 %PDNSTAT: 2,377064041115,377064057717,"REJECTED",1007 %PDNSTAT: 2,377064041129,,"ACCEPTED" OK

- Read all statistic: AT%PDNSTAT? %PDNSTAT:
2,377064041115,377064057717,"REJECTED",1007 %PDNSTAT:
2,377064041129,377064057812,"ACCEPTED" %PDNSTAT: 2,377064041900,,"ACCEPTED"
%PDNSTAT: 4,377064041133,,"ACCEPTED" OK

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

Execution command returns OK only (without AT response body prefixed by %PINGCMD) in the case that ping requests has been sent, but there is no ECHO replies received. Execution command returns ERROR if there is something wrong in AT command format or parameters, which prevents ping requests issuing.

Defined values:

<id> - integer type:

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

<IP type> - integer type:

- 0 - Ipv4
- 1 - Ipv6

<dst_ip> - string

- Destination (remote machine) IPv4 or IPv6 address

<packetsize> - integer type:

- 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.
- Maximum size in IPv4 is 9936 Bytes. Maximum size in IPv6 is 9908 Bytes.

<count> - integer type:

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

<timeout> - integer type:

- Time to wait for a response, in seconds.

<ttl> - integer type:

- 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> - integer type:

- The round trip time of the PING

%POLTECMD

Command	Possible response(s)
%POLTECMD=<polte_object>[,<param1>...]	%POLTECMD: <polte_object>[,<res1>...]
%POLTECMD?	ERROR
%POLTECMD=?	%POLTECMD: (list of supported <polte_object>s)

Description:

This command is used to trigger PoLTE functionality.

The command is compound, which means that <param#> parameters are <polte_object> specific.

Defined values:

<polte_object> string type:

- "AUX"- Update compressed binary AUX data.
- "CRS"- Will capture CRS symbols and save the result to file-system.
- "COMPRESS"- Will capture CRS symbols and compress the results using the Compression-Engine and save the compressed result to file-system.
- "GETREG"- This command's result provides a UE specific parameters needed to register the UE to PoLTE server.
- "VER"- This command is used to request the version of the application and CE
- "REGISTER"- Command initiates registration to PoLTE server using UE parameters
- "SERVERAUTH"- Provide the UE with authentication parameters needed to send compressed binary to PoLTE server successfully. Used for renewal credentials after modem reboot or power save related power up.
- "REPORT"- Sends report with compressed binary to PoLTE server
- "LOCATE"- Combines "COMPRESS" and "REPORT" to one action that reduces the need to save compressed data (i.e. the output of "COMPRESS" command) to flash and read it before sending to server. The commands captures CRS, compresses it, and sends it to server.
- "SETAPI"- Set PoLTE-API token to be used when sending PoLTE CR requests. The token must be a User Equipment API token.
- "CR"- Get location using PoLTE CR (User Equipment API).
- "MQTTCONFIG"- Set MQTT configuration.

For "CRS" and "COMPRESS":

<param1>: integer type; number of frames:

- 0- Cancel capture CRS
- 1- Capture CRS symbols of 1 frame
- 2- Capture CRS symbols of 2 contiguous frames
- <param2>: integer type; [Optional]
- 0- save file without waiting for RRC connected state.
- 1- wait for RRC connected and get RTTD value before saving file to flash.

<res1>: integer type; capture-start status. This result-code reflects the ability to send command to modem for starting this process but doesn't guarantee a successful capture:

- 0- Success
- 1- Modem invalid state
- 2- Bad number of frames to capture
- 3- Not enough memory

- 4- Pending response from modem
- 5- Retrying capture attempt (previously buffered by application)
- 7- Device ID unavailable
- 8- Delaying capture attempt because of ongoing paging
- 9- Flash read/write failure
- 12- A preceding operation has failed
- 13- Invalid RAT in use

For "GETREG":

<res1> - string type; Manufacturer token (Maximum size 20 characters)

<res2> - string type; Model token (Maximum size 20 characters)

<res3> - string type in decimal format indicating the IMEI

<res4> - string type; unique modem token (Maximum size 256 characters)

For "VER":

<res1> - string type; ASCII text representing the version of the application

<res2> - string type; ASCII text representing the version of the CE

For "SERVERAUTH":

<param1> - string type; username for PoLTE server as received from registration process (Maximum size 20 characters)

<param2> - string type; password for PoLTE server as received from registration process (Maximum size 20 characters)

For "REPORT":

<param1> - string type; file-system path to compressed binary file to send to PoLTE server for location evaluation

<param2> - integer type; flag to mandate back location URC or not

- 0- "LOCATION" URC is not expected, client shall disconnect from server right after data send
- 1- "LOCATION" URC is expected, client shall not disconnect from server until response is received.

For "LOCATE":

<param1>: integer type; number of frames:

- 0- Cancel capture CRS
- 1- Capture CRS symbols of 1 frame
- 2- Capture CRS symbols of 2 contiguous frames

<param2>: integer type; retrieve location from server:

- 0- Don't request to get location back
- 1- Request to get location to device after generated by server

<res1>: integer type; capture-start status. This result-code reflects the ability to send command to modem for starting this process but doesn't guarantee a successful capture:

- 0- Success
- 1- Modem invalid state
- 2- Bad number of frames to capture
- 3- Not enough memory
- 4- Pending response from modem
- 5- Retrying capture attempt (previously buffered by application)
- 7- Device ID unavailable
- 8- Delaying capture attempt because of ongoing paging
- 9- Flash read/write failure
- 12- A preceding operation has failed
- 13- Invalid RAT in use

For "MQTTCONFIG":

<param1> - integer type; Number of seconds to allow MQTT session before clearing PoLTE-Client session parameters.

<param2> - integer type:

- 0- Don't perform disconnect if timer expires.
- 1- Perform disconnect if timer expires
-

%POLTEEV

Command	Possible response(s)
%POLTEEV=<event>,<mode>	OK or ERROR
%POLTEEV?	%POLTEEV: <event>,<mode>,<event>,<mode>[...]
%POLTEEV=?	%POLTEEV: (list of supported <event>s),(list of supported <mode>s)
(unsolicited report)	<p>For "CRS": %POLTEEVU: "CRS",<stat>[,<imei>,<tac>,<mcc>,<mnc>,<ci>,<pci>,<earfcn>,<bw>,<nsymb>,<sfn>[,<capture_path>]]</p> <p>For "COMPRESS": %POLTEEVU: "COMPRESS",<stat>[,<len>[,<compressed_path>]]</p> <p>For "REGISTER": %POLTEEVU: "REGISTER",<stat>[,<server_username>,<server_password>]</p> <p>For "LOCATION": %POLTEEVU: "LOCATION",<stat>[,<latitude>,<longitude>,<time>,<confidence>]</p> <p>For "ALLOWSTAT": %POLTEEVU: "ALLOWSTAT"\,<stat></p>

Description:

This command enables PoLTE unsolicited notification events. The unsolicited command is used to deliver information from PoLTE App to the Host.

For execution only, event name "ALL" will activate or deactivate all event.

Defined values:

<event> - string type:

- "CRS": event for CRS capture attempt file triggered by "CRS" or "COMPRESS" command.
- "COMPRESS": event for an attempt to compress a CRS capture file triggered by "COMPRESS" command.
- "REGISTER"- event reported upon registration to PoLTE server triggered by "REGISTER" command.
- "LOCATION"- event reported upon location received from PoLTE server triggered by "REPORT" command.
- "ALLOWSTAT" event reported upon POLTE allowed status change.
- "ALL"- Enables all events

<mode> - integer type:

- 0- disable <event>

- 1- enable <event>

<stat> - integer type:

For "CRS" and "COMPRESS"

- (-100)-(-1)- Compress operation failure
- 0- Success
- 1- Modem invalid state
- 2- Not enough memory
- 12- Preceding operation failure

For "REGISTER" and "LOCATION"

- 0- Success
- 1- No response from server
- 12- Preceding operation failure

<imei> - string type; as defined in 3GPP

<tac> - string type. Two byte tacking area code in hexadecimal format, as defined in 3GPP

<mcc> - integer type. A three-digit value indicating mobile country

<mnc> - integer type. A three-digit value indicating the mobile network code

<ci> - string type; four byte E-UTRAN cell ID in hexadecimal format, as defined in 3GPP

<pci> - integer type; Physical cell ID value, as defined in 3GPP

<earfcn> - integer type; E-UTRA Absolute Radio Frequency Channel Number of the modem at the time of the data capture, as defined in 3GPP

<bw> - integer type; E-UTRA bandwidth enumeration for serving cell

- 0- 0.18
- 1- 1.4
- 2- 3
- 3- 5
- 4- 10
- 5- 15
- 6- 20

<nsymb> - integer type; number of contiguous OFDM symbols captured:

- 0-80

<sfn> - integer type; the system frame number (SFN) of first CRS data block

<capture_path>- string type; file-system path to captured CRS data

<len> - integer type; length of compressed file:

- 0-3000

<compressed_path> - string type; file-system path to compressed binary file

<server_username> - string type; username to PoLTE server as reported in registration message
(Maximum size 20 characters)

<server_password> - string type; password to PoLTE server as reported in registration message
(Maximum size 20 characters)

<latitude> string type, which contains floating value in quotes. Latitude as defined and returned by NMEA command GGA. Positive values represent "North", negative values represent "South".

<longitude> - string type, which contains floating value in quotes. Longitude as defined and returned by NMEA command GGA. Positive values represent "East", negative values represent "West".

<time> - integer type ; The UTC timestamp of the position (in 1ms units counted since January 1, 1970)

<confidence> - string type, which contains floating value in quotes. Confidence level as reported by PoLTE represent certainty of fix in meters.

For "ALLOWSTAT"

- 0 - POLTE is not allowed.
- 1 - POLTE is allowed.

%POLTETST

Command	Possible response(s)
%POLTETST=<cmd>,<param1>	OK or ERROR
%POLTEST?	ERROR
%POLTETST=?	%POLTETST: (list of supported <cmd>s, (list of supported <param1>s

Description:

This command sends commands to provide debug information regarding PoLTE flow.

<cmd> - string type:

- "SaveAltairDump": In PoLTE's operation the Altair format file will be saved to flash in addition to the file in which the PoLTE operation results.
- "SavePolteUnpack": Relevant when %POLTECMD="COMPRESS" command is issued and will save the file after the conversion from Altair format to PoLTE format, regardless to the result of compression-engine.
- "PrintUrcToCli": Prints the URC assembled in PoLTE flow to CLI as well as to registered AT clients.
- "Psm": PoLTE capture request during PSM will send CPSMS command to modem to camp on cell with 10 seconds timeout.

For "SaveAltairDump":

<param1> - integer type:

- 0- disable file save.
- 1- enable file save.

For "SavePolteUnpack":

<param1> - integer type:

- 0- disable file save.
- 1- enable file save.

For "PrintUrcToCli":

<param1> - integer type:

- 0- disable prints to CLI.
- 1- enable prints to CLI.

For "Psm":

<param1> - integer type:

- 0- disable moving to camped-on-cell mode automatically.
- 1- enable moving to camped-on-cell mode automatically.

%PPPAUTH

Command	Possible response(s)
%PPPAUTH=<cid>,<auth_type>[,<auth_name>][,<auth_pwd>][,<host_name>]]	OK ERROR
%PPPAUTH?	ERROR (OPERATION_NOT_SUPPORTED)
%PPPAUTH=?	OK

Description:

This command defines APN authentication parameters for the PDP context id <cid>.

Defined values:

<cid> - integer type. PDP context.

<auth_type> - string type:

- "None"
- "PAP"
- "CHAP"
- "AUTO" - Unknown authentication protocol. Attempts to use CHAP then PAP

<auth_name> - string type. Username used for authentication. Optional. If the parameter is omitted, blank username is used.

<auth_pwd> - string type. Password used for authentication. Optional. If the parameter is omitted, blank password is used.

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

%PPPCFG

Command	Possible response
AT%PPPCFG=<cid>,<mode>[,<id>,<user_name>,<rand>,<hash>[,<host_name>]]	OK or ERROR
AT%PPPCFG?	[%PPPCFG:<cid>,<mode>[,<id>,<user_name>][<CR><LF>%PPPCFG:...]] OK
AT%PPPCFG=?	OK

Description:

This command is used to configure challenge parameters for PPP CHAP session on specific PDN.

If <mode>=1 is selected, the <id>,<user>,<rand>,<hash> parameters becomes mandatory.

Defined values:

<cid> - decimal; PDP context id

<mode>:

- 0 - disable user-configured CHAP challenge parameters
- 1 - enable user-configured CHAP challenge parameters

<id> - decimal; CHAP challenge ID

<user_name> - string; client's username

<rand> - hexadecimal (in quotes); random number

<hash> - hexadecimal, 16 bytes (in quotes); hash value (MD5)

<host_name> - string; optional, the name of the Authentication server.

%PPPLOC

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

Description: This command is used to initiate local PPP session for modem management without LTE network PPP data connectivity. Its 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.

%PWRCONMON

Command	Possible response(s)
AT%PWRCONMON=<mode>[,<ps_mode>,<tout>]	OK ERROR
AT%PWRCONMON?	%PWRCONMON:<mode>[,<ps_mode>,<tout>]
AT%PWRCONMON=?	%PWRCONMON: (list of supported <mode>s) , (list of supported <ps_modes>s), (range of supported <tout>s)
(Unsolicited result code)	%PWRCONMONU

Description: The Power Consumption Monitor feature monitors sleep deprivation and enables notification about unexpected modem behaviour, which may impact power consumption. The execution command defines power save (PS) mode and related to it timeout. Monitored event occurs if more than <tout> seconds had passed since the last time modem entered <ps_mode> or any deeper PS mode. The order of PS modes (from lighter to deeper) is reflected in <ps_mode> parameter description.

