Cinterion® PLAS9-W

AT Command Set

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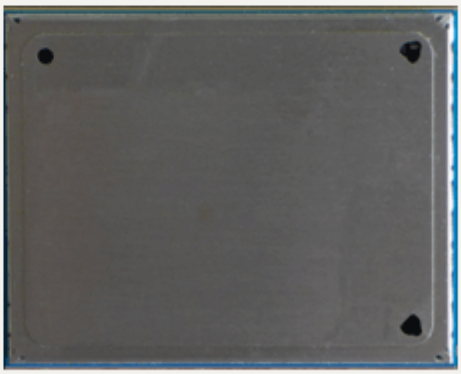

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1. Introduction

1.1 Scope of the document

This document presents the AT Command Set for
PLAS9-W GSM/UMTS/LTE Mobile Engine, Release 01.005.

Before using the PLAS9-W or upgrading to a new firmware version please read the latest product information provided in "PLAS9-W Release Notes, Version 01.005".

DISCLAIMER:
AT commands or parameters not documented in this document are subject to change and reserved for future use. THALES DIS AIS Deutschland GmbH reserves the right to modify or even eliminate these options in later releases.

PLAS9-W features packet switched (PS) data capability, but does not support circuit switched (CS) data transmission. Hoewever, for reasons of compatibility with other products, and for compliance with 3GPP TS specificatiions, some AT commands imply parameters or values related to CS data capability.

1.2 Related documents

[1] PLAS9-W Release Notes, Version 01.005

[2] PLAS9-W Hardware Interface Description, Version 01.005

[3] User's Guide: Getting Started with PLAS9-W

[4] Application Note 16: Updating PLAS9-W Firmware

[5] Application Note 39: USB Interface Description for PLAS9-W

[6] Application Note 90: Controlling Functionality Levels of Cinterion® Modules

[7] MPSS.AT LTE RF Software Overview

[8] Controlling Rx Chains on LTE

[9] 3GPP TR 21.905 (descendant of 3GPP TR 01.04): Vocabulary for 3GPP Specifications

[10] International Organization for Standardization (ISO): ISO/IEC10646: Universal Multiple-Octet Coded Character Set (UCS) - Part 1: Architecture and Basic Multilingual Plane.
This international standard is closely related to the Unicode Standard published by the Unicode Consortium

[11] The Unicode Consortium: Mapping of ETSI GSM 03.38 7-bit default alphabet characters into Unicode [.TXT!]

[12] ITU-T V.24 List of definitions for interchange circuits between data terminal equipment (DTE) and data circuit-terminating equipment (DCE)

[13] ITU-T V.250 Serial asynchronous automatic dialling and control

[14] 3GPP TS 11.11: Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface

[15] 3GPP TS 31.101: UICC-terminal interface; Physical and logical characteristics

[16] 3GPP TS 31.102: Characteristics of the Universal Subscriber Identity Module (USIM) application

[17] ETSI TS 102 221: Smart Cards; UICC-Terminal interface; Physical and logical characteristics

[18] 3GPP TS 11.14: Specification of the SIM Application Toolkit for the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface

[19] 3GPP TS 31.111: Universal Subscriber Identity Module (USIM) Application Toolkit (USAT)

[20] ETSI TS 102 223: Smart Cards; Card Application Toolkit (CAT)

[21] 3GPP TS 31.124: Mobile Equipment (ME) conformance test specification - Universal Subscriber Identity Module Application Toolkit (USAT) conformance test specification

[22] 3GPP TS 22.002 (descendant of 3GPP TS 22.02): Circuit Bearer Services (BS) supported by a Public Land Mobile Network (PLMN)

[23] 3GPP TS 22.004 (descendant of 3GPP TS 02.04): General on supplementary services

[24] 3GPP TS 22.030 (descendant of 3GPP TS 02.30): Man-Machine Interface (MMI) of the Mobile Station (MS)

[25] 3GPP TS 22.060 (descendant of 3GPP TS 02.60): General Packet Radio Service (GPRS); Service description; Stage 1

[26] 3GPP TS 23.060 (descendant of 3GPP TS 03.60): General Packet Radio Service (GPRS); Service description; Stage 2

[27] 3GPP TS 22.081 (descendant of 3GPP TS 02.81): Line Identification Supplementary Services; Stage 1

[28] 3GPP TS 22.082 (descendant of 3GPP TS 02.82): Call Forwarding (CF) Supplementary Services; Stage 1

[29] 3GPP TS 22.083 (descendant of 3GPP TS 02.83): Call Waiting (CW) and Call Holding (HOLD); Supplementary Services; Stage 1

[30] 3GPP TS 22.085 (descendant of 3GPP TS 02.85): Closed User Group (CUG) supplementary services; Stage 1

[31] 3GPP TS 22.088 (descendant of 3GPP TS 02.88): Call Barring (CB) supplementary services; Stage 1

[32] 3GPP TS 22.090 (descendant of 3GPP TS 02.90): Unstructured Supplementary Service Data (USSD); Stage 1

[33] 3GPP TS 23.038 (descendant of 3GPP TS 03.38): Alphabets and language specific information

[34] 3GPP TS 23.040 (descendant of 3GPP TS 03.40): Technical realization of the Short Message Service (SMS)

[35] 3GPP TS 23.041 (descendant of 3GPP TS 03.41): Technical realization of Cell Broadcast Service (CBS)

[36] 3GPP TS 23.107: Quality of Service (QoS) concept and architecture

[37] 3GPP TS 24.011 (descendant of 3GPP TS 04.11): Point-to-Point (PP) Short Message Service (SMS) support on mobile radio interface

[38] 3GPP TS 24.008 (descendant of 3GPP TS 04.08): Mobile radio interface Layer 3 specification; Core network protocols; Stage 3

[39] 3GPP TS 24.080 (descendant of 3GPP TS 04.80): Mobile radio interface layer 3 supplementary services specification; Formats and coding

[40] 3GPP TS 24.301 Non-Access-Stratum (NAS) protocol for Evolved Packet System (EPS)

[41] 3GPP TS 25.133 Requirements for support of radio resource management

[42] 3GPP TS 25.304 User Equipment (UE) procedures in idle mode and procedures for cell reselection in connected mode

[43] 3GPP TS 25.331 Radio Resource Control (RRC)

[44] 3GPP TS 27.005 (descendant of 3GPP TS 07.05): Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)

[45] 3GPP TS 27.007 (descendant of 3GPP TS 07.07): AT command set for User Equipment (UE)

[46] 3GPP TS 27.060 (descendant of 3GPP TS 07.60): Mobile Station (MS) supporting Packet Switched Services

[47] 3GPP TS 22.101 (descendant of 3GPP TS 02.07 and 3GPP TS 02.40): Service principles

[48] Common PCN Handset Specification (CPHS) v4.2 [.ZIP!]

[49] 3GPP TS 45.008 (descendant of GSM 05.08): Radio subsystem link control

[50] 3GPP TS 36.133 Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management

[51] Documents posted on website of USB Implementers Forum

[52] USB Language Identifiers (LANGIDs) [.PDF!].

[53] USB Class Definitions for Communication Devices, Version 1.1 January 19, 1999

1.3 Document Conventions

Throughout this document PLAS9-W is also referred to as GSM/UMTS/LTE Mobile Engine or short UE, ME (Mobile Engine), MS (Mobile Station) or Mobile Terminal (MT). In related documents the equivalent term DCE (Data Communication Equipment) may be found.
AT Commands are used to control the PLAS9-W. The controlling device is referred to as Customer Application or short TE. Related documents may use the equivalent term DTE (Data Terminal Equipment).
All abbreviations and acronyms used throughout this document are based on GSM or 3GPP specifications. For additional definitions please refer to 3GPP TR 21.905 [9].

1.3.1 Quick Reference Table

Each AT command description includes a table similar to the example shown below. The table is intended as a quick reference to indicate the following functions:

PIN: Is the AT command PIN protected?
- **+** Yes
- **-** No
- **±** Usage is dependent on conditions specified for the command, or not all command types are PIN protected (for example write command PIN protected, read command not).

Note: The table provided in Section 16.1, `Available AT Commands and Dependency on SIM PIN` uses the same symbols.

MDM: Is the AT command supported on the Modem instance?
- **+** Yes
- **-** No

APP: Is the AT command supported on the Application instance?
- **+** Yes
- **-** No

✈ Is the AT command supported in AIRPLANE mode?
- **+** Yes
- **-** No
- **±** In AIRPLANE mode, not all described functions are available. For example, the test or read command is usable, the write or execute command is not. Furthermore, only some of the listed parameters can be changed in AIRPLANE mode. A typical example is `AT^SCFG` that controls different features.

Last: If commands are concatenated, this AT command must be the last one.
- **+** Yes
- **-** No

Note: See also Section 1.5, AT Command Syntax for details on concatenated AT commands.

Example:

PIN	MDM	APP	✈	Last
-	+	+	-	-

1.3.2 Superscript Notation for Parameters And Values

Table 1.1: Symbols used to mark the type of parameters

Parameter type	Meaning
<param>(num)	Parameter value must be numeric type
<param>(str)	Parameter value must be string type enclosed in quotation marks.
<param>(text)	Parameter value is a string according to selected character set. Not enclosed in double quotes.
<param>(u)	Unspecified, i.e. parameter value may be numeric or string type.

Table 1.2: Symbols used to indicate storage options or correlations with other commands

Parameter option	Meaning
<param>(+CSCS)	Parameter value has to be (is) coded according to current setting of <charSet> (see AT+CSCS for details)
<param>(&W)	Parameter value is stored to user profile in non-volatile memory after executing AT&W
<param>(&V)	Parameter value is displayed by AT&V
<param>(NV)	Parameter is stored in non-volatile memory.

Table 1.3: Symbols used to mark different types of default values of parameters

Value option	Meaning
[x]	Default value set if parameter is omitted.
x(&F)	Factory value restored by AT&F
x(P)	Powerup value of a parameter not stored in non-volatile memory.
x(D)	Delivery value of a parameter which may be overridden from non-volatile setting (refer to symbol (NV) and symbol (&W) above).

1.4 AT Command Interpreter

PLAS9-W features two instances for processing AT commands: Application and Modem instances. Their assignment to the PLAS9-W's devices is dependent on the setting of AT^SSRVSET. See in particular Table 2.6, Validated and released Service/Device Mappings.

Application instance:
Auxiliary AT command instance designed especially for controlling the PLAS9-W, i.e. for entering AT commands, receiving URCs, or sending and receiving short messages. It is not recommended for data transmission.
This instance is referred to as "Application" if queried with AT^SQPORT. In the quick reference tables it is named APP.

Modem instance:
Main AT command instance intended for data transmission.
This instance is referred to as "Modem" if queried with AT^SQPORT. In the quick reference tables it is named MDM.

Bear in mind that Application and Modem instances are handled by the same AT command interpreter. As a result, AT commands entered on both instances are not executed in parallel but sequentially, one after the other. So, an AT command issued on one instance will be buffered on this instance to be executed after the other instance has completed processing earlier AT command(s).

When a data connection is established over the Modem instance, the Application instance can still be used for any control functions.

1.5 AT Command Syntax

The "AT" or "at" prefix must be set at the beginning of each command line. To terminate a command line enter <CR>. Commands are usually followed by a response that includes "<CR><LF><response><CR><LF>". Throughout this document, only the responses are presented, <CR><LF> are omitted intentionally.

Table 1.4: Types of AT commands and responses

AT command type	Syntax	Function
Test command	AT+CXXX=?	The test response returns supported parameters and supported values. Values can be shown as a list of single values or a range, for example, (1,2,3) or (1-3).
Read command	AT+CXXX?	This command returns the currently set value of the parameter or parameters.
Write command	AT+CXXX=<...>	This command sets user-definable parameter values.
Exec(ution) command	AT+CXXX	The execution command reads non-variable parameters determined by internal processes in the UE.

1.5.1 Using Parameters

- Parameters are separated by commas.
  Please note that throughout this document spaces behind commas may be added for better readability.
- Optional parameters are enclosed in square brackets. If optional parameters are omitted and no default value is explicitly specified, the current settings are used until you change them.
- Optional parameters or subparameters can be omitted unless they are followed by other parameters. If you want to omit a parameter in the middle of a command string it must be replaced by a comma.
- A parameter value enclosed in square brackets represents the value that will be used if an optional parameter is omitted.
- When the parameter is a character string, e.g. `<text>` or `<number>`, the string must be enclosed in quotation marks, e.g. "Charlie Brown" or "+49030xxxx". Symbols in quotation marks will be recognized as strings.
- All spaces will be ignored when using strings without quotation marks.
- It is possible to omit the leading zeros of strings which represent numbers.
- If an optional parameter of a ITU-T V.250 command is omitted, its value is assumed to be 0.

1.5.2 Concatenating AT Commands

Concatenating AT commands on the same line is possible, though not recommended because of restrictions listed below (for more details see ITU-T V.250 [13]).
When concatenating AT commands you need to enter the "AT" or "at" prefix only once at the beginning of a command line. Basic commands (i.e., ITU-T V.250 commands) are concatenated without delimiter. Extended commands (i.e., commands starting with AT+ or AT^) use a semicolon as delimiter.

Disadvantages and restrictions:

- There is no way to control the minimum time to wait between finishing an AT command and sending the next one. Please refer to Section 1.6, Communication between Customer Application and PLAS9-W for details about timing.
- The sequence of processing the AT commands may be different from the sequential order of command input.
- Many AT commands cannot be concatenated (see list below). Concatenating these commands might end up with an error result code, or leads to an unexpected order of responses.