Once the timeout had expired, %PWRCONMONU URC will be sent. Read command output may omit non-configured yet parameters.

Defined values:

<mode> - integer type; unsolicited result response (URC) presentation:

- 0 - disabled
- 1 - enable one-shot URC. To receive next URC the URC shall be re-enabled again

<ps_mode> - string type; PS (Power Save) mode, which will be subject of monitoring:

- "LS" - Light Sleep - the lightest
- "DS" - Deep Sleep
- "DH2" - DH2 (deep hibernation type 2)
- "DH1" - DH1 (deep hibernation type 1)
- "DH0" - DH0 (deep hibernation type 0) - the deepest

<tout>: integer type; timeout in sec. The time modem is expected to enter the <ps_mode> or deeper power save modes.

- 5 - 1200

%PWR SVCMD

Command	Possible response
AT%PWR SVCMD=<cmd>[,<mode>[,<param1>[,<param2>]]]	OK or ERROR
AT%PWR SVCMD?	ERROR (not supported)
AT%PWR SVCMD=?	%PWR SVCMD: (list of supported <cmd>s), (list of supported <mode>s)

Description:

This command is intended to manage the user commanded power save mode and power save parameters at run-time only.

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. It is only applicable to AT%PWR SVCMD= "FORCE" and AT%PWR SVCMD= "TEST",2(DH). If parameter is omitted, forever timeout will be applied. If non-zero <timeout> value is specified for other than DH power save (PS) test modes, it will be ignored, module will always stay forever in these modes. Reboot is expected to recover module from any running forever PS test mode.

Defined values:

<cmd>:

- "FORCE" - force specified power save mode

<mode> - integer type; PS mode:

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

<param1> - integer type; sleep time before wakeup in sec:

- 0 - forever
- 1 - 4294967 sec

<param2> - integer type; to mask 1 or more (up to 4) HW pins as wakeup source of standby (DH0) mode

- 0 - unmasked (default)
- 1-15 - 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)
-

%RAISET

Command	Possible response(s)
AT%RAISET=<rai>	OK/ERROR
AT%RAISET?	%RAISET: <rai>
AT%RAISET=?	OK

Description: AT used to pre-set RAI flag before last expected datagram will be sent. Flag could be also cleared using <rai>=0 if more TX data is expected.

Pre-set of RAI flag is expected a short time before last packet will be sent. If expected last packet arrival (provided by the AT command, see the list of such ATs below) does not occur during predefined aging interval (currently 10 sec), flag is cleared automatically.

Currently feature is supported for UDP data transfer only.

This AT may be called in the next potential scenarios just before:

1. LWM2M last notification via AT%LWM2MOBJEV
2. Single datagram via AT%SOCKETCMD
3. Last datagram via AT%SOCKETDATA

The RAI flag retrieval executed internally by these ATs clear the RAI flag itself.

Read command returns current RAI flag setting. This read operation (AT%RAISET?) does not clear RAI flag.

Defined values:

<rai> - integer type; the RAI settings:

- 0 - Clear RAI value for execute command, no RAI for read command
- 1 - Last UL packet is expected
- 2 - Last UL and single DL packet is expected
- 3 - Select RAI type automatically as per internal App (LWM2M or others) need

Examples:

1. Single packet:

```
AT%RAISET=1
```

```
OK
```

```
AT%SOCKETCMD="FASTSEND",1,200,"23F1..."
```

```
OK
```

2. Multiple:

```
AT%SOCKETDATA="SEND",1,1500,"E0A2..."
```

```
OK
```

```
...
```

```
AT%SOCKETDATA="SEND",1,1500,"1350..."
```

```
OK
```

```
AT%RAISET=1
```

```
OK
```

```
AT%SOCKETDATA="SEND",1,96,"33A9..."
```

```
OK
```

3. LWM2M:

```
AT%RAISET=3
```

```
OK
```

```
AT%LWM2MOBJEV="12345678","0",,"0","/19/0/1","58"  
OK
```

%RATACT

Command	Possible response(s)
AT%RATACT=<rat>[,<storage>[,<source>]]	OK/ERROR
AT%RATACT?	%RATACT: <current_rat>,<rat_mode>,<source>
AT%RATACT=?	%RATACT: (list of supported <rat>s),(list of supported <storage>s)

Description:

This execution command switches to selected RAT without full reboot. Any attempt to switch to the RAT already in use will be silently ignored and return OK.

The execution command acceptance depends on the content of d:/config/radiom (Radio Manager) config file:

- If this config file is missed, command behavior is the same as in all previous versions.
- If config file is present and "multi_rat_enable" is "false", the AT%RATACT returns ERROR regardless of any parameter values.

If multiple mode is enabled in configuration file, the call of this AT with <rat>="DEFAULT" returns device to RAT automatic selection mode. The conditional fallback to default preferred RAT and automatic mode is also expected for <rat>="C2D"/"N2D"/"G2D" modes. The AT with such <rat> values executes one-shot attempt to connect to the target RAT in single mode:

- They return to default RAT (even to the same cell, if possible) and multi-mode immediately in the case of single scan attempt failure on target RAT.
- In the case of success, modem will stay in single mode and on target RAT forever until AT%RATACT="DEFAULT" will be called by Host.

The <source> parameter may be used by external Host and shall be used by internal Apps (LWM2M/FOTA, etc.) to inform RM about switch source (Host, internal App). If parameter is omitted, the external Host is assumed as a source of switch. Any switch or fallback to automatic default mode caused by <rat>="DEFAULT"/"C2D"/"N2D" clears the <source> flag. The source may be cleared also explicitly calling AT%RATACT="DEFAULT",,0.

Host is considered as higher priority source:

- If <source>= Host or empty (Host is default) than the command will be handled immediately and will override the currently selected RAT.
- If <source>= LWM2M switch depends on the source already in use. If RAT was previously switched by Host, the LWM2M attempt to switch RAT will be rejected with ERROR.

In the case of present "radiom" config file, the <storage>=1 parameter processing also depends on config file content and has some limitations:

- It is accepted only if next parameters are explicitly defined:
- "multi_rat_enable": "true"
- "preferred_rat_list": "none"
- In all other use-cases <storage>=1 parameter will be silently ignored. In other words if RAT preference mode and preferred RAT is explicitly enabled/defined at Production, new RAT cannot be stored into NV by run-time AT%RATACT.

Defined values:

<rat> - string type; RAT to be activated by execution command or currently used RAT for read command:

- "DEFAULT" - activate default RAT/configured mode
- "CATM" - activate CAT-M RAT
- "NB-IOT" - activate NB-IOT RAT
- "GSM" - activate GSM RAT in single RAT mode.
- "C2D" - activate CAT-M RAT in single mode with fallback to default auto mode and previous RAT.
- "N2D" - activate NB-IOT RAT in single mode with fallback to default auto mode and previous RAT.
- "G2D" - activate GSM RAT in single mode with fallback to default auto mode and previous RAT.
- "C2DUC" - activate CAT-M RAT in single mode with unconditional fallback to default auto mode and to previous RAT on any following scan attempt.
- "N2DUC" - activate NB-IOT RAT in single mode with unconditional fallback to default auto mode and to previous RAT on any following scan attempt.
- "G2DUC" - activate GSM RAT in single mode with unconditional fallback to default auto mode and to previous RAT on any following scan attempt.

<storage> - integer type; flag indicates if settings are persistent over a power-cycle (stored into non-volatile memory):

- 0 - not persistent (default if parameter omitted)
- 1 - persistent

<source> - integer type, flag used for RAT switch requests arbitration.

- 0 - none/clear
- 1 - Host (default)
- 2 - LWM2M/FOTA

<rat_mode> - integer type; RAT mode of RM state machine.

- 0 - Single RAT
- 1 - Multiple RAT

<current_rat> - integer type; current RAT.

- "CATM"
- "NB-IOT"
- "GSM"

%RATEV

Command	Possible response(s)
%RATEV=<mode>	OK or ERROR
%RATEV?	ERROR (Not supported)
%RATEV=?	%RATEV: (list of supported <modes>s)
unsolicited	%RATEVU: <event>,<rat>,<source>

Description: This command is intended to notify about RAT switch events.

Defined values:

<mode> : integer type; status of unsolicited result response presentation:

- 0 - disabled
- 1 - enabled

<event> : integer type; event type:

- 0 - scan success
- 1 - scan failed

<rat> : string type; current RAT:

- "CATM"
- "NBIOT"
- "GSM"

<source> : integer type; event type:

- 0 - none/clear
- 1 - Host (default)
- 2 - LWM2M/FOTA

%RATIMGSEL

Command	Possible response(s)
AT%RATIMGSEL==<img_id>	OK or ERROR
AT%RATIMGSEL?	%RATIMGSEL:<img_id>
AT%RATIMGSEL=?	OK

Description: This command switches to the 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 - CAT-M
- 2 - NB-IOT
- 3 - GSM

%RESETCID

Command	Possible response(s)
%RESETCID=[<cid>]	
%RESETCID?	ERROR
%RESETCID=?	OK

Description:

This command is intended to clear the 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
- Additional PDN PPP authentication parameters defined by AT%PPPAUTH or by APN table

Read command is not supported.

Defined values:

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

%ROHCCMD

Inapplicable to NB-IOT.

Command	Possible response(s)
%ROHCCMD=<cmd>[,<param>]	OK ERROR
%ROHCCMD?	ERROR
%ROHCCMD=?	ROHCCMD: (list of supported <cmd>s)

Description:

This command is used to set RTP stream filter for RoHC. For IPv4, The IP addresses should use the Dot-decimal notation: For IPv4, there should be 4 decimal numbers, each pair separated by a full stop (dot). For IPv6, there should be 16 decimal numbers, each pair separated by a full stop (dot).

Defined values:

<cmd>:

- "SETRTP" - Set RTP filter for RoHC profiles 1 and 5
- "CLEAR RTP" - Clear RTP filter for RoHC profiles 1 and 5
- "CLEARALL" - Clear all RTP filters

For "SETRTP" and "CLEAR RTP"

<param1>: string

- RTP stream Source IP address (V4 or V6)

<param2>: integer type:

- RTP stream Source port address

<param3>: string

- RTP stream Destination IP address (V4 or V6)

<param4>: integer type:

- RTP stream Destination port address

%RSIMRSP

Command	Possible response(s)
%RSIMRSP=<cmd name>, <rsp body>	OK/ERROR
%RSIMRSP?	ERROR (OPRATION_NOT_ALLOWED)
%RSIMRSP=?	OK

Description:

This command allows CM on an external host to provide the SIM owner (3G modem) answer to the last AT%RSIMREQ command from LTE. This commands encapsulates the AT command answer into Altair-proprietary form.

Defined values:

<cmd name>:

- "CRSM" - AT command name of AT+CRSM as per TS27.007
- "CSIM" - AT command name of AT+CSIM as per TS27.007
- "AUTH" - since all vendors call their proprietary authentication commands differently, the common alias name "AUTH" for all such commands is preferable.

<rsp body>:

- For "CRSM" - AT command response body copied from original command starting just after ":" as per TS27.007
- For "CSIM" - AT command body copied from original command starting just after ":" as per TS27.007
- For "AUTH" - AT command response body starting just after ":". Most of vendor-proprietary authentication commands have the same input parameters, but slightly different output parameters. Some customization per NV parameter (CustomerId) may be needed for output parameter parsing in the future.

Examples:

The 3G command response received by CM:

+ERTCA=2

OK

Will be sent as AT command from CM to LTE in form:

```
%RSIMRSP:"AUTH".2
```

The 3G command response received by CM:

[illegible]

33

OK

Will be sent as AT command from CM to LTE in form:

[illegible]

Notes: +ERTCA customer-proprietary command is not compliant to spec and does not use quotes in the answer for hexadecimal parameters. Its output will be used "as is", no quotes expected.

%RSTINFO

Command	Possible response(s)
AT%RSTINFO	%RSTINFO: <rst_type>[,<rst_cause>[,<cpu>[,<failure_type>]]] OK
AT%RSTINFO?	ERROR (OPERATION_NOT_ALLOWED)
AT%RSTINFO=?	OK

Description: This command is used to get detailed reset cause information after boot.

Defined values:

<rst_type>: integer type; reset applied:

- 0 - power on, no reset
- 1 - boot caused by reset

<rst_cause>: integer type; reset applied:

- 0 - unknown
- 1 - shutdown button
- 2 - power button
- 3 - reserved
- 4 - watchdog
- 5 - overheating
- 6 - SW failure
- 7 - user triggered (i.e. ATZ)
- 8 - LWM2M triggered
- 9 - FW upgrade triggered

<cpu>: integer type; optional reset caused by CPU indication. Relevant to <rst_cause>=4/6 only:

- 0 - PMP
- 1 - MAC
- 2 - PHY
- 3 - MAP
- 4 - MCU

<failure_type>: integer type; optional SW failure type indication. Relevant to <rst_cause>=6 only, if known:

- 0 - unknown
- 1 - assert
- 2 - exception

%SCACHECMD

Command	Possible response
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 command used to get SIM files from FW SIM cache in RAM.

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

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

If a required file is missed in cache (not supported), the 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

%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>,<RSRP>,<RSRQ>[,<eci>,<bw>,<tac>,<cstat>,<emg>,<oper1>[,<oper2>[...]]] [<CR><LF>%SCAN: <band>,<earfcn>,<pci>,<RSRP>,<RSRQ>[,<eci>,<bw>,<tac>,<cstat>,<emg>,<oper1>[,<oper2>[...]]] ...]]
%SCAN?	%SCAN: <bw>, <eci>, <EARFCN>,<Physical_cell_ID>, <PLMN_ID>,<RSRP>[...]
%SCAN=?	OK

Description:

This command returns the RSSI scan results, a result is displayed only for cells successfully acquired SIB1 from.