AT command type	Comment
3GPP TS 27.007 commands	Cannot be concatenated with extended commands (prefix AT^S)
3GPP TS 27.005 commands (SMS)	To be used standalone
Commands starting with AT&	To be used standalone
AT+IPR	To be used standalone

1.6 Communication between Customer Application and PLAS9-W

After power-up or restart ensure that the UE is in ready state before trying to send any AT command or data. For detailed information on timing conditions, signal states and particularly the startup behavior of the PLAS9-W's signal lines refer to the Hardware Interface Description [2].

Leaving hardware flow control unconsidered the Customer Application (TE) is coupled with the PLAS9-W (UE) via a receive and a transmit line.
Since both lines are driven by independent devices collisions may (and will) happen. For example, if the TE issues an AT command and the PLAS9-W starts sending a URC. This will probably cause the TE to misinterpret the URC being part of the AT command's response. To avoid this conflict the following measures must be taken:

- If an AT command is finished (with "OK" or "ERROR") the TE shall always wait at least 100 ms before sending the next one.
  The pause between two AT commands gives the PLAS9-W the opportunity to the transmission of pending URCs and get necessary service.
- The TE shall communicate with the PLAS9-W using activated echo (ATE1), i.e. the PLAS9-W echoes characters received from the TE.
  Hence, when the TE receives the echo of the first character "A" of the AT command just sent by itself it has control both over the receive and the transmit paths.

Using Backspace at command line:

- As the standard GSM alphabet does not provide a backspace functionality the PLAS9-W is designed to use the character "08" (hex 0x08) as backspace for command line input. This allows the user to easily erase the last character when writing an AT command. On the other hand, this solution requires entering the escape sequence \08 for writing the "ò" character in GSM character string parameters.
- If command echo is enabled (ATE1) Backspace may cause 08 - 32 - 08 (decimal) character sequence or no echo, depending on serial interface and speed of character input.

1.7 Supported character sets

PLAS9-W supports three character sets: *GSM 7 bit*, also referred to as GSM alphabet or SMS alphabet (3GPP TS 23.038 [33]) *UCS2 16 bit* (ISO-10646 [10]), and *IRA* (International Reference Alphabet, ITU T T.50). See AT+CSCS for information about selecting the character set. Character tables can be found below.

Explanation of terms

- Escape Character
  There are two types of escape sequences which lead to an alternative interpretation on subsequent characters by the UE:
  - AT command interface
    Escape sequences starting with character value 0x5C are used for the UE's non-UCS2 input and output.
  - GSM 7 bit default alphabet
    The escape sequence used within a text coded in the GSM 7 bit default alphabet is starting with character value 0x1B and needs to be correctly interpreted by the TE, both for character input and output. To the PLAS9-W, an escape sequence appears like any other byte received or sent.

  For SMS user data input after the prompt '>' in text mode (AT+CMGF)=1 and AT+CSCS="GSM" the character 0x1A is interpreted as 'CTRL-Z'. The character 0x1B (interpreted as 'ESC') as well as the escape character 0x5C (is interpreted as 'Ö'), therefore both escape mechanisms are not supported in this case.
- TE Character Set
  The character set currently used by the Customer Application is selected with AT+CSCS. It is recommended to select UCS2 setting.
- Data Coding Scheme (DCS)
  DCS is part of a short message and is saved on the SIM. When writing a short message to the SIM in text mode, the DCS stored with AT+CSMP is used and determines the coded character set.
- International Reference Alphabet (IRA)
  The International Reference Alphabet is equivalent to ASCII (American Standard Code for Information Interchange) and ISO 646, i.e. it defines a 7-bit coded character set. The mapping can be obtained from the character set tables below (UCS2 values 0x0000 to 0x007F).

When you enter characters that are not valid characters of the supported alphabets the behavior is undefined.
If GSM alphabet is selected, all characters sent over the serial line (between TE and UE) must be in the range from 0 to 127 (7 bit range).
Note: If the UE is configured for GSM alphabet, but the Customer Application (TE) uses ASCII, bear in mind that some characters have different code values, such as the following:

- "@" character with GSM alphabet value 0 is not displayable by an ASCII terminal program, e.g. Microsoft© Hyperterminal®.
- "@" character with GSM alphabet value 0 will terminate any C string! This is because value 0 is defined as C string end tag. Therefore, the GSM Null character will cause problems on application level when using 'C'-functions, e.g. "strlen()". Using an escape sequence as shown in the table below solves the problem. By the way, this may be the reason why even network providers sometimes replace '@' with "@=*" in their SIM application.
- Some other characters of the GSM alphabet may be misinterpreted by an ASCII terminal program. For example, GSM "ö" (as in "Börse") is assumed to be "|" in ASCII, thus resulting in "B|rse". This is because in both alphabets there are different characters assigned to value 7C (hexadecimal).

If the TE sends characters differently coded or undefined in ASCII or GSM (e.g. Ä, Ö, Ü) it is possible to use escape sequences. The UE's input parser translates the escape sequence to the corresponding GSM character value.

Note:
The UE also uses escape sequences for its non-UCS2 output: Quotation mark (") and the escape character itself (\, respectively Ö in GSM alphabet) are converted, as well as all characters with a value below 32 (hexadecimal 0x20).
Hence, the input parser of the Customer Application needs to be able to translate escape sequences back to the corresponding character of the currently used alphabet.
Unsupported characters are shown as a space (hexadecimal 0x20).

Table 1.5: Exemplary escape sequences generated by PLAS9-W for its non-UCS2 output

Character Value	ASCII Character	GSM Character	UCS2 Character	Escape Sequence	Numeric Escape Sequence
0x5C	\	Ö	00D6	\5C	0x5C 0x35 0x43
0x22	"	"	0022	\22	0x5C 0x32 0x32
0x00	NULL	@	n/a	\00	0x5C 0x30 0x30

Usually terminal programs are not able to recognize escape sequences, and thus, handle them as normal characters.
To prevent misinterpretation of control characters or special characters it is recommended to always use UCS2 alphabet and PDU mode.

1.7.1 GSM alphabet tables and UCS2 character values

This section provides tables for the GSM default alphabet (3GPP TS 23.038 [33]) supported by the PLAS9-W. Below any GSM character find the corresponding two byte character value of the UCS2 alphabet. For details refer to "ETSI GSM 03.38 mapping into Unicode" [11].

Main character table of GSM 7 bit default alphabet				b7	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7
0	0	0	0	0	@ 0040	Δ 0394	SP 0020	0 0030	¡ 00A1	P 0050	¿ 00BF	p 0070
0	0	0	1	1	£ 00A3	_ 005F	! 0021	1 0031	A 0041	Q 0051	a 0061	q 0071
0	0	1	0	2	$ 0024	Φ 03A6	" 0022	2 0032	B 0042	R 0052	b 0062	r 0072
0	0	1	1	3	¥ 00A5	Γ 0393	# 0023	3 0033	C 0043	S 0053	c 0063	s 0073
0	1	0	0	4	è 00E8	Λ 039B	¤ 00A4	4 0034	D 0044	T 0054	d 0064	t 0074
0	1	0	1	5	é 00E9	Ω 03A9	% 0025	5 0035	E 0045	U 0055	e 0065	u 0075
0	1	1	0	6	ù 00F9	Π 03A0	& 0026	6 0036	F 0046	V 0056	f 0066	v 0076
0	1	1	1	7	ì 00EC	Ψ 03A8	' 0027	7 0037	G 0047	W 0057	g 0067	w 0077
1	0	0	0	8	ò 00F2 [3]	Σ 03A3	(0028	8 0038	H 0048	X 0058	h 0068	x 0078
1	0	0	1	9	ç 00E7	Θ 0398	) 0029	9 0039	I 0049	Y 0059	i 0069	y 0079
1	0	1	0	10/A	LF [LF] [2]	Ξ 039E	* 002A	: 003A	J 004A	Z 005A	j 006A	z 007A
1	0	1	1	11/B	Ø 00D8	[1]	+ 002B	; 003B	K 004B	Ä 00C4	k 006B	ä 00E4
1	1	0	0	12/C	ø 00F8	Æ 00C6	, 002C	< 003C	L 004C	Ö 00D6	l 006C	ö 00F6
1	1	0	1	13/D	CR [CR] [2]	æ 00E6	- 002D	= 003D	M 004D	Ñ 00D1	m 006D	ñ 00F1
1	1	1	0	14/E	Å 00C5	ß 00DF	. 002E	> 003E	N 004E	Ü 00DC	n 006E	ü 00FC
1	1	1	1	15/F	å 00E5	É 00C9	/ 002F	? 003F	O 004F	§ 00A7	o 006F	à 00E0

Figure 1.1: Main character table of GSM 7 bit default alphabet

1) This code is an escape to the following extension of the 7 bit default alphabet table.
2) This code is not a printable character and therefore not defined for the UCS2 alphabet. It shall be treated as the accompanying control character.
3) See Section 1.6 for further details on using backspace and "ò" character.

Extension character table of GSM 7 bit default alphabet				b7	0	0	0	0	1	1	1	1
				b6	0	0	1	1	0	0	1	1
				b5	0	1	0	1	0	1	0	1
b4	b3	b2	b1		0	1	2	3	4	5	6	7
0	0	0	0	0					| 007C			
0	0	0	1	1								
0	0	1	0	2								
0	0	1	1	3								
0	1	0	0	4		^ 005E						
0	1	0	1	5							€ [2] 20AC	
0	1	1	0	6								
0	1	1	1	7								
1	0	0	0	8			{ 007B					
1	0	0	1	9			} 007D					
1	0	1	0	10 /A	[3] [LF]							
1	0	1	1	11 /B		[1]						
1	1	0	0	12 /C				[005B				
1	1	0	1	13 /D				~ 007E				
1	1	1	0	14 /E				] 005D				
1	1	1	1	15 /F			\ 005C					

Figure 1.2: Extension character table of GSM 7 bit default alphabet

1) This code value is reserved for the extension to another extension table. On receipt of this code, a receiving entity shall display a space until another extension table is defined.
2) This code represents the EURO currency symbol. The code value is the one used for the character 'e'. Therefore a receiving entity which is incapable of displaying the EURO currency symbol will display the character 'e' instead.
3) This code is defined as a Page Break character and may be used for example in compressed CBS messages. Any mobile which does not understand the 7 bit default alphabet table extension mechanism will treat this character as Line Feed.

If the Customer Application receives a code where a symbol is not represented in Figure 1.2, Extension character table of GSM 7 bit default alphabet it shall display the character shown in the main GSM 7 bit default alphabet table (see Figure 1.1, Main character table of GSM 7 bit default alphabet).

1.7.2 UCS2 and GSM character coding and conversion

This section provides basic information on how to handle input and output character conversion, e.g. for SMS text mode and Remote SAT, if the character representation of UE and Customer Application differ, i.e. if the Data Coding Scheme and the TE character set use different mappings.

1.7.2.1 Output of SIM data (UE to TE)

Used character set	DCS = 7 bit GSM	DCS = 8 bit Data	DCS = 16 bit UCS2
GSM	Case 1 GSM (1:1)	Case 2 8 bit to IRA (1:2)	Case 3 UCS2 to IRA (2:4)
UCS2	Case 4 GSM to IRA (1:4)	Case 5 8 bit to IRA (1:4)	Case 6 UCS2 to IRA (2:4)

Note: The ratio of SIM bytes to output bytes is given in parentheses.

Case 1
Every GSM character is sent to the TE as it is (8-bit value with highest bit set to zero).
Example: 47'H, 53'H, 4D'H → 47'H, 53'H, 4D'H, displayed as "GSM"

Case 2
Every data byte is sent to the TE as 2 IRA characters each representing a halfbyte.
Example: B8'H (184 decimal) → 42'H, 38'H, displayed as "B8"

Case 3
Every 16-bit UCS2 value is sent to the TE as 4 IRA characters.
Example: C4xA7'H (50343 decimal) → 43'H, 34'H, 41'H, 37'H, displayed as "C4A7"
Problem: An odd number of bytes leads to an error because there are always two bytes needed for each UCS2 character

Case 4
Every GSM character is sent to the TE as 4 IRA characters to show UCS2 in text mode.
Example: 41'H ("A") → 30'H, 30'H, 34'H, 31'H, displayed as "0041"

Case 5
Every data byte is sent to the TE as IRA representation of UCS2 (similar to case 4).
Example: B2'H → 30'H, 30'H, 42'H, 32'H, displayed as "00B2"

Case 6
Every 16-bit value is sent to the TE as IRA representation of it. It is assumed that number of bytes is even.
Example: C3x46'H → 43'H, 33'H, 34'H, 36'H, displayed as "C346"

1.7.2.2 Input of SIM data (TE to UE)

Used character set	DCS = 7 bit GSM	DCS = 8 bit Data	DCS = 16 bit UCS2
GSM	Case 1 GSM (1:1)	Case 2 IRA to 8 bit (2:1)	Case 3 IRA to 16 bit (4:2)
UCS2	Case 4 UCS2 to GSM (4:1)	Case 5 UCS2 to 8 bit (4:1)	Case 6 UCS2 to 16 bit (4:2)

Note: The ratio between the number of input characters and bytes stored on the SIM is given in parentheses.