Not applicable for 2G. It returns ERROR if the RAT in use is 2G.

Defined values:

<cmd> - command, string:

- "QUERY" - ask for last scan results

<mode> - integer; result representation mode:

- 0 - short
- 1 - long

<bw>:

- 0 - 1.4 MHz - Not supported in NB-IoT
- 1 - 3 MHz - Not supported in NB-IoT
- 2 - 5 MHz - Not supported in NB-IoT
- 3 - 10 MHz - Not supported in NB-IoT
- 4 - 15 MHz - Not supported in NB-IoT
- 5 - 20 MHz - Not supported in NB-IoT
- 6 - 180 kHz - Supported only in NB-IoT

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

- 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>,<RSRP>,<RSRQ>,<bw>,<tac>

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

<cstat> - integer; cell status from SIB1:

- 0 - regular cell
- 1 - cell barred

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

- 0 - false (omitted)
- 1 - true

%SCANCFG

Command	Possible response
AT%SCANCFG=<rs_cfg>[,<sl_cfg[,<estart>,<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.

Not applicable for 2G. It returns ERROR if the RAT in use is 2G.

The 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.

The Run-time Scan List (RTSL) is intended to create Scan List or substitute MDOP Scan List. If user is aware about deployment, the scanning time may be essentially reduced by band boundaries reduction or even by individual band definition.

The RTSL defines a list of EARFCN ranges, where each EARFCN range boundaries are defined within the same band.

The RTSL can contain a number of entries (up to 64 on ALT125x). To define individual EARFCN it is enough to set <estart>=<estop>.

The EARFCN ranges of RTSL should be a subset of bands defined in BSP (MDOP) file and used for device calibration at wakeup time.

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

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

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

<estart> - Start EARFCN

<estop> - Stop EARFCN of the same band as start 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

%SCANCMD

Command	Possible response
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:

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

Not applicable for 2G. It returns ERROR if the RAT in use is 2G.

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.

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 - Omitted in NB-IoT ->,<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

%SETACFG

Command	Possible response(s)
AT%SETACFG=<config_file_name.section_name.field_name> ,<param_value>[,<operator>][,<lock>]]	OK/ERROR
AT%SETACFG?	ERROR (OPERATION_NOT_ALLOWED)
AT%SETACFG=?	%SETACFG: (list of supported configuration files)

Description: This command sets a value of configuration parameter in MAP configuration file. A path to the configuration parameter is composed as "config_file_name.section_name.field_name".

<param_value> defines the value of the configuration parameter to be set.

<lock> - integer type; optional parameter. To lock or not access to configured parameter in Commercial Mode: 0 - unlock (default) 1 - lock

<operator> - string type; optional parameter. NW operator's name.

It is not allowed to specify <operator> parameter for the following file/folders: lwm2m_dir, lwm2m_resources_info, version, admin, manager, operator

It is disallowed to set "ALL" value to the <operator> parameter for the following file/folders: APNTable*

Examples:

1. Configure IP Type:

```
AT%SETACFG="APNTable.Class1.IP_Type","IPV4V6"  
OK
```

2. Configure UartA baud rate:

```
AT%SETACFG="manager.uartA.baudrate","115200"  
OK
```

%SETBDELAY

Command	Possible response(s)
AT%SETBDELAY=<tout>	OK or ERROR
AT%SETBDELAY?	%SETBDELAY:<tout>
AT%SETBDELAY=?	OK

Description: This command is intended for debugging purposes. It modifies the uBoot delay applied in next cold boot. Once modified, new timeout value will be used as new default timeout in all following cold boots. Read command is not supported.

Defined values:

<tout> - integer type; delay timeout value in sec:

- 0-99 sec

%SETCFG

Description: This command sets a configuration field to the NV memory.

Use: AT%SETCFG=<param1>,<param2>,<param3>,<param4>,<param5>

Purpose	Param1	Param2	Param3	Param4	Param5
Sets device's log module severity in NV	"LOG"	"SYS", "L1A", "MAC", "MACGN", "MACUL", "MACDL", "RLC", "RLCGN", "RLCUL", "RLCDL", "PDCP", "PDCPGN", "PDCPUL", "PDCPDL", "RRC", "VL1", "NAS", "USIM", "FRM", "ROHC", "PROF0", "PROF1", "PROF2", "PROF4", "PROF6", "PACKET_C LASS", "OSAL", "SERV", "DT", "SIMLOCK", "SMS", "EXCEPTIO N_MANAGE R", "AMA", "AT", "PMP", "PWR", "SMSMNGR", "CAT"	"DEBUG", "INFO", "NOTICE", "WARN", "ERROR", "EMRG"		
Sets device's log severity for all modules in NV	"LOG"	"ALL"	"DEBUG", "INFO", "NOTICE", "WARN", "ERROR", "EMRG"		
Sets device's USIM	"USIM_SIM ULATOR"	"0" (disable), "1" (enable).			

simulator enable/disable in NV					
Set bands defined in DOP/MDOP file, these bands are the ones to be calibrated (all chips except of ALT1250) and scanned in full scan. Note only bands that also reside in PhyBP are allowed (all chips except of ALT1250)	"BAND"	Band1[,Band2[...[,BandN]...]]			
Set stored cell feature state	"SC_STATE"	"0" (disable), "1" (enable).			
sets if the device should disable the reset on assert feature in MAC CPU	"DISABLE_RESET"	"0" (enable), "1" (disable)			
Sets min pause interval between unsuccessful scanning	"REPOSE_MIN"	Time in seconds			
Sets max pause interval between unsuccessful scanning	"REPOSE_MAX"	Time in seconds			
Sets incremental step interval between unsuccessful scanning	"REPOSE_STEP"	Time in seconds for linear mode. -1 for exponent mode			
Sets power save mode for Idle RRC state	"PW_IDLE"	"DEFAULT" - SW Default "NONE" - Disable "PHY" - Only PHY "NAP" - Nap "LS" - Light sleep "DS" - Deep sleep			

		"DH2" - Hibernation level 2 "DH1" - Hibernation level 1 "DH05" - Hibernation level 0.5 "DH0" - Hibernation level 0			
Sets power save mode for Connected RRC state	"PW_CONN "	"DEFAULT" - SW Default "NONE" - Disable "PHY" - Only PHY "NAP" - Nap "LS" - Light sleep "DS" - Deep sleep "DH2" - Hibernation level 2 "DH1" - Hibernation level 1 "DH05" - Hibernation level 0.5 "DH0" - Hibernation level 0			
Sets power save mode for not in service state	"PW_NOSR VC"	"DEFAULT" - SW Default "NONE" - Disable "PHY" - Only PHY "NAP" - Nap "LS" - Light sleep "DS" - Deep sleep "DH2" - Hibernation level 2 "DH1" - Hibernation level 1 "DH05" - Hibernation level 0.5			

		"DH0" - Hibernation level 0			
Sets power save mode for Power Save Mode	"PW_PSM"	"DEFAULT" - SW Default "NONE" - Disable "PHY" - Only PHY "NAP" - Nap "LS" - Light sleep "DS" - Deep sleep "DH2" - Hibernation level 2 "DH1" - Hibernation level 1 "DH05" - Hibernation level 0.5 "DH0" - Hibernation level 0			
Sets 3GPP release number	"LTE_RELE ASE_NUM"	"default", "release13", "release14"			
Set IMEI to DIP (only if OTP is not locked)	"DEBUG_IM EI"	"IMEI value"			
Sets if device should disable PHY logger mechanism at wakeup	"PHY_LOG_ DISABLE"	"0" (enable), "1" (disable)			
Sets Scan Plan feature enabled flag	"SCAN_PLA N_EN"	"0" (disable), "1" (enable)			
Sets Scan List Row	"SCAN_LIS T"	"1"-"40" (Row index)	"0" (disable), "1" (enable) (Row enable flag)	[band] (band to scan, optional for disable)	[EARFCN step [,EARFCN start, EARFCN end]] (optional for disable. If omitted for enable setting, standard band params are used)

Sets if device should disable IPv4 source filtering	"IPV4_SRC_FILTER_DIS"	"0" - enable "1" - disable			
Sets if device should disable IPv6 source filtering	"IPV6_SRC_FILTER_DIS"	"0" - enable "1" - disable			
Sets device stateless DHCPv6 configuration	"STATELESS_DHCPV6"	"0" - SW default "1" - enable in proxy mode "2" - enable in tunnel mode "3" - disable			
Sets NW Operator Mode flag used to enable operator-specific features	"NW_OPERATOR_MODE"	"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 "13" - CTC 14 - Vodafone 15 - Telstra			
Sets scan plan "Verify BW" feature enable flag	"SP_CELL_BW_EN"	"0" - disable "1" - enable			
Sets 32KHz clock correction mechanism enable flag	"DS_32K_CORR_EN"	"0" - disable "1" - enable			
Sets scan plan mode	"SP_MODE"	"0" - SW Default "1" - Limited "2" - Mixed			
Sets scan plan scheduling scheme	"SP_SCHED_SCHEME"	"0" - Periodic regular "1" - Periodic triggered by max repose			

		timer			
Sets scan plan scheduling counter	"SP_SCHED_COUNTER"	"0" - "255"			
Sets SIM RX-TX delay	"SIM_RX_TX_DELAY"	"0" - SW default, "1" - "254" - delay in msec "255" - no delay			
Sets scan plan PLMN selection method	"SP_PLMN_SEL_MET"	"0" - domestic PLMN only "1" - any PLMN			
Sets MRU table disable flag for table update	"MRU_UPD_DIS"	"0" - enable "1" - disable			
Sets MRU table used entries number	"MRU_ENT_USED"	"0" - SW Default, "1" - "254", "255" - unlimited			
Sets MRU table disable flag for NBS usage	"MRU_NBS_DIS"	"0" - enable "1" - disable			
Sets MRU table disable flag for entry aging	"MRU_AGING_DIS"	"0" - enable "1" - disable			
Sets specific LTE DL Category overridden value -Not valid in NB-	"LTE_DL_CATEGORY"	"101" - CAT-M1			
Sets specific LTE UL Category overridden value -Not valid in NB-	"LTE_UL_CATEGORY"	"101" - CAT-M1			
Sets PPI capability enable flag -Not valid in NB-	"PPI_CAP_ENABLE"	"0" - disable "1" - enable			
Sets autonomous gap capability flag -Not valid in NB-	"AUTO_GAP_CAP"	"0" - SW default "1" - enable "2" - disable			
Sets the device	"IP_VLSM_"	"0" - SW			

VLSM mode	MODE"	default "1" - enable "2" - disable			
Sets ROHC profile status	"ROHC"	"PROF0" "PROF1" "PROF2" "PROF0101" "PROF0102"	"0" - disable, "1" - enable		
Sets max number of ROHC contexts	"ROHC_MAX_CT_NUM"	"0" - SW default "2", "4", "8", "12", "16", "24", "32", "48", "64", "128", "256", "512", "1024"			
Sets MAC severity override value	"MAC_LOG_SEV"	"0" - SW default "1" - Debug "6" - Info "7" - Notice "8" - Warning "9" - Error "12" - Emergency "255" - Disable			
Sets power save debug and field trial parameters	"PS_DBG_PARM"	"0" - SW default Binary value in quotes			
Sets the device SIM pool suspend mode	"SIM_POLL_SUSP_MODE"	"0" - SW default "1" - enable "2" - disable			
Sets FGI bit reporting filter -Not valid in NB-	"FGI_REPORT_FILTER"	["b1"[, "b2"[, ...[, "b16""]...]] bit values: "1" - "(max FGI#)" Empty set erases all values. max FGI# is LTE Release dependent			
Sets CE mode A enable flag -Not valid in NB-	"CE_MODE_A_EN"	"0" - disable "1" - enable			
Sets CE mode B enable flag -Not valid in	"CE_MODE_B_EN"	"0" - disable "1" - enable			

NB-					
Sets scan scheduling schema used for wakeup/reset	"SC_POST_NON_OPER"	"0" - old regular scheme "1" - schema #1 "2" - schema #2 "3" - schema #3			
Sets scan scheduling schema used for exit flight mode	"SC_IN_LIMITED_SERV"	"0" - old regular scheme "1" - schema #1 "2" - schema #2 "3" - schema #3			
Sets scan scheduling schema used for after unrecovered RLF	"SC_POST_RLF"	"0" - old regular scheme "1" - schema #1 "2" - schema #2 "3" - schema #3			
Sets scan scheduling repose scheme#1	"REPOSE_SCHEME1"	[minT1,maxT1,step1,rep1 [,...[,minT8,maxT8,step8,rep8]]			
Sets scan scheduling repose scheme#2	"REPOSE_SCHEME2"	[minT1,maxT1,step1,rep1 [,...[,minT8,maxT8,step8,rep8]]			
Sets scan scheduling repose scheme#3	"REPOSE_SCHEME3"	[minT1,maxT1,step1,rep1 [,...[,minT8,maxT8,step8,rep8]]			
Sets MO TC1M timeout value	"SMS_TC1M_TOUT_MO"	"0", "1"-"45"			
Sets MT TC1M timeout value	"SMS_TC1M_TOUT_MT"	"0", "1"-"45"			
Sets TR1M timeout value	"SMS_TR1M_TOUT"	"0", "35"-"45"			
Sets TRAM timeout value	"SMS_TRAM_TOUT"	"0", "25"-"35"			
Sets TR2M timeout value	"SMS_TR2M_TOUT_MO"	"0", "12"-"20"			