Case 1
Every character is sent from TE to UE as GSM character (or ASCII with standard terminal emulation, e.g. Hyperterminal®).
Character value must be in range from 0 to 127 because of 7-bit GSM alphabet.
To reach maximum SMS text length of 160 characters in 140 bytes space characters will be compressed on SIM. This must be set using the parameter <dcs> of AT+CSMP (add 64).
Example: "ABCDEFGH" typed is sent and stored uncompressed as → 4142434445464748'H (stored compressed as 41E19058341E91'H)

Case 2
Every data byte is sent as 2 IRA characters.
Maximum text length is 280 IRA characters which will be converted into 140 bytes SMS binary user data
Example: "C8" typed is sent as 43'H, 38'H → stored as C8'H

Case 3
Every 16-bit value is sent as 4 IRA characters.
Maximum text length is 280 IRA characters which will be converted into 70 UCS2 characters (16-bit each)
Number of IRA characters must be a multiple of four because always 4 half bytes are needed for a 16-bit value
Example: "D2C8" typed is sent as 44'H, 32'H, 43'H, 38'H → stored as D2C8'H

Case 4
Every GSM character is sent as 4 IRA characters representing one UCS2 character.
Example: To store text "ABC" using UCS2 character set you have to type "004100420043".
This is sent as 30'H,30'H,34'H,31'H, 30'H,30'H,34'H,32'H, 30'H,30'H,34'H,33'H → detected as IRA representation of 3 UCS2 characters, converted to GSM character set and stored as 41'H, 42'H, 43'H.
Maximum input is 640 IRA characters representing 160 UCS2 characters when compression is active. These are converted to 160 GSM 7-bit characters.
Without compression only 140 GSM characters can be stored which are put in as 560 IRA characters.
Values of UCS2 characters must be smaller than 80'H (128 decimal) to be valid GSM characters.
Number of IRA characters must be a multiple of four. Problems:
- "41" → Error, there are four IRA characters (two bytes) needed
- "0000" → Error, not an UCS2 character
- "4142" → Error, value of UCS2 character > 7F'H
- "008B" → Error, value of UCS2 character > 7F'H
  This affects the maximum input length of a string)

Case 5
Every UCS2 character is sent as 4 IRA characters and is converted into two 8-bit values. This means that the first two characters have to be '00'.
Example: UCS2 character 009F'H typed as "009F" is sent as 30'H,30'H,39'H,46'H → converted into 8-bit value 9F'H.
Maximum number of UCS2 characters is 140 which are represented by 560 IRA characters. Number of IRA characters must be a multiple of four.

Case 6
Every UCS2 character is sent as 4 IRA characters each and is converted into a 16-bit value again.
Example: UCS2 character 9F3A'H typed as "9F3A" is sent as 39'H,46'H,33'H,41'H → converted into 9F3A'H.
Maximum number of UCS2 characters is 70 which are represented by 280 IRA characters. Number of IRA characters must be a multiple of four.
Invalid UCS2 values must be prevented.

1.8 Unsolicited Result Code Presentation

URC stands for Unsolicited Result Code and is a report message issued by the PLAS9-W without being requested by the TE, i.e. a URC is issued automatically when a certain event occurs. Hence, a URC is not issued as part of the response related to an executed AT command.

Typical events leading to URCs are incoming calls ("RING"), waiting calls, received short messages, changes in temperature, network registration etc. For most of these messages, the UE needs to be configured whether or not to send a URC. Descriptions of these URCs are provided with the associated AT command. Only the URCs related to automatic undervoltage and overvoltage shutdown are not user definable. These URCs are described in Section 1.8.1, Common URCs. A summary of all URCs can be found in Section 16.5, Summary of Unsolicited Result Codes (URC).

As specified in Section 1.4, AT Command Interpreter the Modem instance is dedicated for data transmission , whereas the Application instance is designed primarily for control functions. URCs are output either on the Modem instance "mdm" or on the Application instance "app". The configuration can be changed using the AT^SCFG subcommand "URC/DstIfc". For details see parameter <urcDestIfc>. Delivery default is "mdm".
The "^SYSSTART" URC and the "^SYSSTART AIRPLANE MODE" URC will be output both on the Application and Modem instance.

Important: If the instance used for URC output is reserved by an active data connection or a long running AT command, URCs are buffered internally and will be issued after the instance becomes idle again. A pending URC will be signaled on the URC output instance via RING line. For detailed information regarding configuration of URC signaling refer to AT^SCFG, "URC/Ringline", <urcRinglineCfg>.

1.8.1 Common URCs

This section lists URCs that cannot be disabled by the user and appear automatically when the required conditions described below occur.
Please refer to [2] for specifications regarding the minimum and maximum operating voltage limits. The automatic shutdown procedure is usually equivalent to the Power-down initiated with the AT^SMSO command, except when the voltage threshold is exceeded very quickly.

URC 1

^SBC: Undervoltage

The URC indicates that the UE is close to the undervoltage threshold. If undervoltage persists the UE keeps sending the URC several times before switching off automatically.

URC 2

^SBC: Overvoltage Warning

Supply voltage is close to overvoltage threshold. The URC is sent once.

URC 3

^SBC: Overvoltage Shutdown

Overvoltage threshold exceeded. Module switches off within 5 seconds after sending the URC.

1.9 Errors and Messages

The command result codes "+CME ERROR: <err>" and "+CMS ERROR: <err>" indicate errors related to mobile equipment or network functionality.

The format of <err> can be either numeric or verbose and is selectable via AT+CMEE.

A result error code terminates the execution of the command and prevents the execution of all remaining commands that may follow on the same command line.

Using the wrong command syntax may result in errors: For example, using the execute command syntax although the command has no execute format, causes "ERROR" to be returned. Likewise, using the write command syntax although the command has no write format causes "+CME ERROR: <err>" to be returned.

See also:

- Section 2.8.1, CME/CMS Error Code Overview
- Section 2.5.1, Verbose and numeric result codes
- Section 3.1, AT+CEER

2. Configuration Commands

The AT Commands described in this chapter allow the external application to determine the PLAS9-W's behaviour under various conditions.

2.1 AT&F Reset AT Command Settings to Factory Default Values

AT&F resets AT command settings to their factory default values. AT&W shall be used to retain these values effective for next power-up.
For a list of affected parameters refer to Section 16.4, Factory Default Settings Restorable with AT&F.

Syntax

Exec Command
AT&F[<value>]
Response(s)
OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)
ITU-T V.250 [13]

Parameter Description

<value>(num)	
[0]	Reset parameters in Section 16.4, Factory Default Settings Restorable with AT&F to their factory default values.

2.2 AT&V Display current Configuration

AT&V returns the setting of several AT command parameters applicable to the current operating mode, including the single-letter AT command parameters which are not readable otherwise.

Syntax

Exec Command

```
AT&V
```

Response(s)

```
ACTIVE PROFILE:
```
... (see Section 2.2.1, AT&V Response)
```
OK
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

2.2.1 AT&V Response

Table 2.1: AT&V Response

ACTIVE PROFILE:
E1 Q0 V1 X0 &C1 &D2 &S0 +CMGF: 0 +CSDH: 0 +CNMI: 0,0,0,0,1 +IPR: 115200 +CMEE: 2 +CSMS: 0,1,1,1 ^SCKS: 0,1 ^SSET: 0 +CREG: 0,1 +CEREG: 0,1 +CGSMS: 3 +COPS: 0[,<format>,<opName>,<rat>] OK

2.3 AT&W Store AT Command Settings to User Defined Profile

AT&W stores the current AT command settings to a user defined profile in non-volatile memory of PLAS9-W. The AT command settings will automatically be restored from the user defined profile during power-up or if ATZ is used. AT&F restores AT command factory default settings. Hence, until first use of AT&W, ATZ works as AT&F. A list of parameters stored to the user profile can be found at Section 16.3, AT Command Settings storable with AT&W.

Syntax

Exec Command
AT&W[<value>]
Response(s)
OK ERROR +CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)
V.250

Parameter Description

<value>(num)

[0]	User Profile Number

2.4 ATQ Result Code Presentation Mode

ATQ controls if the PLAS9-W transmits any result code to the TE. Other information text transmitted as response is not affected.

Syntax

Exec Command

ATQ[<n>]

Response(s)

If <n>=0:
OK
If <n>=1:
(none)

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

V.250

Parameter Description

<n>(num)(&V)(&W)

Result Code Presentation Mode.
It is not recommended to change this value.

[0](&F)(D)	UE transmits result code.
1	Result codes are suppressed and not transmitted.

2.5 ATV Result code format mode

This command determines the contents of header and trailer transmitted with AT command result codes and information responses. Possible responses are described in Section 2.5.1, Verbose and numeric result codes.

Syntax

Exec Command

`ATV[<value>]`

Response(s)

`OK`
`ERROR`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

ITU-T V.250 [13]

Parameter Description

`<value>`(num)(&V)(&W)

[0]	Information response: <text><CR><LF> Short result code format: <numeric code><CR>
1(&F)(D)	Information response: <CR><LF><text><CR><LF> Long result code format: <CR><LF><verbose code><CR><LF>

2.5.1 Verbose and numeric result codes

Verbose format	Numeric format	Meaning
OK	0	command executed, no errors
RING	2	ring detected
NO CARRIER	3	link not established or disconnected
ERROR	4	invalid command or command line too long
NO DIALTONE	6	no dial tone, dialling impossible, wrong mode
BUSY	7	remote station busy
NO ANSWER	8	no answer

2.6 ATX Result Code Selection

ATX determines whether or not the PLAS9-W transmits particular result codes to the TE.
ATX also controls whether or not the UE verifies the presence of a dial tone when it begins dialing, and if engaged tone (busy signal) detection is enabled.

Syntax

Exec Command

ATX[<value>]

Response(s)

OK
ERROR

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

ITU-T V.250 [13]

Parameter Description

<value>(num)(&V)(&W)	
[0](&F)(D)	CONNECT result code returned. Dial tone and busy detection are disabled.
1	CONNECT result code returned. Dial tone and busy detection are disabled.
2	CONNECT result code returned. Dial tone detection is enabled, busy detection is disabled.
3	CONNECT result code returned. Dial tone detection is disabled, busy detection is enabled.
4	CONNECT result code returned. Dial tone and busy detection are both enabled.

2.7 ATZ Restore AT Command Settings from User Defined Profile

First ATZ resets the AT command settings to their factory default values, similar to AT&F. Afterwards the AT command settings are restored from a user defined profile in non-volatile memory of PLAS9-W, if one was stored with AT&W before. Any additional AT command on the same command line may be ignored. A delay of 300 ms is required before next AT command is sent.
ATZ does not change the PDP context profiles.

Syntax

Exec Command
ATZ[<value>]
Response(s)
OK

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)
V.250

Parameter Description

<value>(num)	
[0]	User Profile Number

2.8 AT+CMEE Error Message Format

AT+CMEE controls the format of error result codes that indicates errors related to PLAS9-W functionality. Format can be selected between plain "ERROR" output, error numbers or verbose "+CME ERROR: <err>" and "+CMS ERROR: <err>" messages.
Possible error result codes are listed in Table 2.2, General "CME ERROR" Codes (3GPP TS 27.007), Table 2.3, GPRS related "CME ERROR" Codes (3GPP TS 27.007) and Table 2.5, SMS related "CMS ERROR" Codes (3GPP TS 27.005).
The AT+CMEE exec command performs a write command with factory default parameter setting.

Syntax

Test Command

```
AT+CMEE=?
```

Response(s)

```
+CMEE: (list of supported<errMode>s)
OK
```

Read Command

```
AT+CMEE?
```

Response(s)

```
+CMEE: <errMode>
OK
```

Exec Command

```
AT+CMEE
```

Response(s)

```
OK
ERROR
+CME ERROR:<err>
```

Write Command

```
AT+CMEE=<errMode>
```

Response(s)

```
OK
ERROR
+CME ERROR:<err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45], 3GPP TS 27.005 [44]

Parameter Description

<errMode>(num)(&V)(&W)	
0	Disable result code, i.e. only "ERROR" will be displayed.
1	Enable error result code with numeric values.
2(&F)(D)	Enable error result code with verbose (string) values.

2.8.1 CME/CMS Error Code Overview

Table 2.2: General "CME ERROR" Codes (3GPP TS 27.007)

<err> Code	Text (if AT+CMEE=2)
0	phone failure
1	no connection to phone
2	phone adapter link reserved
3	operation not allowed
4	operation not supported
5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong
16	incorrect password
17	SIM PIN2 required
18	SIM PUK2 required
20	memory full
21	invalid index
22	not found
23	memory failure
24	text string too long
25	invalid characters in text string
26	dial string too long
27	invalid characters in dial string
30	no network service
31	network timeout
32	network not allowed - emergency calls only
40	network personalization PIN required
41	network personalization PUK required
42	network subset personalization PIN required
43	network subset personalization PUK required
44	service provider personalization PIN required
45	service provider personalization PUK required
46	corporate personalization PIN required
47	corporate personalization PUK required
100	unknown

Table 2.3: GPRS related "CME ERROR" Codes (3GPP TS 27.007)

<err> Code	Text (if AT+CMEE=2)
103	illegal MS
106	illegal ME
107	GPRS services not allowed
111	PLMN not allowed
112	location area not allowed
113	roaming not allowed in this location area
127	missing or unknown APN
132	service option not supported
133	requested service option not subscribed
134	service option temporary out of order
148	unspecified GPRS error
149	PDP authentication failure
150	invalid mobile class
273	minimum TFTs per PDP address violated
274	TFT precedence index not unique
275	invalid parameter combination

Table 2.4: Enhanced "CME ERROR" Codes

<err> Code	Text (if AT+CMEE=2)
256	operation temporary not allowed
257	network rejected request
258	retry operation
259	invalid deflected to number
260	deflected to own number
261	unknown subscriber
262	service not available
263	unknown class specified
264	unknown network message
300	resource limitation
301	subscription violation
302	TeleService not provisioned
303	error BearerService not provisioned
304	system failure
305	data missing
306	unknown alphabet
307	unexpected data value
308	unrecognized component
309	mistyped component
310	badly structured component
311	mistyped parameter
312	initiating release

<err> Code	Text (if AT+CMEE=2)
320	call barred
330	SMSC address unknown
331	network search aborted
332	could not camp on chosen cell
333	reselection to chosen cell failed
340	call index error
341	call state error
342	sys state error
343	parameters error
344	expired password
350	cancelled due to active call state
351	cancelled due to location update processing
352	cancelled due to packet transfer mode
353	cancelled due to radio resource connection establishment
354	cancelled due to ongoing SMS transfer
355	cancelled due to ongoing SS transaction
767	operation failed

Table 2.5: SMS related "CMS ERROR" Codes (3GPP TS 27.005)

<err> Code	Text (if AT+CMEE=2)
0	none
212	invalid parameter
300	ME failure
301	SMS service of ME reserved
302	operation not allowed
303	operation not supported
304	invalid PDU mode parameter
305	invalid text mode parameter
310	SIM not inserted
311	SIM PIN required
312	PH-SIM PIN required
313	SIM failure
314	SIM busy
315	SIM wrong
316	SIM PUK required
317	SIM PIN2 required
318	SIM PUK2 required
320	memory failure
321	invalid memory index
322	memory full
330	SMSC address unknown
331	no network service

<err> Code	Text (if AT+CMEE=2)
332	network timeout
340	no +CNMA acknowledgement expected
500	unknown error
512	user abort
538	invalid parameter

2.9 AT+CSCS Character Set

AT+CSCS write command informs the PLAS9-W which character set is used by the TE. This enables the UE to convert character strings correctly between TE and UE character sets. Please also refer to Section 1.7, Supported character sets.

Syntax

Test Command

AT+CSCS=?

Response(s)

+CSCS: (list of supported<charSet>s)
OK

Read Command

AT+CSCS?

Response(s)

+CSCS: <charSet>
OK

Write Command

AT+CSCS=<charSet>

Response(s)

OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<charSet>(str)

"GSM"(&F)(P)	GSM default alphabet (3GPP TS 23.038 [33], subclause 6.2.1).
"UCS2"	16-bit universal multiple-octet coded character set (ISO/IEC10646 [32]). UCS2 character strings are converted to hexadecimal numbers in the range 0000 to FFFF; e.g. "004100620063" equates three 16-bit characters with decimal values 65, 98 and 99.
"IRA"	International reference alphabet (ITU T T.50).

2.10 AT+CFUN PLAS9-W Functionality Level

AT+CFUN controls PLAS9-W functionality levels "Normal Functionality Mode" and "Airplane Mode".
AT+CFUN can also be used to reset the UE.

In pure Airplane Mode (AT+CFUN parameter <fun>=4) the UE shuts down its radio interface (PA and receiver), what causes the UE to log off from network and disables AT commands whose execution requires a radio connection. In extended Airplane Mode (<fun>=0) the UE shuts down its radio and USIM interfaces.
The benefit of using Airplane Modes is that they allow to save power and, at locations where no RF emission is allowed (typically airplanes, hospitals etc.), the subscriber can continue network-independent activities rather than powering off the UE.

Syntax

Test Command

```
AT+CFUN=?
```

Response(s)

```
+CFUN: (list of supported <fun>s), (list of supported <rst>s)
OK
ERROR
+CME ERROR: <err>
```

Read Command

```
AT+CFUN?
```

Response(s)

```
+CFUN: <fun>
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CFUN=<fun>[, <rst>]
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Unsolicited Result Codes

URC 1

^SYSSTART

URC indicates that the UE is running in Normal Functionality level.

URC 2

^SYSSTART AIRPLANE MODE

URC indicates that the UE is running in Airplane Mode.

Parameter Description

<fun>(num)	
This parameter determines the functionality level of the UE. It is possible to enable the UE to store the setting of this parameter persistently via AT^SCFG="MEopMode/CFUN", <volaCFUN>. For details refer to [6].	
0	Switch UE into Minimum Functionality level. UE's RF (TX and RX) and USIM interfaces are shut down. Consequently, the UE logs off from network and enters extended Airplane Mode, which is indicated via "^SYSSTART AIRPLANE MODE" URC. Accordingly, AT commands whose execution requires a radio connection or USIM access either return an error result code or reflect the limited operating state. Direct switches between pure and extended Airplane Modes (and vice versa) are not supported. To return to Normal Functionality level use AT+CFUN=1 or AT+CFUN=1,1. After this, PIN authentication may be necessary if required by the USIM.
1(P)	Switch UE into Normal Functionality level, which is indicated via "^SYSSTART" URC. Note: If switching from Minimum Functionality level the USIM interface is enabled first, what may lead to the situation that USIM related URCs are issued before the "^SYSSTART" URC.
4	Switch UE into pure Airplane Mode. UE's RF-interface (TX and RX) is shut down whereby it logs off from the network and enters Airplane mode, which is indicated via "^SYSSTART AIRPLANE MODE" URC. USIM remains accessible. Accordingly, AT commands whose execution requires a radio connection will return an error result code or reflect the limited operating state. Direct switches between pure and extended Airplane Modes (and vice versa) are not supported. To return to Normal Functionality level use AT+CFUN=1 or AT+CFUN=1,1. The UE may reregister to the network, e.g. if network service is available.

<rst>(num)	
[0]	UE switches to <fun> level without reset.
1	Reset and restart the UE. Restart is only possible with <fun>=1; however, the current functionality level will be retained.

Note

- AT+CFUN default powerup value can be changed with <volaCFUN>.

2.11 AT+GCAP Capabilities List

AT+GCAP displays a list of basic capabilities supported by the PLAS9-W. This allows the TE to determine which groups of extended-syntax AT commands can be used with the UE.

Syntax

Test Command

```
AT+GCAP=?
```

Response(s)

```
OK
```

Exec Command

```
AT+GCAP
```

Response(s)

```
+GCAP: <name>
OK
```

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

ITU-T V.250 [13]

Parameter Description

<name>(str)

e.g. +GCAP: +CGSM

2.12 AT^SMSO Switch Off PLAS9-W

AT^SMSO initiates PLAS9-W's power-off procedure. Do not send any other AT command after this.
For further detail please refer to [2].

Syntax

Test Command

```
AT^SMSO=?
```

Response(s)

```
OK
```

Exec Command

```
AT^SMSO
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	+

2.13 AT^SCFG Extended Configuration Settings

AT^SCFG can be used to query and configure various settings of the PLAS9-W.
AT^SCFG read command returns a list of all supported parameters and their current values.
AT^SCFG write command queries a configuration parameter (if no value is entered) or sets its value(s).

Syntax

Test Command

AT^SCFG=?

Response(s)

^SCFG: "GPRS/Auth", (list of supported <gauth>s)
^SCFG: "GPRS/AutoAttach", (list of supported <gaa>s)
^SCFG: "MEopMode/CFUN", (list of supported <volaCFUN>s)
^SCFG: "MEopMode/CregRoam", (list of supported <mrs>s)
^SCFG: "MEopMode/DTM/Mode", (list of supported <dtm>s)
^SCFG: "MEopMode/ExpectDTR", (list of supported <expDtrSet>s), (list of supported <expDtrPort>s)
^SCFG: "MEopMode/Fgi/Split", (list of supported <fgi_split_mode>s)
^SCFG: "MEopMode/IMS", (list of supported <ims>s)
^SCFG: "MEopMode/NonBlock/Cops", (list of supported <com>s)
^SCFG: "MEopMode/PowerMgmt/LCI", (list of supported <lci>s), (list of supported <gpio>s)
^SCFG: "MEopMode/Prov/AutoSelect", (list of supported <provAutoSelect>s)
^SCFG: "MEopMode/Prov/Cfg", (list of supported <provCfg>s)
^SCFG: "MEopMode/PwrSave", (list of supported <PwrSaveMode>s), (list of supported <PwrSavePeriod>s), (list of supported <PwrSaveWakeup>s), (list of supported <PwrSaveCPU>s), (list of supported <PwrSaveSet>s)
^SCFG: "MEopMode/SRPOM", (list of supported <srpom>s)
^SCFG: "MEopMode/USB/KeepData", (list of supported <usbKeepDataSet>s), (list of supported <usbKeepDataPort>s)
^SCFG: "MEShutdown/OnIgnition", (list of supported <msi>s)
^SCFG: "MEShutdown/Timer", (range of supported <shutdownRemainingTime>values)
^SCFG: "Misc/CId", (max. string length of <CId>)
^SCFG: "Radio/Band/2G", (list of supported <rba2g>s), , (list of supported <rbe>s)
^SCFG: "Radio/Band/3G", (list of supported <rba3g>s), , (list of supported <rbe>s)
^SCFG: "Radio/Band/4G", (list of supported <rba4g-1>s), (list of supported <rba4g-2>s), (list of supported <rbe>s)
^SCFG: "Radio/Band/TdScdma", (list of supported <rbaTdScdma>s), , (list of supported <rbe>s)
^SCFG: "Radio/CNS", (list of supported <cns>s)
^SCFG: "Radio/Mtpl", (list of supported <PL_mode>s), (list of supported <PL_profile>s)
^SCFG: "Radio/Mtpl/2G", (list of supported <PL_mode>s), (list of supported <PL_profile>s), (list of supported <PL_band2g>s), , (list of supported <PL_limit2g>s), (list of supported <PL_limit_psk>s)
^SCFG: "Radio/Mtpl/3G", (list of supported <PL_mode>s), (list of supported <PL_profile>s), (list of supported <PL_band3g>s), , (list of supported <PL_limit3g>s)
^SCFG: "Radio/Mtpl/4G", (list of supported <PL_mode>s), (list of supported <PL_profile>s), (list of supported <PL_band4g-1>s), (list of supported <PL_band4g-2>s), (list of supported <PL_limit4g>s)
^SCFG: "Radio/Mtpl/TdScdma", (list of supported <PL_mode>s), (list of supported <PL_profile>s), (list of supported <PL_bandTdScdma>s), , (list of supported <PL_limitTdScdma>s)
^SCFG: "Radio/OutputPowerReduction", (list of supported <ropr>s)
^SCFG: "RemoteWakeUp/Event/URC", (list of supported <RemWakeLine>s)
^SCFG: "RemoteWakeUp/Event/USB", (list of supported <RemWakeLine>s)
^SCFG: "RemoteWakeUp/Ports", (list of supported <RemWakePortSet>s), (list of supported <RemWakePort>s)
^SCFG: "RemoteWakeUp/Pulse", (range of supported <RemWakePulse>s)
^SCFG: "SIM/CS", (list of supported <CS>s)
^SCFG: "SMS/AutoAck", (list of supported <SmsAcknl>s)
^SCFG: "SMS/Retrm", (list of supported <SmsRetrmTimeout>s)
^SCFG: "Trace/SIM", (list of supported <TraceSim>s)

Test Command (Continued)

AT^SCFG=?

Response(s)

^SCFG: "URC/DstIfc", (list of supported <urcDestIfc>s)
^SCFG: "URC/Ringline", (list of supported <urcRinglineCfg>s)
^SCFG: "URC/Ringline/ActiveTime", (list of supported <urcRinglineDuration>s)
OK

Read Command

AT^SCFG?

Response(s)

^SCFG: "GPRS/Auth", <gauth>
^SCFG: "GPRS/AutoAttach", <gaa>
^SCFG: "MEopMode/CFUN", <volaCFUN>, <storedCFUN>
^SCFG: "MEopMode/CregRoam", <mrs>
^SCFG: "MEopMode/DTM/Mode", <dtm>
^SCFG: "MEopMode/ExpectDTR", "current"[, <expDtrPort>$_1$[, <expDtrPort>$_2$[, ...]]]
^SCFG: "MEopMode/ExpectDTR", "powerup"[, <expDtrPort>$_1$[, <expDtrPort>$_2$[, ...]]]
^SCFG: "MEopMode/Fgi/Split", <fgi_split_mode>
^SCFG: "MEopMode/IMS", <ims>
^SCFG: "MEopMode/NonBlock/Cops", <com>
^SCFG: "MEopMode/PowerMgmt/LCI", <lci>[, <gpio>]
^SCFG: "MEopMode/Prov/AutoSelect", <provAutoSelect>
^SCFG: "MEopMode/Prov/Cfg", <provCfg>
^SCFG: "MEopMode/PwrSave", <PwrSaveMode>, <PwrSavePeriod>, <PwrSaveWakeup>, "CPU-A", "powerup"
^SCFG: "MEopMode/PwrSave", <PwrSaveMode>, <PwrSavePeriod>, <PwrSaveWakeup>, "CPU-A", "current"
^SCFG: "MEopMode/PwrSave", <PwrSaveMode>, <PwrSavePeriod>, <PwrSaveWakeup>, "CPU-M", "powerup"
^SCFG: "MEopMode/PwrSave", <PwrSaveMode>, <PwrSavePeriod>, <PwrSaveWakeup>, "CPU-M", "current"
^SCFG: "MEopMode/SRPOM", <srpom>
^SCFG: "MEopMode/USB/KeepData", "current"[, <usbKeepDataPort>$_1$[, <usbKeepDataPort>$_2$[, ...]]]
^SCFG: "MEopMode/USB/KeepData", "powerup"[, <usbKeepDataPort>$_1$[, <usbKeepDataPort>$_2$[, ...]]]
^SCFG: "MEShutdown/OnIgnition", <msi>
^SCFG: "MEShutdown/Timer", <shutdownRemainingTime>
^SCFG: "Misc/CId", <CId>
^SCFG: "Radio/Band/2G", <rba2g>
^SCFG: "Radio/Band/3G", <rba3g>
^SCFG: "Radio/Band/4G", <rba4g-1>[, <rba4g-2>]
^SCFG: "Radio/Band/TdScdma", <rbaTdScdma>
^SCFG: "Radio/CNS", <cns>
^SCFG: "Radio/Mtpl", <PL_mode>[, <PL_profile>]
^SCFG: "Radio/Mtpl/2G", <PL_mode>[, <PL_profile>]
^SCFG: "Radio/Mtpl/3G", <PL_mode>[, <PL_profile>]
^SCFG: "Radio/Mtpl/4G", <PL_mode>[, <PL_profile>]
^SCFG: "Radio/Mtpl/TdScdma", <PL_mode>[, <PL_profile>]
^SCFG: "Radio/OutputPowerReduction", <ropr>
^SCFG: "RemoteWakeUp/Event/URC", <RemWakeLine>
^SCFG: "RemoteWakeUp/Event/USB", <RemWakeLine>
^SCFG: "RemoteWakeUp/Ports", "current"[, <RemWakePort>$_1$[, <RemWakePort>$_2$[, ...]]]
^SCFG: "RemoteWakeUp/Ports", "powerup"[, <RemWakePort>$_1$[, <RemWakePort>$_2$[, ...]]]
^SCFG: "RemoteWakeUp/Pulse", <RemWakePulse>
^SCFG: "SIM/CS", <CS>
^SCFG: "SMS/AutoAck", <SmsAcknl>

Read Command (Continued)

AT^SCFG?