	"				
Reads (AT+CMMS) timeout value	"SMS_CMM S_TOUT"	"0", "1"- "5"			
Sets Maximum number of CPDATA message retransmissions	"SMS_MAX_CPDATA_RET"	"0", "1"- "3"			
Sets dual SIM configuration	"SIM_DUAL_CONFIG"	"0" - SW default "1" - single SIM "2" - dual SIM			
Sets wakeup SIM selection policy	"SIM_INIT_SELECT_POLICY"	"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 normal attach in roaming disabled flag	"NA_ROAM_DIS"	"0" - enable "1" - disable			
Sets capability reporting of Specific Reference Signal flag -Not valid in NB-	"CAP_REF_SIG_SUP_DIS"	"0" - enable "1" - disable			
Sets if capability reporting of RACH Report from SON-Parameters flag -Not valid in NB-	"CAP_SON_RACH_REPORT_DIS"	"0" - enable "1" - disable			
Sets device mobility type flag	"PS_DEV_MOB_TYPE"	"0" - SW default "1" - mobile "2" - static			
Sets rich scan enable flag	"RICH_SCAN_EN"	"0" - disable "1" - enable			
Sets PMP	"PMP_LOG_"	"0" - SW			

severity override value	SEV"	default "1" - Debug "6" - Info "7" - Notice "8" - Warning "9" - Error "12" - Emergency "255" - Disable			
Sets the device eCP mode -Not valid in NB-	"DL_ECP_M ODE"	"0" - SW default "1" - enable "2" - disable			
Sets Connected mode DRX capability setting	"DRX_CAP ABILITY_M ODE"	"0" - SW Default "1" - Disabled "2" - Long DRX "3" - Long and short DRX			
Sets Idle mode DRX special paging cycle negotiated value	"DRX_SPEC _PAG_CYC LE"	"0" - not applied "1" - 320 ms "2" - 640 ms "3" - 1280 ms "4" - 2560 ms			
Sets FGI filter bit/technology reporting list -Not valid in NB-	"FGI_REPO RT_LIST"	["b1","t1"],["b 2","t2"],["...["b 16","t16"...]] bit (b) values: "1"- "(max FGI#)" tech (t) values: "0" - both "1" - FDD "2" - TDD Empty set erases all values. max FGI# is LTE Release dependent			
Sets device LPA presence flag	"DEV_LPA_ MODE"	"0" - SW default "1" - enable "2" - disable			
Sets TE LPA Terminal Capability (TC)	"TE_LPA_T C"	(hex value)			

Sets modem failure fast recovery flag	"MD_FAILU RE_FAST_R ECOVERY"	"0" - SW default "1" - enable "2" - disable			
Sets capability override flag for NW-based power consumption optimizations -Not valid in NB-	"CAP_DEV_ TYPE"	"0" - SW default "1" - no NW-based power consumption optimisation			
Sets PHY TX indication override flag	"PHY_TX_I ND_MODE"	"0" - SW default "1" - enable "2" - disable			
Sets modem CAT operating mode flag	"MT_CAT_ MODE"	"0" - SW default "1" - enable "2" - disable			
Reads power save cell selection optimization flag	"PS_CELL_S EL_OPT"	"0" - SW default "1" - enable "2" - disable			
Sets iUICC startup init mode	"ISIM_STAR T_UP_MOD E"	"0" - SW Default "1" - Standard init flow "2" - Altair APDU init flow			
Sets NB-IOT category	"NB_CATEG ORY"	"0" - SW Default, "1" - NB1			
Sets country scan optimization mode	"COUNTRY_ SCAN_MO DE"	"0" - SW default "1" - enable "2" - disable			
Sets country scan optimization counter	"COUNTRY_ SCAN_CO UNT"	"0" - "255"			
Sets the type of reset on assert and exception failure	"FAIL_RESE T_TYPE"	"0" - SW default "1" - warm reset "2" - cold reset			
Sets RFBP override flag for external VBAT control	"VBAT_FE M_EXT_CT RL"	"0" - SW default "1" - enabled "2" - disabled			
Sets RFBP	"VBAT_FE	"0" - SW			

override flag for external VBAT GPIO pin	M_EXT_GPIO	default "1"-"78"			
Sets data (RLC TX/RX) inactivity timeout value	"DATA_INACTIVITY_TIMEOUT"	"0" - SW default (180 seconds) "1" - "255" - 1-255 sec			
Sets optimization flag to continue PLMN selection, in the case of bad PLMN Attach failure	"OPT_CONTINUE_PLMN_SELECTION"	"0" - SW default "1" - enabled "2" - disabled			
Sets optimization flag to execute new PLMN search when T3402 is running on current PLMN	"OPT_EXECUTE_PLMN_SEARCH"	"0" - SW default "1" - enabled "2" - disabled			
Sets NB-IOT band edge power reduction flag	"NB_BE_ENABLE"	"0" - disable "1" - enable			
Sets NB-IOT band edge reduced max TX power	"NB_BE_TX_PWR"	value in 100*dBm			
Sets band edge EARFCN removal	"NB_BAND_EDGE_CENTRAL"	"0" - Disable "1" - enable			
Sets CE maximum UL TBS Mode -Not valid in NB-	"CE_MAX_UL_TBS_MODE"	"0" - SW default "1" - enable "2" - disable			
Sets CE HARQ-ACK bundling mode -Not valid in NB-	"CE_HARQ_ACK_BUNDLING_MODE"	"0" - SW default "1" - enable "2" - disable			
Sets CE 10 DL HARQ processes -Not valid in NB-	"CE_TEN_DL_HARQ_PROCESSES_MODE"	"0" - SW default "1" - enable "2" - disable			
Sets CE Number retuning symbols	"CE_NUM_RETUN_SYMBOL_OVERRIDE_ENABLE"	"0" - disable "1" - enable			

override enable -Not valid in NB-					
Sets CE Number retuning symbols -Not valid in NB-	"CE_NUM_RETUN_SY M"	"0"-"2"			
Sets CE PDSCH PUSCH Enhacement mode -Not valid in NB-	"CE_PDSCH_PUSCH_EN H_MODE"	"0" - SW default "1" - enable "2" - disable			
Sets CE Scheduling Enhacement mode -Not valid in NB-	"CE_SCHED_ENH_MOD E"	"0" - SW default "1" - enable "2" - disable			
Sets restriction on use of enhanced coverage disable flag	"RESTRICT_EC_DIS"	"0" - enable "1" - disable			
Sets MAC RAI support mode	"MAC_RAI_SUP_MODE "	"0" - SW Default "1" - enable "2" - disable			
Sets CP back-off timer support disable flag	"NB_CP_BA CKOFF_DIS "	"0" - enable "1" - disable			
Sets Data Inactivity disable flag	"DATA_INA CTIVITY_DI S"	"0" - inactivity timer is enabled "1" - disabled			
Sets Customer Product ID	"CUST_PRO DUCT_ID"	"0" - SW default - no product defined "1" - Altair Smart Label			
Sets device's log severity for 2G modules in NV	"GSM_LOG"	<module-name> - one of the following: "FCM", "GRR", "HAC", "HWL", "HWL2", "L1C", "L3CC", "L3GMM",	"DEBUG", "INFO", "ERROR"		

		"L3MM", "L3RR", "L3SM", "L3SMG", "L3SS", "LAPD", "LLC", "MSR", "RLD", "RLU", "SEQ", "SIM", "SNDGP", "SPV", "GSYS"			
Sets device's log severity for all 2G modules in NV	"GSM_LOG"	"GSM_ALL"	"DEBUG", "INFO", "ERROR"		
Sets 2G bands defined in DOP/MDOP file. The new configuration will be applied after modem reset or RAT switch to GSM	"GSM_BAND"	<band-list> "Band1"["Band2"["Band3"["Band4"]]] - among the possible values: "850", "900", "1800", "1900"			
Sets consecutive RRC establishment barring mode	"CONN_EST_BARRING_MODE"	"0" - SW default "1" - enable "2" - disable			

Note: In the "LOG" sub-command, the following module abbreviations: "MAC", "RLC" and "PDCP" work similar to the wildcard and do not have their own severity to report, and will report all logs related to each layer:

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

Note: "GSM_LOG" and "GSM_BAND" sub-commands are available only when 2G is supported and running.

%SETLOG

Description: This command is used to set log severity for run-time (into RAM) per module. This setting will be lost after reboot.

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

Purpose	Param1	Param2	Returns
Sets module log severity in RAM	"SYS", "L1A", "MAC", "MACGN", "MACUL", "MACDL", "RLC", "RLCGN", "RLCUL", "RLCDL", "PDCP", "PDCPGN", "PDCPUL", "PDCPDL", "RRC", "VL1", "NAS", "USIM", "FRM", "ROHC", "PROF0", "PROF1", "PROF2", "PROF4", "PROF6", "PACKET_CLASS", "OSAL", "SERV", "DT", "SIMLOCK", "SMS", "EXCEPTION_MANAGER", "AMA", "AT", "PMP", "PWR", "SMSMNGR", "CAT"	"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
Sets 2G module log severity in RAM (when GSM is supported and running)	"FCM", "GRR", "HAC", "HWL", "HWL2", "L1C", "L3CC", "L3GMM", "L3MM", "L3RR", "L3SM", "L3SMG", "L3SS", "LAPD", "LLC", "MSR", "RLD", "RLU", "SEQ", "SIM", "SNDP", "SPV", "GSYS"	"DEBUG", "INFO", "ERROR"	OK\ ERROR
Sets 2G log severity for all modules in RAM (when GSM is supported and running)	"GSM_ALL"	"DEBUG", "INFO", "ERROR"	OK\ ERROR

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", "PDCPDL"

%SETPCO

Command	Possible response(s)
%SETPCO=<cid>[,<pcoid>[,<payload>]]	OK ERROR
%SETPCO?	ERROR (OPERATION_NOT_SUPPORTED)
%SETPCO=?	OK

Description:

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

Defined values:

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

<pcoid> - hexadecimal type. The PCO container ID as defined in 3GPP 24.008 section 10.5.6.3. Two-bytes value, the leading zero is mandatory, i.e "001A".

<payload> - hexadecimal type. 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).

%SETPROP

Command	Possible response
AT%SETPROP=<fname>[,<param1>...]	OK or ERROR
AT%SETPROP?	ERROR (not supported)
AT%SETPROP=?	%SETPROP: (list of supported <fname>s)

Description:

This command is used to set configuration to the PROP file stored into NV memory.

<fname> - string format; name of parameter in the PROP file. See a list of possible parameter names below.

<param1>-<paramN> - settled values. See <param#> format and range specific for each <fname> in the table below.

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

%SETSYSCFG

Command	Possible response(s)
AT%SETSYSCFG=<obj>[,<value1>[,<value2>...]]	%SETSYSCFG: <range1>[,<range2>...] OK/ERROR
AT%SETSYSCFG?	ERROR (not supported)
AT%SETSYSCFG=?	OK

Description: This command is used to set value(s) to system configuration files HW_CFG and SW_CFG and ANT_CFG.

The <obj> parameter contains file and parameter names. If file is completely missed, AT command returns ERROR. If specified in <obj> parameter is missed in the file, the AT command returns ERROR too. In other words this command does not create new file and new <obj>s.

Before the command sets the value on the configuration file, it validates settled object and its value(s) against the same field in the XX_CAP files, if present. The XX_CAP file contains a real physical capability of the module. For the features, which do not have capability limitations, some internal validity check is applied. If settled value is:

- part of the options described in the XX_CAP file,
- or valid in accordance with the table defined below

The command will set the value on XX_CFG file, otherwise it will return ERROR.

Execution command AT%SETSYSCFG=<obj> with completely omitted <valueX>s parameter(s) may be used to retrieve currently permitted capability value range/list if it is present in capability files. This helper feature is not available for some fields, which does not have limited capability. In such use-cases the command returns ERROR.

All tables in our CFG files (i.e. band table, antenna table, etc.) contain ordered objects within the pre-defined for each table index range (see below). The gaps in the table are not expected and are not accepted. The next rules are applied to the table update:

- If the table entry index is out of defined index range - return an ERROR
- If table present, but empty, command may be used to fill it with data starting from index=1
- If an entry index already exists in the table - override the entry
- If the table entry index is equal to the last entry index+1 - add a new entry into the table
- else - return an ERROR

Existed table entry cannot be deleted, only disabled setting "DISABLE" status. All values provided together with disabled status should be still valid. Use AT%GETSYSCFG to read existed entry values, which are already valid. They can be used together with "DISABLE" settings.

Defined values:

<obj> - string type; path name of parameter in config file, where filename is the part of the path. Path components are separated by '.'.

<value1>-<valueN> - string format; value(s) of <obj>. Any data type including integer values are returned in quotes.

<range1>-<rangeN> - string format; range or list of value(s) of <obj> currently permitted in XX_CAP files.

The table below contains the list of currently supported SW_CFG <obj>s and <value>s.

<obj>	Complete list for possible <value>s
"sw_cfg.cfg_version.version"	"xx.xx"

"sw_cfg.catm_band_table.band#1"- "sw_cfg.catm_band_table.band#40"	"DISABLE"/"ENABLE" "1"/"2"/"3"/"4"/"5"/"8"/"12"/"13"/"14"/"18"/"19"/"20"/"26"/"27"/"28" (band)
"sw_cfg.nb_band_table.band#1"- "sw_cfg.nb_band_table.band#40"	"DISABLE"/"ENABLE" "1"/"2"/"3"/"4"/"5"/"8"/"12"/"13"/"14"/"17"/"18"/"19"/"20"/"25"/"26"/"28"/"66"/"70" (band)
"sw_cfg.catm_vendor_scan_plan.activate"	"DISABLE"/"ENABLE"
"sw_cfg.catm_vendor_scan_plan.verify_bw"	"DISABLE"/"ENABLE"
"sw_cfg.catm_vendor_scan_plan.mode"	"SW_DEFAULT"/"LIMITED"/"MIXED"
"sw_cfg.catm_vendor_scan_plan.sched_scheme"	"0"/"1"
"sw_cfg.catm_vendor_scan_plan.sched_counter"	"0"- "255"
"sw_cfg.catm_vendor_scan_plan.plmn_sel_mode"	"DOMESTIC"/"STANDARD"
"sw_cfg.catm_scan_list.entry#1"- "sw_cfg.catm_scan_list.entry#64"	"DISABLE"/"ENABLE" "1"/"2"/"3"/"4"/"5"/"8"/"12"/"13"/"14"/"18"/"19"/"20"/"26"/"27"/"28" (band) "-1"- "68585" (start EARFCN) "-1"- "68585" (stop EARFCN) "1"- "255" (EARFCN step)
"sw_cfg.nb_vendor_scan_plan.activate"	"DISABLE"/"ENABLE"
"sw_cfg.nb_vendor_scan_plan.verify_bw"	"DISABLE"/"ENABLE"
"sw_cfg.nb_vendor_scan_plan.mode"	"SW_DEFAULT"/"LIMITED"/"MIXED"
"sw_cfg.nb_vendor_scan_plan.sched_scheme"	"0"/"1"
"sw_cfg.nb_vendor_scan_plan.sched_counter"	"0"- "255"
"sw_cfg.nb_vendor_scan_plan.plmn_sel_mode"	"DOMESTIC"/"STANDARD"
"sw_cfg.nb_scan_list.entry#1"- "sw_cfg.nb_scan_list.entry#64"	"DISABLE"/"ENABLE" "1"/"2"/"3"/"4"/"5"/"8"/"12"/"13"/"14"/"17"/"18"/"19"/"20"/"25"/"26"/"28"/"66"/"70" (band) "-1"- "68585" (start EARFCN) "-1"- "68585" (stop EARFCN) "1"- "255" (EARFCN step)
"sw_cfg.scan_time_schedule.rep_min_interval"	"0"- "32767"
"sw_cfg.scan_time_schedule.rep_max_interval"	"0"- "32767"
"sw_cfg.scan_time_schedule.rep_step"	"-1"- "1000"
"sw_cfg.3gpp.plmn_roaming"	"DISABLE"/"ENABLE"
"sw_cfg.sim.rx_tx_delay_ms"	"0"- "255"
"sw_cfg.sim.dual_config"	"SINGLE_SIM"- "DUAL_SIM"
"sw_cfg.sim.dual_init_select"	"NA"/"SIM1_ONLY"/"SIM2_ONLY"/"DUAL_SIM2_FALLBACK"/"DUAL_SIM1_FALLBACK"
"sw_cfg.power_save_flags.ps_device_mobi"	"MOBILE"/"STATIC"

lity_type"	
"sw_cfg.gsm_band_table.band#1"- "sw_cfg.gsm_band_table.band#4"	"DISABLE"/"ENABLE" "850"/"900"/"1800"/"1900" (band)

The table below contains the list of currently supported HW_CFG <obj>s and <value>s.

<obj>	Complete list for possible <value>s
"hw_cfg.cfg_version.version"	"xx.xx"
"hw_cfg.sim1.activate"	"DISABLE"/"ENABLE"
"hw_cfg.sim1.detect_mode"	"DISABLE"/"GPIO"
"hw_cfg.sim1.detect_pin"	"1"- "78"
"hw_cfg.sim1.detect_pull"	"DISABLE"/"PULL_UP"/"PULL_DOWN"
"hw_cfg.sim1.detect_polarity"	"POSITIVE"/"NEGATIVE"
"hw_cfg.sim1.ldo_select"	"SIM_LDO"/"AUX_LDO"
"hw_cfg.sim2.activate"	"DISABLE"/"ENABLE"
"hw_cfg.sim2.detect_mode"	"DISABLE"/"GPIO"
"hw_cfg.sim2.detect_pin"	"1"- "78"
"hw_cfg.sim2.detect_pull"	"DISABLE"/"PULL_UP"/"PULL_DOWN"
"hw_cfg.sim2.detect_polarity"	"POSITIVE"/"NEGATIVE"
"hw_cfg.sim2.ldo_select"	"SIM_LDO"/"AUX_LDO"
"hw_cfg.vbat_fem_ext_ctrl.activate"	"DISABLE"/"ENABLE"
"hw_cfg.vbat_fem_ext_ctrl.gpio"	"1"- "78"
"hw_cfg.tx_indicator.activate"	"DISABLE"/"ENABLE"
"hw_cfg.tx_indicator.gpio"	"1"- "78"
"hw_cfg.tx_indicator.time_on_offset_us"	"(-150)-0"
"hw_cfg.antenna_tunning_ctrl.type"	"DISABLE"/"STATIC"
"hw_cfg.antenna_tunning_ctrl.interface"	"MIPI"/"GPIO"
"hw_cfg.antenna_tunning_ctrl.mipi_ant_switch"	"1"/"10"/"14"
"hw_cfg.antenna_tunning_ctrl.mipi_vio_gpio"	"1"- "78"
"hw_cfg.antenna_tunning_ctrl.gpio_ctrl#0"- "hw_cfg.antenna_tuning_ctrl.gpio_ctrl#3"	"1"- "78"
"hw_cfg.internal_gnss.activate"	"DISABLE"/"ENABLE"
"hw_cfg.internal_gnss.antenna_fem_aux_select"	"NONE"/"AUX1"/"AUX2"
"hw_cfg.internal_gnss.lna_control"	"DISABLE"/"ENABLE"
"hw_cfg.internal_gnss.lna_control_gpio"	"1"- "78"
"hw_cfg.external_gnss.activate"	"DISABLE"/"ENABLE"
"hw_cfg.external_gnss.gnss_reset_ind_gpio"	"1"- "78"
"hw_cfg.external_gnss.gnss_data_ready_gpio"	"1"- "78"
"hw_cfg.system_component_config.anti_tamper"	"DISABLE"/"ENABLE"

The table below contains the list of currently supported ANT_CFG <obj>s and <value>s.

<obj>	Complete list for possible <value>s
"ant_cfg.antenna_tuning.antenna_range_tenth_mhz#1"- "ant_cfg.antenna_tuning.antenna_range_tenth_mhz#56"	"ENABLE"/"DISABLE; 4000-38000; 4000-38000; 0-255"