Response(s)

^SCFG: "SMS/Retrm", <SmsRetrmTimeout>
^SCFG: "Trace/SIM", <TraceSim>
^SCFG: "URC/DstIfc", <urcDestIfc>
^SCFG: "URC/Ringline", <urcRinglineCfg>
^SCFG: "URC/Ringline/ActiveTime", <urcRinglineDuration>
OK

Write Command

Configure PPP authentication.

AT^SCFG="GPRS/Auth"[, <gauth>]

Response(s)

^SCFG: "GPRS/Auth", <gauth>
OK
ERROR
+CME ERROR: <err>

Write Command

PS Domain auto attach.

AT^SCFG="GPRS/AutoAttach"[, <gaa>]

Response(s)

^SCFG: "GPRS/AutoAttach", <gaa>
OK
ERROR
+CME ERROR: <err>

Write Command

Control persistence of AT+CFUN parameter <fun> changes. For details refer to [6].

AT^SCFG="MEopMode/CFUN"[, <volaCFUN>]

Response(s)

^SCFG: "MEopMode/CFUN", <volaCFUN>, <storedCFUN>
OK
ERROR
+CME ERROR: <err>

Write Command

AT^SCFG="MEopMode/CregRoam"[, <mrs>]

Response(s)

^SCFG: "MEopMode/CregRoam", <mrs>
OK
ERROR
+CME ERROR: <err>

Write Command

AT^SCFG="MEopMode/DTM/Mode"[, <dtm>]

Response(s)

^SCFG: "MEopMode/DTM/Mode", <dtm>
OK
ERROR
+CME ERROR: <err>

Write Command

AT^SCFG="MEopMode/ExpectDTR"[, <expDtrSet>[, <expDtrPort>$_1$[, <expDtrPort>$_2$[, ...]]]]

Response(s)

^SCFG: "MEopMode/ExpectDTR", "current"[, <expDtrPort>$_1$[, <expDtrPort>$_2$[, ...]]]
^SCFG: "MEopMode/ExpectDTR", "powerup"[, <expDtrPort>$_1$[, <expDtrPort>$_2$[, ...]]]
OK
ERROR
+CME ERROR: <err>

Write Command

The AT command switches PLAS9-W "Enable Split FGI – LTE-FDD/-TDD"

AT^SCFG="MEopMode/Fgi/Split"[, <fgi_split_mode>]

Response(s)

^SCFG: "MEopMode/Fgi/Split", <fgi_split_mode>
OK
ERROR
+CME ERROR: <err>

Write Command

IMS mode.

AT^SCFG="MEopMode/IMS"[, <ims>]

Response(s)

^SCFG: "MEopMode/IMS", <ims>
OK
ERROR
+CME ERROR: <err>

Write Command

AT^SCFG="MEopMode/NonBlock/Cops"[, <com>]

Response(s)

^SCFG: "MEopMode/NonBlock/Cops", <com>
OK
ERROR
+CME ERROR: <err>

Write Command

Power Management control by Low Current Indicator (LC_IND line).

AT^SCFG="MEopMode/PowerMgmt/LCI"[, <lci>, <gpio>]

Response(s)

^SCFG: "MEopMode/PowerMgmt/LCI", <lci>[, <gpio>]
OK
ERROR
+CME ERROR: <err>

Write Command

Auto select provider profile.

AT^SCFG="MEopMode/Prov/AutoSelect"[, <provAutoSelect>]

Response(s)

^SCFG: "MEopMode/Prov/AutoSelect", <provAutoSelect>
OK
ERROR
+CME ERROR: <err>

Write Command

Provider profile configuration.

AT^SCFG="MEopMode/Prov/Cfg"[, <provCfg>]

Response(s)

^SCFG: "MEopMode/Prov/Cfg", <provCfg>
OK
ERROR
+CME ERROR: <err>

Write Command

Extended power saving control.

AT^SCFG="MEopMode/PwrSave"[, <PwrSaveMode>][, <PwrSavePeriod>][, <PwrSaveWakeup>][, <PwrSaveCPU>, <PwrSaveSet>]

Response(s)

^SCFG: "MEopMode/PwrSave", <PwrSaveMode>, <PwrSavePeriod>, <PwrSaveWakeup>, "CPU-A", "powerup"
^SCFG: "MEopMode/PwrSave", <PwrSaveMode>, <PwrSavePeriod>, <PwrSaveWakeup>, "CPU-A", "current"
^SCFG: "MEopMode/PwrSave", <PwrSaveMode>, <PwrSavePeriod>, <PwrSaveWakeup>, "CPU-M", "powerup"
^SCFG: "MEopMode/PwrSave", <PwrSaveMode>, <PwrSavePeriod>, <PwrSaveWakeup>, "CPU-M", "current"
OK
ERROR
+CME ERROR: <err>

Write Command

Enable or disable RPM if inserted USIM contains no RPM files.

AT^SCFG="MEopMode/SRPOM"[, <srpom>]

Response(s)

^SCFG: "MEopMode/SRPOM", <srpom>
OK
ERROR
+CME ERROR: <err>

Write Command

AT^SCFG="MEopMode/USB/KeepData"[, <usbKeepDataSet>[, <usbKeepDataPort>$_1$[, <usbKeepDataPort>$_2$[, ...]]]]

Response(s)

^SCFG: "MEopMode/USB/KeepData", "current"[, <usbKeepDataPort>$_1$[, <usbKeepDataPort>$_2$[, ...]]]
^SCFG: "MEopMode/USB/KeepData", "powerup"[, <usbKeepDataPort>$_1$[, <usbKeepDataPort>$_2$[, ...]]]
OK
ERROR
+CME ERROR: <err>

Write Command

Enable/disable shutdown by ignition line.

AT^SCFG="MEShutdown/OnIgnition"[, <msi>]

Response(s)

^SCFG: "MEShutdown/OnIgnition", <msi>
OK
ERROR
+CME ERROR: <err>

Write Command

Query/Configure the timer controlled shutdown.

AT^SCFG="MEShutdown/Timer"[, <shutdownRemainingTime>]

Response(s)

^SCFG: "MEShutdown/Timer", <shutdownRemainingTime>
OK
ERROR
+CME ERROR: <err>

Write Command

Query/Configure Customer Id.

AT^SCFG="Misc/CId"[, <CId>]

Response(s)

^SCFG: "Misc/CId", <CId>
OK
ERROR
+CME ERROR: <err>

Write Command

Enable/disable 2G radio bands.

AT^SCFG="Radio/Band/2G"[, <rba2g>][, ,<rbe>]

Response(s)

^SCFG: "Radio/Band/2G", <rba2g>
OK
ERROR
+CME ERROR: <err>

Write Command

Enable/disable 3G radio bands.

AT^SCFG="Radio/Band/3G"[, <rba3g>][, ,<rbe>]

Response(s)

^SCFG: "Radio/Band/3G", <rba3g>
OK
ERROR
+CME ERROR: <err>

Write Command

Enable/disable 4G radio bands.

AT^SCFG="Radio/Band/4G"[, <rba4g-1>][, <rba4g-2>][, <rbe>]

Response(s)

^SCFG: "Radio/Band/4G", <rba4g-1>[, <rba4g-2>]
OK
ERROR
+CME ERROR: <err>

Write Command

Enable/disable TD-SCDMA radio bands.

AT^SCFG="Radio/Band/TdScdma"[, <rbaTdScdma>][, ,<rbe>]

Response(s)

^SCFG: "Radio/Band/TdScdma", <rbaTdScdma>
OK
ERROR
+CME ERROR: <err>

Write Command

Enable/Disable Continuous Network Search

AT^SCFG="Radio/CNS"[, <cns>]

Response(s)

^SCFG: "Radio/CNS", <cns>
OK
ERROR
+CME ERROR: <err>

Write Command

To control (deactivate / activate) output power limitation for SAR (Specific Absorption Rate)
<PL_mode> 2 and 3 (query / configure) are applicable only with:
"Radio/Mtpl/2G"
"Radio/Mtpl/3G"
"Radio/Mtpl/4G"
"Radio/Mtpl/TdScdma"

AT^SCFG="Radio/Mtpl"[, <PL_mode>[, <PL_profile>]]

Response(s)

^SCFG: "Radio/Mtpl", <PL_mode>[, <PL_profile>]
OK
ERROR
+CME ERROR: <err>

Write Command

To control (query / configure) output power limitation for SAR (Specific Absorption Rate).
<PL_mode> 0 and 1 (deactivate / activate) are applicable only with "Radio/Mtpl".

AT^SCFG="Radio/Mtpl/2G"[, <PL_mode>[, <PL_profile>, <PL_band2g>, , <PL_limit2g>, <PL_limit_psk>]]

Response(s)

^SCFG: "Radio/Mtpl/2G", <PL_mode>[, <PL_profile>, <PL_band2g>, , <PL_limit2g>, <PL_limit_psk>]

In case of <PL_mode>=2 and <PL_profile> one profile configuration is printed out
^SCFG: "Radio/Mtpl/2G", <PL_mode>, <PL_profile>, <PL_band2g>, , <PL_limit2g>, <PL_limit_psk>
^SCFG: ["Radio/Mtpl/2G", <PL_mode>, <PL_profile>, <PL_band2g>, , <PL_limit2g>, <PL_limit_psk>]
^SCFG: ["Radio/Mtpl/2G", ...]

In case of <PL_mode>=2 full profile configuration (1-8) is printed out
^SCFG: "Radio/Mtpl/2G", <PL_mode>, <PL_profile>, <PL_band2g>, , <PL_limit2g>, <PL_limit_psk>
^SCFG: ["Radio/Mtpl/2G", <PL_mode>, <PL_profile>, <PL_band2g>, , <PL_limit2g>, <PL_limit_psk>]
^SCFG: ["Radio/Mtpl/2G", <PL_mode>, <PL_profile>, <PL_band2g>, , <PL_limit2g>, <PL_limit_psk>]
^SCFG: ["Radio/Mtpl/2G", ...]

In case of <PL_mode>=3 and <PL_profile>, <PL_band2g>,,<PL_limit2g>,<PL_limit_psk>
^SCFG: "Radio/Mtpl/2G", <PL_mode>[, <PL_profile>]
OK
ERROR
+CME ERROR: <err>

Write Command

To control (query / configure) output power limitation for SAR (Specific Absorption Rate).
<PL_mode> 0 and 1 (deactivate / activate) are applicable only with "Radio/Mtpl".

AT^SCFG="Radio/Mtpl/3G"[, <PL_mode>[, <PL_profile>, <PL_band3g>, , <PL_limit3g>]]

Response(s)

^SCFG: "Radio/Mtpl/3G", <PL_mode>[, <PL_profile>, <PL_band3g>, , <PL_limit3g>]

In case of <PL_mode>=2 and <PL_profile> one profile configuration is printed out
^SCFG: "Radio/Mtpl/3G", <PL_mode>, <PL_profile>, <PL_band3g>, , <PL_limit3g>
^SCFG: ["Radio/Mtpl/3G", <PL_mode>, <PL_profile>, <PL_band3g>, , <PL_limit3g>]
^SCFG: ["Radio/Mtpl/3G", ...]

In case of <PL_mode>=2 full profile configuration (1-8) is printed out
^SCFG: "Radio/Mtpl/3G", <PL_mode>, <PL_profile>, <PL_band3g>, , <PL_limit3g>
^SCFG: ["Radio/Mtpl/3G", <PL_mode>, <PL_profile>, <PL_band3g>, , <PL_limit3g>]
^SCFG: ["Radio/Mtpl/3G", <PL_mode>, <PL_profile>, <PL_band3g>, , <PL_limit3g>]
^SCFG: ["Radio/Mtpl/3G", ...]

In case of <PL_mode>=3 and <PL_profile>, <PL_band3g>,,<PL_limit3g>
^SCFG: "Radio/Mtpl/3G", <PL_mode>[, <PL_profile>]
OK
ERROR
+CME ERROR: <err>

Write Command

To control (query / configure) output power limitation for SAR (Specific Absorption Rate).
<PL_mode> 0 and 1 (deactivate / activate) are applicable only with "Radio/Mtpl".