Example:

```
AT%SETSYSCFG="sw_cfg.sim.dual_config","DUAL_SIM"
```

OK

%SETURLIP

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

Description: This 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.dms.server.operator_name.com", "IPV4", "212.35.345.32"
```

%SIMCMD

Command	Possible response(s)
AT%SIMCMD=<cmd>[,<param1>[,<param2>.. ..]]	OK or ERROR
AT%SIMCMD?	ERROR (not supported)
AT%SIMCMD=?	%SIMCMD: (list of supported <cmd>s)

Description:

This Execution command is used to trigger some run-time SIM manipulation at post-production, integration or field exclusive use-cases.

The command is compound, which means that <paramX> parameters content is <cmd> specific.

Defined values:

<cmd> - string type; operation to be applied:

- "SWITCH" - switch to other SIM. The attempt to move to the SIM already in use will be silently ignored and AT returns OK. The attempt to move to the SIM disabled in GSYSBP will return ERROR.

<param1> - integer type; the SIM selection policy to be applied immediately:

- 1 - SIM1
- 2 - SIM2
- 3 - IUICC

<param2> - integer type; persistence of the setting:

- 0 - not persistent (default if parameter omitted)
- 1 - persistent

%SIMOTA

Command	Possible response(s)
AT%SIMOTA=<cmd>	OK or ERROR
AT%SIMOTA?	ERROR (not supported)
AT%SIMOTA=?	%SIMOTA: (list of supported <mode>s)

Description:

This Execution command is used to trigger some run-time SIM OTA operations, which is NW Operator specific.

Defined values:

<cmd> - string type; operation to be applied:

- "SENDSMS" - compose and send SMS-SUBMIT to trigger SIM OTA session. Command is accepted in registered mode only.

%SIMVAL

Command	Possible response
AT%SIMVAL=<mode>	OK or ERROR
AT%SIMVAL?	ERROR (not supported)
AT%SIMVAL=?	SIMVAL: (list of supported <modes>s)
unsolicited	%SIMVAL: <event>

Description:

This command notifies about SIM validation events, if some validations are required by current NW Operator.

Reporting is disabled by default at wakeup time.

Read command is not supported.

Defined values:

<mode> - integer type; status of unsolicited result response presentation:

- 0 - disabled
- 1 - enabled

<event> - string type; event type:

- "FAIL" - SIM validation failed

%SIPCMD

Command	Possible response(s)
AT%SIPCMD=<cmd>	OK/ERROR
AT%SIPCMD?	%SIPCMD: <status>[,<cause>]
AT%SIPCMD=?	%SIPCMD: (list of supported <cmd>s)

Description:

This command executes SIP layer management for VOIP. The SIP parameters for registration (Domain URL, User name and Password) is taken from configuration file.

Read command returns SIP layer status.

Defined values:

<cmd> - string type; SIP layer command:

- "REGISTER"
- "DEREGISTER"
- "CLOSE" - local deregistration, which closes SIP registration context locally

<status> - integer type; SIP layer status:

- 0 - Not registered
- 1 - Domain resolving
- 2 - Registering
- 3 - Registered
- 4 - Deregistering
- 5 - Registration failed
- 6 - Deregistration failed

<cause> - integer type, optional SIP failure error code defined in RFC3261 section 21.

%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.

%SMSCMD

Command	Possible response
AT%SMSCMD=<cmd>[,<param1>[...]]	OK or ERROR
AT%SMSCMD?	ERROR (not supported)
AT%SMSCMD=?	%SMSCMD: (list of supported <cmd>s)

Description:

AT command is intended to control SMS Manager operations.

This run-time command does not impact persistent config files values for the NV stored "MEMEXREP" and "MEMAVREP" enablers.

Persistent values modification is available via ATSETACFG.

Defined values:

<cmd> - string type; command to execute:

- "MEMEXREP" - controls modem SMS memory exceed response to be sent back to the SMSC in case of memory is full
- "MEMAVREP" - controls modem SMS memory available notification upon memory becoming available to the SMSC
- "MOVE" - Move SMS between different modem SMS storages

For <cmd>="MEMEXREP"/"MEMAVREP":

<param1> - integer type, enable/disable run-time setting:

- 0 - disable
- 1 - enable

For <cmd>="MOVE":

<param1> - string type; source memory type to move SMS from (see detailed description in 3GPP 27.005):

- "ME" - ME message storage
- "SM" - (U)SIM message storage

<param2> - string type; target memory type to move SMS (see detailed description in 3GPP 27.005):

- "ME" - ME message storage
- "SM" - (U)SIM message storage

<param3> - integer type; the SMS storage index in the source memory. The range of indexes (N) depends on NV configuration. Use AT+CPMS to retrieve N value :

- 1-N

%SMSEXEV

Command	Possible response
AT%SMSEXEV=<ev_type>,<mode>	OK or ERROR
AT%SMSEXEV?	ERROR (not supported)
AT%SMSEXEV=?	%SMSEXEV: (list of supported <ev_type>s), (list of supported <mode>s)
(unsolicited report)	%SMSEXEV: <ev_type>[,<res1>[...]]

Description:

AT command is intended to notify Host about SMS events.

Defined values:

<ev_type> - string type:

- "MEMEX" - SMS memory is full
- "MEMAV" - SMS memory is available
- "SMSPP" - SMS-PP data download to UICC, starting LTESYS-32770
- "ALL" - All events, used only in execution command

<mode> - integer type; status of unsolicited result response presentation:

- 0 - disabled (default)
- 1 - enabled

For <ev_type>="MEMEX"/"MEMAV":

<res1> - string type; SMS storage memory type (see detailed description in 3GPP 27.005)

- "ME" - ME message storage
- "SM" - (U)SIM message storage

%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>s)

Description:

This command is used 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.

%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>]] OK</p> <p>For "SSLINFO" command: [%SOCKETCMD:<SSL_mode>,<ClientCerId>] OK</p> <p>For "LASTERROR" command: [%SOCKETCMD:<socket_err>] OK</p> <p>For "ALLOCATE" command %SOCKETCMD:<socket_id> OK</p> <p>For "FASTSEND" and "CONFSEND" command: %SOCKETCMD:<wlength> OK</p> <p>For "SSLKEEP" command: %SOCKETCMD:<ssl_session_id> OK</p> <p>For other commands: OK/ERROR</p>
AT%SOCKETCMD?	<p>Return the list of created sockets and their status: [%SOCKETCMD:<socket_id>,<socket_stat>[<CR><LF>%SOCKETCMD:<socket_id>,<socket_stat> [...]]] OK</p>
AT%SOCKETCMD=?	%SOCKETCMD: (list of supported <cmd>s)

Description:

This command is used to create and maintain socket by the device.

IP address formatting for using in this command:

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

When socket is opened (using "OPEN" or "LISTEN" command) the unsolicited %SOCKETEV is automatically enabled (see AT%SOCKETEV for details).

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

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

Asynchronous listening socket is also called Parent Listening socket below. Parent listening socket and spawned from it connected sockets will have different IDs.

After activating of parent listening socket, %SOCKETEV=4 unsolicited response will be used to notify "accept incoming connection". This URC provides both listening and spawned from it connected sockets IDs.

Parent listening socket cannot be used for fast send operation. The ERROR will be returned on "FASTSEND" call for such socket.

If connected socket has been spawned from parent listening socket, the connected socket deactivation will close this connected socket completely.

Important Notes :

- AT%SOCKETCMD command is blocking. This may cause blocking of the AT channel for long time in case of "OPEN" and "LISTEN" command.
- The "DEACTIVATE"/"DELETE" commands are non-blocking by default. They could be configured to wait for operation completion using additional parameter. If configured, sub-command become to be also blocking and can take time (The socket implementation may take about 30 sec to close the connection due to internal TCP FIN timer)
- The "DEACTIVATE"/"DELETE" commands 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.
- Number of supported sockets is operators/OEM specific configured with AT%SETACFG. It can be ranged from 1 socket to several ones.

Important notes related to SSL :

- The network allocated SSL session ID is kept and maintained internally by the device per connection allocated "socket ID" until socket deletion. The SSL session ID is kept even when the socket connection is closed (by "DEACTIVATE" subcommand) to allow reuse of the SSL session on new opened socket connection.
- Upon "ACTIVATE" command, if SSL session ID is allocated by the network, then device will try first to recover the existing SSL session ID. If failed to recover SSL connection, then will open new one.
- "SSLALLOC" command will delete previously allocated SSL session ID.
- Using "SSLKEEP" subcommand, the SSL session may be kept even when the socket connection is deleted to allow reuse of the SSL session on newly created socket connection. For this purpose the SSL session identifier (<ssl_session_id>) returned by "SSLKEEP" subcommand shall be stored for future use.
- To reuse kept SSL session the "ACTIVATE" sub-command for newly created socket shall use this stored SSL session identifier.

- User shall delete kept SSL session by "SSLDEL" subcommand when it is not needed any more to prevent limited resource leakage.
- Number of supported SSL sessions is the same as a number of configured sockets (see above).

Defined values:

<cmd> - string type:

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

<param1> - integer type:

- The "Session ID" - a numerical numeric value defined in NP configuration file which point to the PDN on which the socket should be opened. "Session ID" is defined in AT%CGINFO

<param2> - string type:

- "TCP" - for creation of TCP socket (TLS mode when security is enabled)
- "UDP" - for creation of UDP socket (DTLS mode when security is enabled)

<param3> - string type:

- "OPEN" - The socket open TCP/UDP connection with the peer
- "LISTEN" -The socket create TCP/UDP listener
- "LISTENP" -The socket create TCP/UDP parent listener socket. Once activated, multiple connected sockets could be spawned from it.

<param4> - string type:

- Destination IPv4 or IPv6 address for all chipsets
- Or URL - Note that for TLS client socket, use URL instead of IP address if the server requires SNI

<param5> - integer type:

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

<param6> - string type:

- Optional source (local) UDP/TCP port number in the range 0-65535 (0 - means auto port selection by the socket and it is also used as the default value)

<param7> - integer type:

- Option 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. Inapplicable to ALT1250.

<param8> - integer type:

- TCP Connection setup timeout. If timer expires, then command return ERROR. Parameter range is 30-360sec (Default is 60 sec). Parameter is irrelevant for parent listening socket; it will be ignored if present.
- In case that connection type is "OPEN" the timeout event is: No SYN-ACK reply from the peer. Inapplicable to ALT1250.
- In case that connection type is "LISTEN" the timeout event is: No SYN request from the peer.

<param9> - integer type:

- Optional IP type used to configure preferred IP type for connection. The IPv4v6 type is default for zero Session ID. Otherwise IP type of selected Session ID is used as default:
- 0 - IPv4v6
- 1 - IPv4

- 2 - IPv6

<cmd> - string type:

- "SSLALLOC" - Add SSL for specific socket session id with the following SSL parameters.

<param1> - integer type:

- The previously allocated socket id

<param2> - integer type:

- SSL mode. See definition in <SSL_mode>

<param3> - integer type:

- Client certificate ID. See definition in <ClientCerId>

<param4> - integer type:

- Optional cipher suite filtering option to be applied to the default list of supported ciphers for negotiation with server.
- 0 - white list, to leave only selected cipher suites
- 1 - black list, to remove mentioned cipher suites

<param5> - string type:

- Optional cipher suite list (white or black). See definition in <cipher_suite_list>.

<cmd> - string type:

- "ACTIVATE" - Activate the predefined socket

<param1> - integer type:

- The socket ID (identifier) of the specified socket

<param2> - integer type:

- The optional SSL session ID, if it was kept by "SSLKEEP" beforehand

<param3> - integer type; optional parameter. Synchronous or asynchronous sub-command processing method:

- 0 - sync, command blocked up to complete sub-command execution (Default)
- 1 - async, command returns OK/ERROR immediately. For OK the %SOCKETEV URC with final operation result is expected. Any new sub-command for the same socket before URC will be rejected.

<cmd> - string type:

- "INFO" - return the details of specific socket ID

<param1> - integer type:

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

<cmd> - string type:

- "SSLINFO" - return the SSL details of specific socket ID

<param1> - integer type:

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

<cmd> - string type:

- "DEACTIVATE" - Request to deactivate specific socket ID and release its resources

<param1> - integer type:

- The socket ID (identifier) to be closed

<param2> - integer type; optional parameter:

- Optional flag to indicate wait or not for socket deactivation completion:
- 0 - no need to wait (default)
- 1 - wait

<cmd> - string type:

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

<param1> - integer type:

- The socket ID (identifier) of the socket

<param2> - integer type:

- The length in Bytes of the data which need to be written; range is:
- 1 to 1500

<param3> - hexadecimal type:

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

<cmd> - string type:

- "DELETE" - Request to delete specific socket ID allocation (including SSL session context if exist)

<param1> - integer type:

- The socket ID (identifier) to be closed

<param2> - integer type; optional parameter:

- Optional flag to indicate wait or not for socket deletion completion:
- 0 - no need to wait (default)
- 1 - wait

<cmd> - string type:

- "LASTERROR" - Request to get the last Socket error code

<param1> - integer type:

- The socket ID (identifier)

<cmd> - string type:

- "SETOPT" - Set Socket options for specific socket ID

<param1> - integer type:

- The socket ID (identifier) for which the option is set

<param2> - integer type:

- TCP/UDP aggregation timer in msec (1-36000, default: 5000). This timer allows improved data transmission efficiency by aggregating several transmissions to single packet.

<param3> - integer type:

- TCP/UDP TX buffer aggregation size in Bytes (1-2048, default: 1500). This aggregation allows improved data transmission efficiency by aggregating several transmissions to single packet.

<param4> - integer type:

- TCP idle timer in seconds (0-300, default: 60). When there is no client/server activity over the predefined time, the socket is deactivated (Socket option TCP_KEEPINTVL). Inapplicable to ALT1250.

<cmd> - string type:

- "CONFSEND" - Similar to "FASTSEND" this command activates the predefined socket, writes to the socket and then deactivates it. In addition, this command guarantees that data has been transmitted within pre-defined timeout (command is blocking). If not, command returns ERROR.

<param1> - integer type:

- The socket ID (identifier) of the socket

<param2> - integer type; timeout in sec:

- 10-360 sec

<param3> - integer type:

- The length in Bytes of the data which need to be written; range is:
- 1 to 1500

<param4> - hexadecimal type:

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

<cmd> - string type:

- "SSLKEEP" - Keep SSL session of specific socket ID

<param1> - integer type:

- The socket ID (identifier) for which SSL session will be kept over socket deletion.

<cmd> - string type:

- "SSLDEL" - Delete kept SSL session

<param1> - integer type:

- The SSL session ID (identifier) which SSL session was kept over socket deletion.

<socket_id> - integer type:

- The socket ID (identifier) of the specified socket

<socket_stat> - string type:

- "DEACTIVATED" - The socket is not active
- "ACTIVATING" - The socket is activating in async mode, if enabled in "ACTIVATE" command
- "ACTIVATED" - The socket is active
- "LISTENING" - The socket is listening

<socket_type> - string type:

- "TCP" - for creation of TCP socket (TLS mode when security is enabled)
- "UDP" - for creation of UDP socket (DTLS mode when security is enabled)

<src_ip> - string type:

- Source IPv4 or IPv6 address

<dst_ip> - string type:

- Destination IPv4 or IPv6 address

<src_port> - string type:

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

<dst_port> - string type:

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

<socket_dir> - integer type; the direction of the TCP socket

- 0 - no set
- 1 - dialer
- 2 - listener

<socket_to> - integer type:

- TCP connection setup timeout as specified in "OPEN" command

<socket_err> - integer type:

- Error values as defined by 3GPP TS 27.007 subclause 9.2 for <err> values with extension.

<SSL_mode> - integer type:

- 0 - mutual authentication (default)
- 1 - authenticate client side only
- 2 - authenticate server side only
- 3 - no authentication

<ClientCerId> - integer type:

- Certificate profile ID pre-settled by AT%CERTCFG. Default zero profile ID may be used for server authentication only and will apply root CAs stored into Root Trusted folder for authentication.

<ssl_session_id> - integer type:

- The SSL session ID

<cipher_suite_list> - string type:

- List of cipher suites as per <https://www.iana.org/assignments/tls-parameters/tls-parameters.xhtml> definition. All cipher suites in the list are encoded into single string using hexadecimal cipher suite ID separated by ";", i.e. "C02C;C0AD...C003". List of permitted values to be inserted into string (refer to IANA site for exact definition):
 - C02C
 - C030
 - 009F
 - C0AD
 - C09F
 - C024
 - C028
 - 006B
 - C00A

- C014
- 0039
- C0AF
- C0A3
- C02B
- C02F
- 009E
- C0AC
- C09E
- C023
- C027
- 0067
- C009
- C013
- 0033
- C0AE
- C0A2
- C008
- C012
- 0016
- 00AB
- C0A7
- C038
- 00B3
- C036
- 0091
- C0AB
- 00AA
- C0A6
- C037
- 00B2
- C035
- 0090
- C0AA
- C034
- 008F
- 009D
- C09D
- 003D
- 0035
- C032
- C02A
- C00F
- C02E
- C026
- C005
- C0A1
- 009C
- C09C
- 003C
- 002F
- C031

- C029
- C00E
- C02D
- C025
- C004
- C0A0
- 000A
- C00D
- C003
- 00AD
- 00B7
- 0095
- 00AC
- 00B6
- 0094
- 0093
- 00A9
- C0A5
- 00AF
- 008D
- C0A9
- 00A8
- C0A4
- 00AE
- 008C
- C0A8
- 008B

<wlength> - integer type:

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

%SOCKETDATA

Command	Possible response(s)
AT%SOCKETDATA=<cmd>[,<param1>[,<param2>[,<param3>...]]]	For "RECEIVE" command: %SOCKETDATA:<socket_id>[,<rlength>,<moreData>[,<rdata>[,<src_ip>,<src_port>]]] 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: This command is used 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> - string type:

- "SEND" - Write to the socket

<param1> - integer type:

- The socket ID (identifier) of the socket

<param2> - integer type:

- The length in Bytes of the data which need to be written; range is:
- 1 to 1500

<param3> - hexadecimal type:

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

<param4> - string type; optional parameter. Applied for UDP datagrams only.

- Destination IPv4 or IPv6 address

<param5> - integer type; optional parameter. Applied for UDP datagrams only.

- Destination port number in the range 1-65535

<cmd> - string type:

- "RECEIVE" - Read from the socket

<param1> - integer type:

- The socket ID (identifier) of the socket

<param2> - integer type:

- The maximal length of data buffer in Bytes to be read from the socket; the range is:
- 1 to 1500

<socket_id> - integer type:

- The socket ID (identifier) of the specified socket

<rlength> - integer type:

- The actual length in Bytes of the data which was actually read.

<moreData> - integer type:

- The length on bytes of the data left in the RX buffer

<rdata> - hexadecimal type:

- The read data, in HEX format (in quotes).

<wlength> - integer type:

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

<src_ip> - string type; optional parameter, returned for UDP datagrams only:

- Source IPv4 or IPv6 address

<src_port> - integer type; optional parameter, returned for UDP datagrams only:

- Source UDP port number in the range 1-65535

%SOCKETEV

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

Description: This 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:

1. Rx buffer has more Bytes to read.
2. Socket termination due to Idle timer expiration.
3. Socket terminated by peer.
4. 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
- 6 - Socket activation finished in asynchronous mode, if configured in AT%SOCKETCMD="ACTIVATE".

<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

%SRVCHANGE

Command	Possible response(s)
AT%SRVCHANGE=<mode>	%SRVCHANGE: <code> OK
AT%SRVCHANGE?	<mode> OK
AT%SRVCHANGE=?	%SRVCHANGE: (list of supported <mode>s),(list of supported <code>s)

Description: The access to the device can be obtained using different services, such as, Telnet, FTP, HTTP, AT%EXE, etc. Accessing the device is essential in developing/debugging sessions, but oppose a serious security breach in a commercial mode where these services must be closed. The AT%SRVCHANGE command is used to toggle between 2 modes:

- Commercial mode in which these services are closed
- Debug mode in which these services are open.

The vendor configures the list of enabled services in both modes according to its needs. Each mode has a configurable list of enabled services:

- c:/cfg_defaults/config/admin_commercial
- c:/cfg_defaults/config/admin_debug

The default mode is set by the vendor. Mode changing is protected by <code>.

Defined values:

<mode> : string

- DEBUG
- COMM

<code>: string of 9-10 digits

- Using fullSDK: The admin password is created under the build/service_code file during compilation
- Using miniSDK: The admin password is created under the images/service_code file during recreate file system process.

%STATCM

Command	Possible response
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 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.

%STATEV

Command	Possible response
AT%STATEV=<mode>	OK or ERROR
AT% STATEV?	ERROR (not supported)
AT% STATEV=?	%STATEV: (list of supported < mode>s)
(unsolicited report)	%STATEV:<event>,<rat>[,<scan_type>,<scan_reason>]

Description:

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

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, Suitable or Acceptable
- 3 - Connection Establishment
- 4 - Start Rescan
- 5 - RRC Connected
- 6 - No Suitable Cells Found
- 7 - All Registration Attempts Failed
- 8-99 - Reserved

<rat>:

- 0 - CAT-M
- 1 - NB-IOT
- 2 - GSM

<scan_type>:

- 0 MRU only
- 1 MRU+FS
- 2 MRU+CS
- 3 MRU+LS

<scan_reason>:

- 0 SWITCH ON
- 1 NORMAL SEARCH
- 2 RE SELECTION
- 3 OUT OF COVERAGE
- 4 HIGH PRIORITY
- 5 LIMITED SERVICE
- 6 QUERY (COPS)
- 7 - OTHER

%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:

This Execution command retrieves the current status of the specified UE subsystem.
Read command is not supported.

Defined values:

<subsystem>:

- "INIT"
- "AMBR" - Not applicable for NB-IoT
- "USIM"
- "RRC"
- "SEC"
- "ROAM"
- "IPS"
- "CSPS"
- "UICC"
- "TEMPM" - temperature monitor, not applicable for NB-IoT
- "DSIMA"
- "PSM"
- "EMM"
- "ATT"
- "BOOT"
- "REGCMD"

<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 "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"
- "USIM: PERMANENT LOCK ERROR"

For "IPS":

- "IPS: 0" - UE IP stack works correctly.
- "IPS: 1" - UE IP stack failure

For "AMBR":

For each bearer with APN AMBR, it retrieves:

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

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

For "RRC":

- "RRC: IDLE"
- "RRC: CONNECTED"
- "RRC: UNKNOWN" - Used for all other states (init, standby, flight mode, etc.)

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: <0-7>

- 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 "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 "TEMPM":

- "TEMPM: 0" - normal UE operation
- "TEMPM: 1" - heating protection applied

For "DSIMA" - dual SIM status: SIM ID in use

- "DSIMA: 0" - SIM not selected
- "DSIMA: 1" - SIM1 selected
- "DSIMA: 2" - SIM2 selected
- "DSIMA: 3" - IUICC selected

For "PSM":

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

For "EMM":

- "EMM: 1" - EMM_NULL
- "EMM: 2" - EMM_DEREGISTERED_NORMAL_SERVICE
- "EMM: 3" - EMM_DEREGISTERED_ATTEMPTING_TO_ATTACH
- "EMM: 4" - EMM_DEREGISTERED_PLMN_SEARCH
- "EMM: 5" - EMM_DEREGISTERED_NO_IMSI
- "EMM: 6" - EMM_DEREGISTERED_ATTACH_NEEDED
- "EMM: 7" - EMM_DEREGISTERED_NO_CELL_AVAILABLE
- "EMM: 8" - EMM_DEREGISTERED_ATTACH_ACCEPT_RECEIVED
- "EMM: 9" - EMM_DEREGISTERED_REGISTRATION_INITIATED
- "EMM: 10" - EMM_DEREGISTERED_LIMITED_SERVICE
- "EMM: 11" - EMM_REGISTERED_LIMITED_SERVICE
- "EMM: 12" - EMM_REGISTERED_NORMAL_SERVICE
- "EMM: 13" - EMM_REGISTERED_ATTEMPTING_TO_UPDATE
- "EMM: 14" - EMM_REGISTERED_PLMN_SEARCH
- "EMM: 15" - EMM_REGISTERED_UPDATE_NEEDED
- "EMM: 16" - EMM_REGISTERED_NO_CELL_AVAILABLE
- "EMM: 17" - EMM_REGISTERED_ATTEMPTING_TO_UPDATE_MM
- "EMM: 18" - EMM_REGISTERED_IMSI_DETACH_INITIATED
- "EMM: 19" - EMM_REGISTERED_NO_CELL_AVAILABLE_PSM_ACTIVE
- "EMM: 20" - EMM_REGISTERED_DEREGISTRATION_INITIATED
- "EMM: 21" - EMM_REGISTERED_TRACKING_AREA_UPDATING_INITIATED
- "EMM: 22" - EMM_REGISTERED_SERVICE_REQUEST_INITIATED

<status_info>:

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

For "ATT":

- "ATT: 0" - detached
- "ATT: 1" - normal attach
- "ATT: 2" - attach without PDN
- "ATT: 3" - emergency attach

For "BOOT" - boot type

- "BOOT: 0" - full power on wakeup
- "BOOT: 1" - sleep mode wakeup

For "REGCMD":

- "REGCMD: 0" - no registration commanded
- "REGCMD: 1" - registration commanded

For "CDRX":

- "CDRX: 0" - disabled by UE or disabled by NW or NA (not in connected mode)
- "CDRX: 1" - enabled by NW

For "EDRX":

- "EDRX: 0" - disabled by UE or disabled by NW or not supported by cell or NA (in other than Idle mode)
- "EDRX: 1" - eDRX activated in Idle mode

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
```

%TESTCFG

Command	Possible response(s)
AT%TESTCFG=<test_mode>[,<param1>[,<param2>...]]	OK or ERROR
AT%TESTCFG?	%TESTCFG: <test_mode>
AT%TESTCFG=?	%TESTCFG: (list of supported <test_mode>s)

Description: This execution command is used to configure parameters for modem system tests.

Defined values:

<test_mode> - string type:

- "DEFAULT" - the default setting is different per operator
- "DEFAULT_PDN"
- "LWM2M_TEST"
- "LWM2M_SERVER"
- "GCF_RF"
- "GCF_BB"
- "GCF_RRM"
- "GCF_SUP_RF"
- "GCF_PROT"
- "GCF_USIM"
- "GCF_UICC"
- "USAT"
- "BLOCK_DATA"
- "ATCMD"

For VZW NW Operator only:

- "VZW_IOT"
- "VZW_DTHPUT"
- "VZW_FT"
- "VZW_SUP_SIG"
- "VZW_DRETRY"
- "VZW_IMS"
- "VZW_SMS"
- "VZW_IBAND"
- "VZW_USAT"

<param1> - string type;

For "LWM2M_SERVER":

- LWM2M server URL

<param2> - string type;

For "LWM2M_SERVER":

- "BS_NOSEC" - bootstrap server non-secure connection
- "BS_SEC" - bootstrap server secure connection
- "DM_NOSEC" - device management server non-secure connection
- "DM_SEC" - device management server secure connection

<param3> - string type;

For "LWM2M_SERVER" & ("BS_SEC" or "DM_SEC"):

- PSK Identity; size up to 32 chars

<param4> - string type;

For "LWM2M_SERVER" & ("BS_SEC" or "DM_SEC"):

- Secret Key; size up to 32 chars

%TRSHCMD

Command	Possible response(s)
%TRSHCMD=<module>,<cmd>[,<param1>]	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.

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

Read command is not supported.

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).

<param1>:

- "0" - disable
- "1" - enable

<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) should be commanded.

<param1>:

- Timer value in sec

<cmd>:

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

<param1>:

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

<module>:

- "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
- "NBBE" - 'NB band edge'. Apply reduced max power on band's low/high edges for special NB-IoT bands

For "USRMAX":

<param1> - string type; floating value in quotes:

- max TX power for all TX channels

For "USRMAXD":

<param1> - integer type:

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

For "NBBE":

<param1> - integer type:

- reduced max TX power in 100*dBm for low/high edges for special NB-IoT bands

<module>:

- "UE_CAPABILITIES" - UE Capabilities

<cmd>:

- "Category" - Setting the UE Category

<param1>:

- Cat-M: "1", "2", "3", "4", "5".
- NB-IoT: "NB1", "NB2".

<cmd>:

- "ASReleaseNum" - Setting the Access Stratum Release Number

<param1>:

- "release8" - Not applicable for NB-IoT
- "release9" - Not applicable for NB-IoT
- "release10" - Not applicable for NB-IoT
- "release11" - Not applicable for NB-IoT
- "release12" - Not applicable for NB-IoT
- "release13"
- "release14"

<module>:

- "RSIM" - Remote USIM module

<cmd>:

- "TIMEOUT" - Time out value for the commands sent from our UE to the remote USIM until response is expectedUnits are in msec

Value of 0 will leave the timeout to be the SW default - 5000m

<param1>:

- Timeout value

<module>:

- "NETWORK" - Network provider features management

<cmd>:

- "ARCH" - network provider architecture

<param1>:

For "ARCH":

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

<module>:

- "USIM"

<cmd>:

- "ERASE_EF" - Erase file regardless of location on SIM or BSP

<param1> string type:

- "0" - erase EMM information (EPSLOCI and EPSNSC)
- <cmd>:
- "WARMRST" - Apply warm reset to UICC

<module>:

- "BSPFILE"

<cmd>:

- "ERASE_LTEPP" - Erase some specific entity of LTEPP file (in NV and in RAM mirror of LTEPP)

<param1>: string

- "0" - erase MRU table (all LTE legacy categories including CAT-M)
- "1" - erase ERPLMN List
- "2" - erase NB-IOT MRU table
- "3" - erase Flight Mode
- "4" - erase PLMN Selection Mode

<cmd>:

- "TECHSEL" - Selects the technology for duplicated objects in MDOP, which will be accessed by ATSETCFG/GETCFG.

<param1>: string

- "0" - currently running technology
- "1" - CAT-M
- "2" - NB-IOT
- "3" - GSM (if GSM is supported)

<module> :

- "CELLSEL" - cell selection RRC module

<cmd>:

- "BANDPR" - modify the cell sorting criteria in cell selection LTE procedure

<param1>: string

- "0" - disable band priority cell selection
- "1" - enable band priority cell selection

<param2>-<param1 1> - integer; list of bands in priority order.

<module>:

- "SIMDET"

<cmd>:

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

<param1>: string type:

- "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 GSYBP 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 GSYBP 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>:

- "BSR" - BSR index calculation

<cmd>:

- "EXPER" - experimental BSR calculation improved for packets still pending process in higher layers

<param1>: string type:

- "0" - disable
- "1" - enable

<module>

- "ATTACH"

<cmd>:

- "REGEXP" - inform MAC FW that post-scanning registration is expected due to auto-connect mode.

<param1>: string type:

- "0" - disable
- "1" - enable

<module>

- "RRC" - RRC module

<cmd>:

- "CAMPEC" - if configured, then UE is not allowed to camp on a cell on configured enhanced coverage level(s). Applicable for NB-IoT only.

<param1>: string type:

- "0" - Disabled (default)
- "1" - Camping is not allowed on a cell for an UE on enhanced coverage level 1 and 2
- "2" - Camping is not allowed on a cell for an UE on enhanced coverage level 2

<param2> - integer type: optional

- 0 - Disabled (default)
- 1,2,4,...,2048 - Number of NPDCCH repetitions, prevent camping on a cell where the number is equal or above of the value on current enhanced coverage level based on SIB2-NB parameter (npdcch_NumRepetitions_RA)

<cmd>:

- "CELLSEARCHLEVEL" - Limit cell search level on PHY layer. Applicable for NB-IoT only.

<param1>: string type:

- "0" - Disable limitations (default)
- "1" - Restrict using higher than level 1 cell search on PHY layer
- "2" - Restrict using higher than level 2 cell search on PHY layer
- "3" - Restrict using higher than level 3 cell search on PHY layer

<module>

- "RRC" - RRC module

<cmd>: "ECCAMP" - enable or disable UE camping on enhanced coverage cell. Applicable for CAT-M only

<param1>: string type:

- "0" - disable
- "1" - enable (default)

<module>

- "MAC" - MAC module

<cmd>:

- "CONNEC" - Restrict UE to move higher enhanced coverage level in RRC_CONNECTED-state

<param1>: string type:

- "0" - Disable (default)
- "1" - Restrict selecting higher enhanced coverage level 1 and 2 on MAC layer
- "2" - Restrict selecting higher enhanced coverage level 2 on MAC layer

<param2>: integer; optional parameter

- 0 - Continues using current enhanced coverage level (default)
- 1 - Report restriction immediately to RRC using radio link failure and set cell barred

<module>: following feature is supported for ALT125x starting LTESYS-31173:

- "PSM"

<cmd>:

- "FORCE" force PSM mode enable regardless of negotiated with Network PSM. Note that additional "T3324" setting is mandatory if PSM is enabled by this sub-command, but PSM was previously disabled (by NV configuration or by AT+CPSMS command call).

<param1>: string type:

- "0" disable override, use default setting
- "1" enable PSM

<cmd>:

- "T3324" - Define PSM T3324 timer value, which locally overrides default or NW negotiated configuration

<param1>: integer type:

- -1 - disable override, use default setting
- 0-11160 override value in sec

%TSTCAT

Command	Possible response
AT%TSTCAT=<cmd>,<length>,<command>	OK
AT%TSTCAT?	ERROR (not supported)
AT%TSTCAT=?	OK

Description:

This command is used to move NP CAT application to Test mode and provide some SIM simulations and additional test services for CAT L3 (CAT UI) Application.

The real SIM may be involved or not in these simulation flows.

Defined values:

<cmd>:

- "SIMPROACT" - simulate SIM proactive command.

<length> - integer type; similar to AT+CSIM <length> parameter: length of the characters that is going to be sent in <command> (two times the actual length of the real hex command)

<command> - hexadecimal character format, similar to AT+CSIM <command> parameter in the format as described in 3GPP TS 51.011

%TSTEXT

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

Description:

This Test 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 should 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

%TSTRF

Command	Possible response(s)
AT%TSTRF=<cmd>[,<earfcn>,<time>[,<param1>[,<param2>,<param3>[,<param4>,<param5>,<param6>[,<param7>]]]]]	For <cmd>=4 (RX read)only: %TSTRF: min=<min>, avg=<avg>, max=<max> OK For other <cmd> values: %TSTRF: OK or +CME ERROR: <error>
AT%TSTRF?	%TSTRF:<status>
AT%TSTRF=?	OK

Description:

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

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

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 reboot is required.