AT^SCFG="Radio/Mtpl/4G"[, <PL_mode>[, <PL_profile>, <PL_band4g-1>, <PL_band4g-2>, <PL_limit4g>]]

Response(s)

^SCFG: "Radio/Mtpl/4G", <PL_mode>[, <PL_profile>, <PL_band4g-1>, <PL_band4g-2>, <PL_limit4g>]

In case of <PL_mode>=2 and <PL_profile> one profile configuration is printed out
^SCFG: "Radio/Mtpl/4G", <PL_mode>, <PL_profile>, <PL_band4g-1>, <PL_band4g-2>, <PL_limit4g>
^SCFG: ["Radio/Mtpl/4G", <PL_mode>, <PL_profile>, <PL_band4g-1>, <PL_band4g-2>, <PL_limit4g>]
^SCFG: ["Radio/Mtpl/4G", ...]

In case of <PL_mode>=2 full profile configuration (1-8) is printed out
^SCFG: "Radio/Mtpl/4G", <PL_mode>, <PL_profile>, <PL_band4g-1>, <PL_band4g-2>, <PL_limit4g>
^SCFG: ["Radio/Mtpl/4G", <PL_mode>, <PL_profile>, <PL_band4g-1>, <PL_band4g-2>, <PL_limit4g>]
^SCFG: ["Radio/Mtpl/4G", <PL_mode>, <PL_profile>, <PL_band4g-1>, <PL_band4g-2>, <PL_limit4g>]
^SCFG: ["Radio/Mtpl/4G", ...]

In case of <PL_mode>=3 and <PL_profile>, <PL_band4g-1>,<PL_band4g-2>,<PL_limit4g>
^SCFG: "Radio/Mtpl/4G", <PL_mode>[, <PL_profile>]
OK
ERROR
+CME ERROR: <err>

Write Command

To control (query / configure) output power limitation for SAR (Specific Absorption Rate).
<PL_mode> 0 and 1 (deactivate / activate) are applicable only with "Radio/Mtpl".

AT^SCFG="Radio/Mtpl/TdScdma"[, <PL_mode>[, <PL_profile>, <PL_bandTdScdma>, , <PL_limitTdScdma>]]

Response(s)

^SCFG: "Radio/Mtpl/TdScdma", <PL_mode>[, <PL_profile>, <PL_bandTdScdma>, , <PL_limitTdScdma>]

In case of <PL_mode>=2 and <PL_profile> one profile configuration is printed out
^SCFG: "Radio/Mtpl/TdScdma", <PL_mode>, <PL_profile>, <PL_bandTdScdma>, , <PL_limitTdScdma>
^SCFG: ["Radio/Mtpl/TdScdma", <PL_mode>, <PL_profile>, <PL_bandTdScdma>, , <PL_limitTdScdma>]
^SCFG: ["Radio/Mtpl/TdScdma", ...]

In case of <PL_mode>=2 full profile configuration (1-8) is printed out
^SCFG: "Radio/Mtpl/TdScdma", <PL_mode>, <PL_profile>, <PL_bandTdScdma>, , <PL_limitTdScdma>
^SCFG: ["Radio/Mtpl/TdScdma", <PL_mode>, <PL_profile>, <PL_bandTdScdma>, , <PL_limitTdScdma>]
^SCFG: ["Radio/Mtpl/TdScdma", <PL_mode>, <PL_profile>, <PL_bandTdScdma>, , <PL_limitTdScdma>]
^SCFG: ["Radio/Mtpl/TdScdma", ...]

In case of <PL_mode>=3 and <PL_profile>, <PL_bandTdScdma>,,<PL_limitTdScdma>
^SCFG: "Radio/Mtpl/TdScdma", <PL_mode>[, <PL_profile>]
OK
ERROR
+CME ERROR: <err>

Write Command

Radio output power reduction.

AT^SCFG="Radio/OutputPowerReduction"[, <ropr>]

Response(s)

^SCFG: "Radio/OutputPowerReduction", <ropr>
OK
ERROR
+CME ERROR: <err>

Write Command

Configure line that shall be toggled when a URC is issued.

AT^SCFG="RemoteWakeUp/Event/URC"[, <RemWakeLine>]

Response(s)

^SCFG: "RemoteWakeUp/Event/URC", <RemWakeLine>
OK
ERROR
+CME ERROR: <err>

Write Command

Configure line that shall be toggled to wake up the TE when a Remote Wakeup Event occurs on USB.

AT^SCFG="RemoteWakeUp/Event/USB"[, <RemWakeLine>]

Response(s)

^SCFG: "RemoteWakeUp/Event/USB", <RemWakeLine>
OK

Write Command (Continued)

Configure line that shall be toggled to wake up the TE when a Remote Wakeup Event occurs on USB.

AT^SCFG="RemoteWakeUp/Event/USB"[, <RemWakeLine>]

Response(s)

ERROR
+CME ERROR: <err>

Write Command

Select ports for waking up the TE

AT^SCFG="RemoteWakeUp/Ports"[, <RemWakePortSet>[, <RemWakePort>$_1$[, <RemWakePort>$_2$[, ...]]]]

Response(s)

^SCFG: "RemoteWakeUp/Ports", "current"[, <RemWakePort>$_1$[, <RemWakePort>$_2$[, ...]]]
^SCFG: "RemoteWakeUp/Ports", "powerup"[, <RemWakePort>$_1$[, <RemWakePort>$_2$[, ...]]]
OK
ERROR
+CME ERROR: <err>

Write Command

Configure duration of Wakeup Event pulse.

AT^SCFG="RemoteWakeUp/Pulse"[, <RemWakePulse>]

Response(s)

^SCFG: "RemoteWakeUp/Pulse", <RemWakePulse>
OK
ERROR
+CME ERROR: <err>

Write Command

Select the USIM interface to be used.

AT^SCFG="SIM/CS"[, <CS>]

Response(s)

^SCFG: "SIM/CS", <CS>
OK
ERROR
+CME ERROR: <err>

Write Command

Enable / disable automatic acknowledgement of a directly routed incoming SMS without entering AT+CNMA.

AT^SCFG="SMS/AutoAck"[, <SmsAcknl>]

Response(s)

^SCFG: "SMS/AutoAck", <SmsAcknl>
OK
ERROR
+CME ERROR: <err>

Write Command

Configure SMS retransmission timeout.

AT^SCFG="SMS/Retrm", <SmsRetrmTimeout>

Response(s)

^SCFG: "SMS/Retrm", <SmsRetrmTimeout>
OK
ERROR
+CME ERROR: <err>

Write Command

Configuration of QXDM Tracing for UICC related messages.

AT^SCFG="Trace/SIM"[, <TraceSim>]

Response(s)

^SCFG: "Trace/SIM", <TraceSim>
OK
ERROR
+CME ERROR: <err>

Write Command

Subcommand controls which interface will be used for URC presentation.

AT^SCFG="URC/DstIfc"[, <urcDestIfc>]

Response(s)

^SCFG: "URC/DstIfc", <urcDestIfc>
OK
ERROR
+CME ERROR: <err>

Write Command

Subcommand controls the behavior of the RING line if it is selected for URC signalization.

AT^SCFG="URC/Ringline"[, <urcRinglineCfg>]

Response(s)

^SCFG: "URC/Ringline", <urcRinglineCfg>
OK
ERROR
+CME ERROR: <err>

Write Command

Subcommand controls duration of active RING line if it is selected for URC signalization.

AT^SCFG="URC/Ringline/ActiveTime"[, <urcRinglineDuration>]

Response(s)

^SCFG: "URC/Ringline/ActiveTime", <urcRinglineDuration>
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<gauth>(str)

PPP authentication mechanism

Setting can be used to configure which authentication algorithm the AT+CGDATA or ATD*99# commands will apply, during the PPP startup phase, for PDP contexts not yet activated.
For contexts activated with AT+CGACT please use the AT command AT^SGAUTH to configure the authentication method.

“0“	CHAP only
“1“	PAP only
“2“(P)	Try CHAP first, then PAP

<gaa>(str)(NV)

PS Domain auto attach

Setting can be used to control whether or not the UE will perform a PS Domain attach immediately after power-up and registering to the network. If the setting is changed to "enabled" and the UE is not attached yet, it will not initiate an attach immediately but after the next restart and registration to the network. For LTE please see more information in Section 10.1.1, Attaching to LTE Networks and Registering to IMS.

“disabled“	PS Domain auto attach is disabled
“enabled“(D)	PS Domain auto attach is enabled

<volaCFUN>(str)(NV)

Volatile +CFUN Mode

Parameter determines whether future changes of the AT+CFUN parameter <fun> will be stored in the non-volatile memory. For details refer to [6].

“0“	Future changes of the AT+CFUN parameter <fun> will be stored in the non-volatile memory.
“1“(D)	Future changes of the AT+CFUN parameter <fun> will always be volatile, i.e. changes will not be reestablished after next UE restart.

<storedCFUN>(str)(NV)

Stored +CFUN Mode

Indicates setting of AT+CFUN parameter <fun> which will be used for next UE restart.

<mrs>(str)(NV)

Modified Roaming Status

This parameter enables or disables the modified roaming status displayed by AT+CREG. If it is enabled, the registration status is "registered to home network" instead of "registered, roaming", when the registered PLMN and the Home PLMN from USIM Elementary File EF_{IMSI} are mapped to the same network name in the PLAS9-W internal operator list.
Please consider this configuration has no influence to the commands AT^SIND="roam" and AT+CGREG!

“0“(D)	Disable the Modified Roaming Status Display.
“1“	Enable the Modified Roaming Status Display.

<dtm>(str)(NV)

DTM Mode

This parameter controls the Dual Transfer Mode.

“0“	DTM and EDTM are disabled.
“1“(D)	DTM is enabled and EDTM is disabled.
“2“	DTM and EDTM are enabled.

<expDtrSet>(str)

The <expDtrSet> parameter specifies whether the "MEopMode/ExpectDTR" configuration set with <expDtrPort> is non-volatile or volatile.

“current“	The currently used configuration (volatile).
“powerup“	The configuration used after powerup or restart (non-volatile).

<expDtrPort>(str)

The purpose of AT^SCFG "MEopMode/ExpectDTR" subcommand is to ensure power saving even though a Customer Application is designed to use only some but not all of the UE's ports. Keep in mind that the UE enters Sleep mode only if there is no data pending on any port. This might be a problem if ports are not connected or not opened. To ensure power saving in such case, the AT^SCFG "MEopMode/ExpectDTR" subcommand can be activated simply by listing all those ports for which the Customer Application has no driver implemented. Vice versa, if a Customer Application implements a driver for a given port, and thus ensures to open this port and read all data, this port can be removed from the <expDtrPort> list.

On each port listed via <expDtrPort>, the UE transmits data and notifications only *after* the connected host has activated DTR, or has sent a "SetControlLineState(DTE present)" request to a USB CDC ACM port, or a "SetInterface(AltSet)" request to a USB CDC ECM port (WWAN or RmNet adapter). Any data pending on such a port *BEFORE* the host has notified its readiness will be discarded because the UE assumes that there is no host connected reading the data. This is to avoid that data left unsent in the output queues (e.g. a ^SYSSTART URC) prevent the UE from sleeping, or even gradually block the output queue.

The supported ports are reported by the AT^SCFG test command in the line for "MEopMode/ExpectDTR". By delivery default, all ports are listed in the AT^SCFG "MEopMode/ExpectDTR" read command responses, meaning that the "MEopMode/ExpectDTR" feature is activated for all ports.

“acm1“(D)	Refers to USB0 set with AT^SSRVSET, parameter <Device>
“acm2“(D)	Refers to USB1 set with AT^SSRVSET, parameter <Device>
“acm3“(D)	Refers to USB2 set with AT^SSRVSET, parameter <Device>
“acm4“(D)	Refers to USB3 set with AT^SSRVSET, parameter <Device>. USB3 is not set within preconfigured AT^SSRVSET Service Sets. But it may be set within a customized AT^SSRVSET Service Set <SetNum> ≥ 10. For preconfigured AT^SSRVSET Service Sets, "acm4" must be left enabled.
“rmnet0“(D)	WWAN adapter
“rmnet1“(D)	WWAN adapter

Examples:
Default: UE expects the DTR signal on all ports.
Advantage: If a port is not connected or not opened any data available before DTR activation will be discarded.
AT^SCFG?
....
^SCFG: "MEopMode/ExpectDTR","current","acm1","acm2","acm3","rmnet0","rmnet1"
^SCFG: "MEopMode/ExpectDTR","powerup","acm1","acm2","acm3",
....
OK
If the Customer Application implements a driver for a given port (in this example for the USB modem) then this port can be removed from the "MEopMode/ExpectDTR","powerup" list:
AT^SCFG="MEopMode/ExpectDTR","powerup","acm2","acm3","rmnet0","rmnet1"
^SCFG: "MEopMode/ExpectDTR","current","acm1","acm2","acm3","rmnet0","rmnet1"
^SCFG: "MEopMode/ExpectDTR","powerup","acm2","acm3","rmnet0","rmnet1"
OK
AT+CFUN=1,1
OK
^SYSSTART
AT^SCFG="MEopMode/ExpectDTR"
^SCFG: "MEopMode/ExpectDTR","current","acm2","acm3","rmnet0","rmnet1"
^SCFG: "MEopMode/ExpectDTR","powerup","acm2","acm3","rmnet0","rmnet1"
OK

<fgi_split_mode>(str)(NV)

split feature group indication

This parameter controls split feature group indication.
The feature is used in networks, which support the split FGI – LTE-FDD/-TDD (3GPP 36.331 – "tdd-Add-UE-EUTRA-Capabilities-r9 UE-EUTRA-CapabilityAddXDD-Mode-r9")

"0"	disable
"1"	enable

<com>(str)(NV)

AT+COPS operation mode

Parameter determines whether to use the UE's standard AT+COPS write command (default) or the non-blocking AT+COPS write command. In non-blocking mode the AT+COPS write command immediately returns OK. In this mode, the AT command interface will not be blocked till the search is finished. The status of the search will be indicated by the "+CREG" URC.

"0"(D)	Normal mode The standard mode of AT+COPS write command.
"1"	Non-blocking mode AT+COPS write command immediately returns OK.

<ims>(str)(NV)

IMS Mode

The parameter <ims> of AT^SCFG "MEopMode/IMS" can be used to enable or disable the IMS registration attempt after LTE attach. If value is not supported a "NOT IN USE" will be given.
Depending on provider requirements, the delivery value is part of the provider profiles preconfigured in the UE, thus eliminating the need to change it. If nevertheless the setting may need to be changed consider that the new setting takes effect after restart.

"0"	Disable IMS registration attempt after LTE attach.
"1"	Enable IMS registration attempt after LTE attach.

<lci>(str)

Low Current Indicator

Setting can be used to enable or disable the Low Current Indicator using the line specified with parameter <gpio>. For details refer to "PLAS9-W Hardware Interface Description, Version 01.005".

"disabled"(P)	Low Current Indicator is disabled.
"enabled"	Low Current Indicator is enabled.

<gpio>(str)

Low Current Indicator GPIO

Parameter specifies the GPIO used as Low Current Indicator.
If Low Current Indicator is enabled with parameter <lci>, the used GPIO cannot be assigned to other functions such as GPIO handler (see AT^SCPIN) or Remote Wakeup line (see <RemWakeLine>). Vice versa, if assigned to another function a GPIO cannot be configured as Low Current Indicator.

"GPIO1"...["GPIO6"]..."GPIO10"

<provAutoSelect>(str)(NV)

Autoselect provider profile

The AT^SCFG "MEopMode/Prov/AutoSelect" parameter <provAutoSelect> enables / disables the autoselection of provider profiles. Setting takes effect after next restart.

The UE comes with two types of preconfigured provider profiles:

- *Dedicated provider profiles distinguished by the IIN field (Issuer Identification Number) of the ICCIDs in the SIM:*
  Each provider profile loads a set of non-volatile provider specific settings, such as PDP contexts defined with AT+CGDCONT, as well as IMS settings if applicable for the specific provider.
- *One Fallback profile intended for all other providers:*
  The fallback profile comes with default PDP contexts. It depends on the provider whether default PDP contexts will do. If not, the TE will be required to define provider specific PDP contexts.

All preconfigured provider profiles are listed by the AT^SCFG=? test command and by ATI61. The currently selected provider profile is indicated by the <provCfg> parameter of the AT^SCFG "MEopMode/Prov/Cfg" read command response, by ATI61 and by the <provCur> parameter of the AT^SIND "prov" indicator. For profile settings refer to: AT+CGDCONT, <ims> of AT^SCFG "MEopMode/IMS".
It is the responsibility of the Customer Application manufacturer to use a desired profile.

“on“(D)	Autoselection is on. The provider profile changes automatically when the inserted SIM card matches one of the provider profiles preconfigured in the UE.
“off“	Autoselection is off. The provider profile can be set manually using the AT^SCFG "MEopMode/Prov/Cfg" write command.

If autoselection is "on", provider profile settings are non-volatile as long as the same SIM or a SIM of the same provider is inserted. Otherwise, if a different provider configuration is selected, or a SIM of a different provider is inserted the existing profile will be cleared before the new profile can be loaded. This applies, in particular, to all PDP contexts defined by AT+CGDCONT, no matter whether loaded as part of a preconfigured provider profile, or set by the TE.
If the fallback profile is enabled, provider profile settings are non-volatile only as long as exactly the same SIM is inserted. Changing the SIM, even though a SIM of the same issuer, always clears all profile settings.

The provider profile status is reported by the URC +CIEV: prov,<provMm>,<provCur> (see AT^SIND "prov"). The URC is enabled by powerup default. The URC reports the current provider profile status after UE restart and any change of the provider profile configuration when autoselection is "on".
If the ICCID IIN of the inserted SIM matches one of the dedicated preconfigured provider profiles <provMm> equals 0.
If the ICCID IIN of the inserted SIM does not match any dedicated preconfigured provider profile <provMm> equals 1. For the fallback provider profile <provMm> is always 1.

<provCfg>(str)(NV)

Provider configuration

The AT^SCFG "MEopMode/Prov/Cfg" parameter <provCfg> controls the provider profiles.
It is not allowed to manually change the provider profile when <provAutoSelect> value is "on". Any attempt to do so will be denied with result code "+CME ERROR: operation temporary not allowed".
During internal provider reconfiguration it is possible that the AT^SCFG "MEopMode/Prov/Cfg" write command response with result code "+CME ERROR: operation temporary not allowed".
For manual selection, setting takes effect after next restart.

“fallb*“(D)	This value represents the fallback provider profile. Can be used if the inserted SIM card does not match the provider profiles preconfigured in the UE. The "*" is only a sign. Do not use this "*" in the provider profile name when setting the fallback provider profile.
“tmode“	*EXAMPLE !* Provider T-Mobile
“vdfde“	*EXAMPLE !* Provider Vodafone

"..."	Next possible provider ...
"..."	Next possible provider ...

<PwrSaveMode>(str)(NV)

Power Save Mode

AT^SCFG "MeOpMode/PwrSave" settings allow to control the PLAS9-W's power saving behavior.
See also "PLAS9-W Hardware Interface Description, Version 01.005" for additional advice on power saving requirements.

The UE integrates two CPUs, one referred to as CPU-A or application processor, the other one referred to as CPU-M or modem processor. Specific power saving functions are executed on each CPU. To save power each CPU enters a Low Power Mode (LPM) whenever possible. For maximum power saving both CPUs must be in LPM. There are two ways to wake up the CPUs: event triggered and timer controlled.
The AT^SCFG "MeOpMode/PwrSave" subcommand specifies the following settings:

- whether a CPU shall enter LPM at all (set with <PwrSaveMode>)
- how long a CPU may remain in LPM = max. LPM time (set with <PwrSavePeriod>)
- how long a CPU shall run before it is allowed to enter LPM again = min. active time (set with <PwrSave-Wakeup>).

If different maximum LPM times are given and one is an integer multiple of the other one the software tries to synchronize the wake-up at maximum LPM time.

"disabled"(D)	LPM is disabled. Under no circumstances the UE will enter its power save (SLEEP) state.
"enabled"	LPM is enabled for given CPU. This mode enables the UE to enter LPM when no activity occurs on any port. Please note that, regardless of this setting, power saving will always be disabled until 5 seconds after powerup. For further detail refer to parameter <PwrSaveSet>.

<PwrSavePeriod>(str)(NV)

Maximum Power Save Period

If <PwrSaveMode> is "enabled" the <PwrSavePeriod> value specifies the maximum duration the given CPU is allowed to stay in LPM.

Value range for CPU-A (resolution for CPU-A is 1s, thus a given value is internally rounded to full seconds):

"0"(D)..."4"	Internally rounded to 0. No limit. CPU-A may stay in LPM until an event triggered wakeup occurs.
"5"..."44"	Maximum LPM time of CPU-A is 4 seconds.
"45"..."36000"	Maximum LPM time of CPU-A is (<PwrSavePeriod>+5)/10 seconds.

Value range for CPU-M:

"0"(D)..."36000"	Maximum LPM time. 0 = No limit, CPU-M may stay in LPM until an event triggered wakeup occurs. 1...36000 = maximum LPM time of CPU-M in in 1/10 seconds.

<PwrSaveWakeup>(str)(NV)

Minimum awake time

"0"(D)..."36000"	Minimum delay in 1/10 seconds before the UE enters power save mode (SLEEP) again after a wakeup event.

<PwrSaveCPU>(str)

PowerSaveCPU

The <PwrSaveCPU> parameter allows to configure power saving for the application or modem processor. If the parameter is omitted in the write command the CPU-A is assumed as default.

["CPU-A"]	APPS processor (Linux is running here)
"CPU-M"	Modem processor (radio protocol stack is executed here)

<PwrSaveSet>(str)

The <PwrSaveSet> parameter specifies whether the "MeOpMode/PwrSave" configuration is non-volatile or volatile.
Please note that each time after starting the UE, power saving will be disabled until 5 seconds after the "^SYSSTART" URC, regardless of the power save configuration set before powerup. Also, note that during this time any changes to power save settings will not be accepted. After this time the configuration selected before powerup becomes effective, and changing the configuration is also allowed.

"powerup"(D)	Power save configuration is non-volatile (written to flash), and becomes effective immediately and 5 seconds after the "^SYSSTART" URC.
"current"	Power save configuration is volatile (not written to flash), and becomes effective immediately. The powerup configuration won't be changed.

<srpom>(str)(NV)

Radio Policy Manager Mode

Depending on the provider configuration it is possible that the AT^SCFG="MEopMode/SRPOM" command is not available.
This parameter enables / disables the usage of the default Radio Policy Manager (RPM) parameter settings according to GSMA "TSG.34/TS.34 - IoT Device Connection Efficiency Guidelines", as of Version 1.x, chapter 8.
If RPM files are found on the inserted USIM the configuration given in these RPM files applies, i.e. the Radio Baseband Chipset shall use the RPM parameter settings of the USIM. In this case <srpom> settings are not effective.
If the USIM does not contain RPM files, RPM functionality shall be enabled or disabled based on the default setting of the UE's RPM parameter settings.
The AT^SINFO="RPM" subcommand returns the currently loaded RPM (Radio Policy Manager) parameters.
In some special provider configurations setting to enable or disable is not allowed. In this case the result code will be "+CME ERROR: operation temporary not allowed".
Delivery value is dependent of provider requirements.
Changed value takes effect after restart.

"0"	Usage of default RPM parameter settings saved in the UE is disabled.
"1"	Usage of default RPM parameter settings saved in the UE is enabled. Compliant with TS.34_8.2.1_REQ_001 in the GSMA "TSG.34/TS.34 - IoT Device Connection Efficiency Guidelines", as of Version 1.x, chapter 8.
"99"	RPM has an inconsistent setting. This parameter is not writable. Therefore this value will be denied with result code "+CME ERROR: operation not allowed".

<usbKeepDataSet>(str)

The <usbKeepDataSet> parameter specifies whether the "MEopMode/USB/KeepData" configuration set with <usbKeepDataPort> is non-volatile or volatile.

"current"	The currently used configuration (volatile).
"powerup"	The configuration used after powerup or restart (non-volatile).

<usbKeepDataPort>(str)

On ports not listed with <usbKeepDataPort> calls or data connections pending at this time will not be dropped while VUSB is removed (USB DISCONNECT). Any data, already pending at this time or becoming pending while VUSB is removed, are kept till they are picked up by the host. Module will not drop calls or data connections pending at that time on such port only because VUSB has been removed. The supported ports are reported by the AT^SCFG test command in the line for "MEopMode/USB/KeepData". By delivery default the "MEopMode/USB/KeepData" feature is activated for all ports.

“acm1“(D)	Refers to USB0 set with AT^SSRVSET, parameter <Device>
“acm2“(D)	Refers to USB1 set with AT^SSRVSET, parameter <Device>
“acm3“(D)	Refers to USB2 set with AT^SSRVSET, parameter <Device>
“acm4“(D)	Refers to USB3 set with AT^SSRVSET, parameter <Device>
“rmnet0“(D)	WWAN adapter
“rmnet1“(D)	WWAN adapter

<msi>(str)(NV)

Parameter determines the switching mode of the ignition line (IGT): The line may either be used only to switch on the UE, or to toggle it on and off. For details refer to "PLAS9-W Hardware Interface Description, Version 01.005".

“on“	Ignition line (IGT) can be used to switch on and off the UE.
“off“(D)	Ignition line (IGT) can be used to switch on the UE.

<shutdownRemainingTime>(str)

Remaining time for timer controlled shutdown

Remaining time in minutes until PLAS9-W is powered down automatically. The timer is based on the real time clock of the PLAS9-W (see AT+CCLK).
Please note, that changing the real time clock using AT+CCLK influences the remaining time for an activated automatic shutdown timer. Setting the time into the past will increase the remaining time, setting the time into the future will decrease the remaining time. If the real time clock is set to a time later than the expiration time of the active automatic shutdown timer, then the automatic shutdown is disabled.

“off“(P)	Automatic shutdown is disabled
“0“	Automatic shutdown within the next minute
"1"..."525600"	Automatic shutdown after specified number of minutes

<CId>(str)(+CSCS)(NV)

Customer Id

Setting allows customers to store an identification string. It is not used by the UE itself. The maximum length of the string is 290 characters (GSM or UCS2 or IRA depending on the setting of AT+CSCS). The delivery value is an empty string.

<rba2g>(str)(NV)

<rba2g> determines the 2G frequency bands the UE is allowed to use. Values are given in *hexadecimal 32-bit-value order.* Every bit corresponds to a dedicated band number. Leading zeros and 0x... are not necessary.