The SC-FDMA (Single Carrier FDMA) ul transmission will not be on the full system BW but over BW=1.4MHz (CATM)/180Khz (NB-IOT).

The maximum Frequency/EARFCN available for testing will be according to the RFBP file of the device.

Defined values:

<cmd> - integer type:

- 1 - Abort RX/TX test
- 2 - Start RX test mode
- 3 - Start TX test
- 4 - RX test results read (after cmd=2 was used)

<earfcn> - integer type; EARFCN decimal value as per LTE spec.

<time> - integer type; 0-600000; test execution time in ms:

- For [cmd=RX=2] time=0 means one-shot measurement
- For [cmd=TX=3] time=0 means continuous TX forever

For <cmd>=2 (RX):

<param1> integer type; Antenna index, for ALT125X, 0 must be applied!

- 0 (Single antenna)

For <cmd>=3 (TX):

<param1> integer type; type of transmitted signal:

- 0 - SC-FDMA, RAT=CATM
- 1 - CW (continuous waveform)

- 2 - SC-FDMA, RAT=NB-IoT

For <param1>=0 (RAT=CATM):

<param2> - integer type; TX power:

- Absolute output power [dBm*100]

<param3> - integer type; BW (not applicable for 2G RAT):

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

<param4> - integer type; MCS

- 0-15

<param5> - integer type; number of RB allocation. Not applicable for NB-IoT.

- 1-6

<param6> - integer type; position of RB allocation. Where: <rb_num>+<rb_pos> <= 6 (maximum 6 RB's slots). Not applicable for NB-IoT.

- 0-5

<param7> - integer type; NB index as defined in TS36.211, sec. 5.2.4. Not applicable for NB-IoT.

- 0 - max available per BW (for example, in 20M there will be 14 options)

Example (TX @ CATM) AT%TSTRF=3,20175,0,0,2300,0,5,6,0,0

AT command parameter description:

3- Tx test

20175- Earfcn

0- Continuous

0- SC-FDMA

2300- TX power (23dBm)

0 1.4M

5 MCS (Modulation)

6- number of allocated Resource Blocks

0- RB's position offset to start transmission

0 Index number for transmission in system BW

For <param1>=1 (CW):

<param2> - integer type; TX power:

- Absolute output power [dBm*100]

<param3> - integer type; offset to central frequency in Hz

Example (TX @ CW) at at%tstrf=3,20175,0,1,2300,1000000

For <param1>=2 (RAT=NB-IoT):

<param2> - integer type; TX power:

- Absolute output power [dBm*100]

<param3> - integer type; MCS:

- 0-12

<param4> - integer type; subcarrier spacing:

- 0 15KHz
- 1 3.75KHz

<param5> - integer type; subcarrier index, as defined in TS36.211, table 16.5.1.1-1:

- For <param4>=0 (15KHz): 0-18
- For <param4>=1 (3.75KHz): 0-47

For <cmd>=4 (RX test results read)

AT%TSTRF=2,8865,20,0 // Band 26 - 876.5

AT%TSTRF=2,1575,1000,0 // Band 3 - 1842.5

AT%TSTRF=2,2175,100,0 // Band 4 - 2132.5

AT%TSTRF=4

<min>, <avg>, <max> - <min> & <max> are not applicable:

- Measured energy value in dBm.

<status> - integer type; status of test:

- 0 - busy (during RX test)
- 1 - ready (RX test ended)

<error> - integer type:

- As per 3GPP 27.007
- 516 - Invalid EARFCN (see Annex A)

%TSTSIM

Command	Possible response
AT%TSTSIM=<cmd> [,<voltage>[,<sim_id>]]	OK
AT%TSTSIM?	ERROR (not supported)
AT%TSTSIM=?	% TSTSIM: (list of supported <cmd>s)[,(list of supported <voltage>s)[,(list of supported <sim_id>s)]

Description:

This command is used to move SIM to Test mode and manipulate with SIM.

Command is not accepted in Operational mode (AT+CFUN=1) and Flight mode (CFUN=4), it returns ERROR. The modem should be previously switched in non-operational mode by CFUN=0. The switch back from SIM test mode to Operational/Flight mode is not supported, device reboot is expected.

The "SW2TESTER" is blocking command and will return AT response only after whole switch procedure will be finished.

Defined values:

<cmd>:

"SW2TESTER" - switch to external on-Host Tester/Programmer.

<voltage>:

- 1 - 1.8v
- 2 - 3v

<sim_id>:

- 1 - SIM1
- 2 - SIM2

%UPGCMD

Command	Possible response(s)
AT%UPGCMD=<cmd>[,<param>]	For "UPGVLM" on ALT1250: UPGCMD: <diu_result> For other commands: OK or ERROR
AT%UPGCMD?	%UPGCMD: <diu_result>[,<cause>]
AT%UPGCMD=?	%UPGCMD: (list of supported <cmd>s)

Description: This command is used to manages firmware upgrade (loading and/or update) over LAN. This command is used by Upgrade Manager on external Host only. If <param> is omitted in the "START" upgrade command, the default static IP mechanism is used by both uBoot and Upgrade Agent. The value returned in <status> parameter reflects the status of running or last finished upgrade attempt.

Defined values:

<cmd>:

- "UPGVLM" - A command to initiate delta image upgrade procedure.
- "CFGPART" - A command to configure interim partitioning map and re-generate tempFS before storing delta image.

<param>:

For <cmd>="START" - string; IP address assignment mechanism:

- "static"
- "dhcpc"

For <cmd>="UPGVLM" - string type; the name (with full path) of the vRM image will be used for firmware upgrade.

For <cmd>="CFGPART" - hexadecimal type; interim partition map.

<diu_result>:

- 0 - successfully finished software upgrade step (image pre-check, update, etc.)
- 1 - general upgrade errors
- 2 - failed to the pre-checking of delta image
- 3 - image validation failure
- 4 - failed to update
- 5 - delta update Agent was not found
- 6 - no upgrade result is found

<cause>:

- Optional cause of delta image update failure used normally for debug purposes. Relevant only for <diu_result>=4.

%USMSF

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

Description:

This 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 should 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 should return an error when trying to configure SMS format to 3GPP2 in SMS over SGs mode.

Defined values:

<smsformat>:

- "3GPP"
- "3GPP2"

%VECEER

Command	Possible response(s)
%VECEER[=<mode>]	[%VECEER: <subsystem>,<error>[,<reason>]] OK or ERROR
%VECEER?	ERROR (not supported)
%VECEER=?	OK
(unsolicited report)	%VECEERU: <subsystem>,<error>[,<reason>]

Description

The command is used to query the reason of the last call failure/disconnection based on indication from VoLTE framework.

If command is called with <mode> parameter it will also enable/disable VoLTE framework error notification. URC mode of this AT is used on ALT125x only.

Missed command response body indicates that there is no any last error saved in the VoLTE framework.

Defined values:

<mode> - integer type. Optional parameter, which sets the status of unsolicited result response presentation. Applicable to ALT125x only starting PRODUCTS-24205:

- 0 - disabled (default)
- 1 - enabled

<subsystem> - string type; name of subsystem the last failure observed:

- "SIP"
- "SOCKET" - applicable for ALT125x only
- "INTERNAL" - applicable for ALT125x only

<error> - integer type; error reported by VoLTE framework. Error enumeration is subsystem dependent:

For "SIP" see detailed codes description in [HYPERLINK](#)

"<https://tools.ietf.org/html/rfc3261>" RFC 3261:

- 3xx-Redirection Responses.
- 4xx-Client Failure Responses.
- 5xx-Server Failure Responses.
- 6xx-Global Failure Responses.

For "SOCKET":

- 0 - unknown error

For "INTERNAL":

- 0 - Unknown Error
- 1 - Missing Parameters
- 2 - Active Call
- 3 - Set Route Failed
- 4 - PDNRDP Failed
- 5 - NO PCSCF Error
- 6 - IMSSTACK Error

- 7 - Invalid State
- 8 - CHLD Failed
- 9 - Invalid Action
- 0 - ATA Failed
- 11 - ATH Failed
- 12 - Memory Error

<reason>: string type; textual reason of failure or any other additional error info.

For "SIP:

- SIP method for ALT125x

The text field in the reason header of the SIP message for other chipsets

- Examples:

1. Get SIP errors

AT%VECEER

%VECEER: "SIP",501,"Invite"

OK

2.Enable SIP errors URC

AT%VECEER=1

OK

%VECEER: "SIP",501,"Invite"

3. Disable SIP errors URC

AT%VECEER=0

%VECEER: "SIP",501,"Invite"

OK

%VER

Command	Possible response(s)
%VER	<ver_info>
%VER?	ERROR (OPRATION_NOT_ALLOWED)
%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:

<ver_info> - version information

Examples:

AT%VER

NP Package: RK_03_00_00_00_32

Apps: RKAPP_03_00_00_00_32_f719e1efa50b6c3a1091fb448534210e31546a42

Using APP processor - no SB or 3B versions

MAC Revision: REL_1250_03_00_00_REV_220389

MAC Package Version: ALT1250_03_00_00_00_32_FW

MAC Build Time: Dec_04_2019_17_34_09

PHY Revision: 12.50.220357

PHY Build Time: Dec_04_2019_15_17_29

PHY Build Info: releas_0

PMP Revision: 220389

PMP Version: 32_FW

PMP build time: Dec_04_2019_17_34_09

DSP Revision: 57939

BB Product: 1250

BB HW Revision: 20

RFIC_6200 Revision: 00

NP Build Time: Dec 4 2019 18:57:16

C&V Ver: 9.27

Calibration date: 30.12.18

Calibrated NP package: RK_02_01_00_00_68

OK

%VLTEV

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

Description:

This command is used for enabling/disabling VoLTE notifications from NP to host.
The notifications indicate on state changes happened in the IMS module .

Defined values:

<ev_type>:

- "SESSPROG" - Enable Session Progress indication (SIP 183)
- "RINGPEER" - Enable notification on Alert indication received by peer (SIP 180 ringing)
- "ALL" - enables/disables all event types. This event type cannot be sent in unsolicited reporting.
- "\SIPHDR\" - Enable notification on SIP message header event. Starting PRODUCTS-24588

For "SESSPROG" and "RINGPEER":

- The call id <ccidx> as defined in AT+CDU per 27.007

Param1:

For "SIPHDR": integer type

- SIP header type, optional parameter. If omitted, the presence in SIP message any header defined below headers will trigger URC:
- 1 - "X-Twilio-CallSID"
- 2 - "Call-ID"
- 3 - "CSeq:Method"

Example:

- Enable "SIPHDR" multiple events:
- AT%VLTEV="SIPHDR",1,1,2
- OK
- VLTEV: "SIPHDR",1,"CA86a3b26004fe564ecefda2e4fddffc6d", 2,"1633371772-user-id"
- Enable "SIPHDR" all events:
- AT%VLTEV="SIPHDR",1
- OK
- VLTEV: "SIPHDR",1,"CA86a3b26004fe564ecefda2e4fddffc6d", 2,"1633371772-user-id",3,"2 INVITE"

VZMTCRAT

Command	Possible response(s)
AT+VZMTCRAT	+VZMTCRAT: <currentRAT>,<roamingstate>, <scanningRAT> +CME ERROR: <err>
AT+VZMTCRAT?	ERROR (not supported)
AT+VZMTCRAT=?	+VZMTCRAT: (list of supported <currentRAT>s), (list of supported <roamingstate>s), (list of supported <scanningRAT>s)+CME ERROR: <err>

Description:

The execution command returns the selected RAT by UE, Roaming status and current scanning RAT.

The test command returns a list of supported parameters.

Defined values:

<currentRAT> - a numeric parameter which indicates the current Radio access technology selected by UE:

- 0 - None No RAT attached (selected)
- 1 - NB-IoT
- 2 - CAT-M
- 4 - GSM

<roamingstate> - a numeric parameter which indicates current roaming state of UE:

- 0 - No PLMN selected
- 1 - Home PLMN
- 2 - Roaming PLMN (VPLMN)

<scanningRAT> - a numeric parameter which indicates the current scanning (searching) RAT type:

- 0 - MT is not currently searching (scanning) a new RAT
- 1 - MT is currently searching (scanning) NB-IoT RAT
- 2 - MT is currently searching (scanning) Cat-M RAT
- 4 - MT is currently searching (scanning) GSM RAT

<err> - refer to section 9.2 of 3GPP TS 27.007 document for possible <err> values.

VZWAPNE

Command	Possible response(s)
+VZWAPNE=<wapn>,<apncl>,<apnni>,<apntype>,<apnb>,<apned>	+CME ERROR: <err>
+VZWAPNE?	+VZWAPNE: <apncl>1,<apnni>1,<apntype>1,<apnb>1,<apned>1, <apncl>2,<apnni>2,<apntype>2,<apnb>2,<apned>2,..., <apncl>n,<apnni>n,<apntype>n,<apnb>n,<apned>n +CME ERROR: <err>
+VZWAPNE=?	+VZWAPNE: (list of supported <wapn>s), (list of supported <apncl>s), (list of supported <apnni>s), (list of supported <apntype>s), (list of supported <apnb>s), (list of supported <apned>s), (list of supported <apntime>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 in "Lab mode".

Use: 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

VZWRSRP

Command	Possible response(s)
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)

VZWRSRQ

Command	Possible response(s)
AT+VZWRSRQ=	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/15kHz

SONY