“1“	GSM 900
“2“	GSM 1800

Factory default of <rba2g> is the combination of all available bands meaning that all supported bands are allowed. If AT+COPS equals "0" (automatic mode) this solution allows the subscriber to take advantage of a full-featured automatic network selection when trying to register.
Therefore, changes to the band configuration are recommended only if the subscriber wishes to restrict the allowed bands to a specific band or band combination, in particular to speed up the network search, and thus,

to reduce the power consumption. In such case, <rba2g> may be one of the supported single values listed below.
If the additional parameter <rbe>="0" or omitted any change to this parameter will take effect after UE restart. So, <rba2g> is a parameter that may be used to read out the current band combination any time, but the read value is used for reinitializing the UE after next restart.
If the additional parameter <rbe>="1" any change takes effect immediately and will also be effective after next UE restart.

Note: The AT^SCFG=? test command shows the minimum and maximum band values. Switching off all bands using AT^SCFG="Radio/Band/2G","0" is possible.

<rba3g>(str)(NV)

<rba3g> determines the 3G frequency bands the UE is allowed to use. Values are given in *hexadecimal 32-bit-value order.* Every bit corresponds to a dedicated band number. Leading zeros and 0x... are not necessary.

“1“	WCDMA 2100 (BC1)
“4“	WCDMA 1800 (BC3)
“10“	WCDMA 850 (BC5)
“20“	WCDMA 800 (BC6)
“80“	WCDMA 900 (BC8)

Factory default of <rba3g> is the combination of all available bands meaning that all supported bands are allowed. If AT+COPS equals "0" (automatic mode) this solution allows the subscriber to take advantage of a full-featured automatic network selection when trying to register.
Therefore, changes to the band configuration are recommended only if the subscriber wishes to restrict the allowed bands to a specific band or band combination, in particular to speed up the network search, and thus, to reduce the power consumption. In such case, <rba3g> may be one of the supported single values listed below.
If the additional parameter <rbe>="0" or omitted any change to this parameter will take effect after UE restart. So, <rba3g> is a parameter that may be used to read out the current band combination any time, but the read value is used for reinitializing the UE after next restart.
If the additional parameter <rbe>="1" any change takes effect immediately and will also be effective after next UE restart.

Note: The AT^SCFG=? test command shows the minimum and maximum band values. Switching off all bands using AT^SCFG="Radio/Band/3G","0" is possible.

<rba4g-1>(str)(NV)

<rba4g-1> determines 4G frequency bands the UE is allowed to use. Values are given in *hexadecimal 32-bit-value order.* Every bit corresponds to a dedicated band number. Leading zeros and 0x... are not necessary. The number range of <rba4g-1> covers band 1 to band 32.

“1“	LTE 2100 (B1)
“4“	LTE 1800 (B3)
“10“	LTE 850 (B5)
“40“	LTE 2600 (B7)
“80“	LTE 900 (B8)
“20000“	LTE 850 (B18)
“40000“	LTE 800 (B19)
“80000“	LTE 800 (B20)
“2000000“	LTE 850 (B26)
“8000000“	LTE 700 (B28)

Factory default of <rba4g-1> is the combination of all available bands meaning that all supported bands are allowed. If AT+COPS equals "0" (automatic mode) this solution allows the subscriber to take advantage of a full-featured automatic network selection when trying to register.
Therefore, changes to the band configuration are recommended only if the subscriber wishes to restrict the allowed bands to a specific band or band combination, in particular to speed up the network search, and thus,

to reduce the power consumption. In such case, <rba4g-1> may be one of the supported single values listed below.
If the additional parameter <rbe>="0" or omitted any change to this parameter will take effect after UE restart. So, <rba4g-1> is a parameter that may be used to read out the current band combination any time, but the read value is used for reinitializing the UE after next restart.
If the additional parameter <rbe>="1" any change takes effect immediately and will also be effective after next UE restart.

Note: The AT^SCFG=? test command shows the minimum and maximum band values. Switching off all bands using AT^SCFG="Radio/Band/4G","0","0" is possible.

<rba4g-2>(str)(NV)

<rba4g-2> determines 4G frequency bands the UE is allowed to use. Values are given in *hexadecimal bit-value order.* Every bit corresponds to a dedicated band number. Leading zeros and 0x... are not necessary. The number range of <rba4g-2> covers band 33 to max possible band. If the UE does not support bands higher as 32 the AT^SCFG test command returns the value range 0 - 0, and the AT^SCFG read command response does not display <rba4g-2>.

“20“	LTE 2600 (B38)
“40“	LTE 1900 (B39)
“80“	LTE 2350 (B40)
“100“	LTE 2550 (B41)

Factory default of <rba4g-2> is the combination of all available bands meaning that all supported bands are allowed. If AT+COPS equals "0" (automatic mode) this solution allows the subscriber to take advantage of a full-featured automatic network selection when trying to register.
Therefore, changes to the band configuration are recommended only if the subscriber wishes to restrict the allowed bands to a specific band or band combination, in particular to speed up the network search, and thus, to reduce the power consumption. In such case, <rba4g-2> may be one of the supported single values listed below.
If the additional parameter <rbe>="0" or omitted any change to this parameter will take effect after UE restart. So, <rba4g-2> is a parameter that may be used to read out the current band combination any time, but the read value is used for reinitializing the UE after next restart.
If the additional parameter <rbe>="1" any change takes effect immediately and will also be effective after next UE restart.

Note: The AT^SCFG=? test command shows the minimum and maximum band values. Switching off all bands using AT^SCFG="Radio/Band/4G","0","0" is possible.

<rbaTdScdma>(str)(NV)

Parameter determines TD-SCDMA frequency band usage of the UE in *hexadecimal 32-bit-value order* and every bit corresponds to a dedicated band number. Leading zeros and 0x... are not necessary.
Factory default of <rbaTdScdma> is the combination of all available bands meaning that all supported bands are allowed. If AT+COPS equals "0" (automatic mode) this solution allows the subscriber to take advantage of a full-featured automatic network selection when trying to register.
Therefore, changes to the band configuration are recommended only if the subscriber wishes to restrict the allowed bands to a specific band or band combination, in particular to speed up the network search, and thus, to reduce the power consumption. In such case, <rbaTdScdma> may be one of the supported single values listed below.
If the additional parameter <rbe>="0" or omitted any change to this parameter will take effect after UE restart. So, <rbaTdScdma> is a parameter that may be used to read out the current band combination any time, but the read value is used for reinitializing the UE after next restart.
If the additional parameter <rbe>="1" any change takes effect immediately and will also be effective after next UE restart.

“1“	TD-SCDMA 2000 Band A (B34)
“20“	TD-SCDMA 1900 Band F (B39)

Note: The AT^SCFG=? test command shows the minimum and maximum band values. Switching off all bands using AT^SCFG="Radio/Band/TdScdma","0" is possible.

<rbe>(str)

Radio Band Enable: Set radio bands immediately activ

The additional <rbe> parameter determines when a changed <rba2g> or <rba3g> or <rba4g-1> and/or <rba4g-2> or <rbaTdScdma> value becomes effective.

"0"	<rba2g> and <rba3g> and <rba4g-1> and <rba4g-2> and <rbaTdScdma> takes effect after next restart.
"1"	<rba2g> and <rba3g> and <rba4g-1> and <rba4g-2> and <rbaTdScdma> takes effect immediately and will also be effective after next restart. Setting a new <rba2g> or <rba3g> or <rba4g-1> and/or <rba4g-2> or <rbaTdScdma> value and <rbe>= 1 causes the UE to restart a network search and to deregister and re-register. If old and new <rba2g> and <rba3g> and <rba4g-1> and <rba4g-2> and <rbaTdScdma> are the same the command will be accepted without triggering a network search and without effect on the registration.

Note: Please note if <rbe>=1 is used all enabled radio bands are set immediately, even if you just change only one band.

Note: If an attempt is made to turn off the last enabled band with <rbe>=1, an error message is generated.

<cns>(str)

Continuous Network Search Mode

This parameter can be used to influence the time the UE takes to register to the network.

"0"(P)	Normal When trying to register to a network the UE sleeps longer than in "Fast mode" before restarting a network scan.
"1"	Fast "Fast mode" reduces the time the UE sleeps before restarting a network scan when trying to register. Advantage: If the UE is out of network service it may take less time to find a network. Disadvantage: Higher current consumption while the UE is out of network service.

Note: To monitor the search process it may be useful to have the "+CREG" URC enabled.

<PL_mode>(str)

Power Limitation Mode

AT^SCFG subcommand "Radio/Mtpl/..." can be used to instantly adapt the module's Specific Absorption Rate (SAR) by reducing its output power for specific or all bands in any operating mode. 8 profiles for instant RF output power limitation can be defined and stored to the NV memory.
<PL_mode> 0 and 1 (deactivate / activate) are applicable only with "Radio/Mtpl".
Modes 2 and 3 (query / configure) are applicable only with specific subcommands.
- for GSM use "Radio/Mtpl/2G".
- for WCDMA use "Radio/Mtpl/3G".
- for TD-SCDMA use "Radio/Mtpl/TdScdma".
- for LTE use "Radio/Mtpl/4G".
A profile contains all supported bands
- for GSM see <PL_band2g>,
- for WCDMA see <PL_band3g>,
- for TD-SCDMA see <PL_bandTdScdma>,
- for LTE see <PL_band4g-1> and <PL_band4g-2>
and, for each single band, a parameter limiting the maximum RF output power
- for GSM see <PL_limit2g>,
- for WCDMA see <PL_limit3g>,
- for TD-SCDMA see <PL_limitTdScdma>,
- for LTE see <PL_limit4g>.

For GSM, a second parameter, <PL_limit_psk>, is required to set the RF output power limit for GSM 8 PSK. The RF output power limit for a GSM band is related to one transmit timeslot. If two/three/four timeslots are used for transmission the specified power limit is reduced by another 3 / 4.8 / 6 dB.
Changing limit values of a profile with <PL_mode> 3 takes effect after UE restart only. Activating and deactivating power limitation with <PL_mode> 1 or 0, takes effect instantly. The <PL_mode> is volatile, therefore output power limitaton is deactivated after UE restart.
For an example on how to configure and trigger instant power limitation see below *Example* section.
Note: Bands WCDMA 850 (BC5) and WCDMA 800 (BC6) use the same SAR configuration. Therefore, changing the configuration of one of them will automatically set the same configuration for the other one.

"0"(P)	Power limitation deactivated (no further parameters are possible).
"1"	Power limitation activated. <PL_profile> parameter is mandatory for activation.
"2"	Query profile settings. The response shows the currently used limit values if instant power limitation is active, i.e. if <PL_mode>= 1. Therefore, bear in mind that modified profile values will be visible only if you restart the UE and run a query before activating instant power limitation. You can read either all profiles, or a specific profile by adding a <PL_profile> number.
"3"	Configure profile. All parameters are mandatory. Remember to restart the UE after changing the output power limits of a profile.

<PL_profile>(str)

Power Limitation Profile

This parameter identifies a profile.
When no profile is activated <PL_mode> "0" is returned and if any profile is activated <PL_mode> "1" and <PL_profile> "1" ... "8" is returned in read command.

"1"..."8"	Number of profile.

<PL_band2g>(str)

Radio Band 2G

Parameter specifies the 2G frequency bands of the UE in *hexadecimal 32-bit-value order.* Every bit corresponds to a dedicated band number. Leading zeros and 0x... are not necessary.

"1"	GSM 900
"2"	GSM 1800

<PL_band3g>(str)

Radio Band 3G

Parameter specifies the 3G frequency bands of the UE in *hexadecimal 32-bit-value order.* Every bit corresponds to a dedicated band number. Leading zeros and 0x... are not necessary.

"1"	WCDMA 2100 (BC1)
"4"	WCDMA 1800 (BC3)
"10"	WCDMA 850 (BC5)
"20"	WCDMA 800 (BC6)
"80"	WCDMA 900 (BC8)

<PL_band4g-1>(str)

Radio Band 4G First Part

Parameter specifies the 4G frequency bands of the UE in *hexadecimal 32-bit-value order.* Every bit corresponds to a dedicated band number. Leading zeros and 0x... are not necessary. Value <PL_band4g-1> supports band 1 to band 32.

“0“	Must be used when setting any value for <PL_band4g-2> (parameter is mandatory).
“1“	LTE 2100 (B1)
“4“	LTE 1800 (B3)
“10“	LTE 850 (B5)
“40“	LTE 2600 (B7)
“80“	LTE 900 (B8)
“20000“	LTE 850 (B18)
“40000“	LTE 800 (B19)
“80000“	LTE 800 (B20)
“2000000“	LTE 850 (B26)
“8000000“	LTE 700 (B28)

<PL_band4g-2>(str)

Radio Band 4G Second Part

Parameter specifies the 4G frequency bands of the UE in *hexadecimal 32-bit-value order.* Every bit corresponds to a dedicated band number. Leading zeros and 0x... are not necessary. <PL_band4g-2> specifies band 33 to band 64 (if supported by UE).

“0“	Must be used when setting any value for <PL_band4g-1> (parameter is mandatory).
“20“	LTE 2600 (B38)
“40“	LTE 1900 (B39)
“80“	LTE 2350 (B40)
“100“	LTE 2550 (B41)

<PL_bandTdScdma>(str)

Radio Band TD-SCDMA

Parameter specifies the TD-SCDMA frequency bands the UE is allowed to use. Values are given in *hexadecimal 32-bit-value order.* Every bit corresponds to a dedicated band number. Leading zeros and 0x... are not necessary.

“1“	TD-SCDMA 2000 B34 (BANDA)
“20“	TD-SCDMA 1900 B39 (BANDF)

<PL_limit2g>(str)(NV)

Power Limitation 2G

This parameter is used to set the power limit.
Setting takes effect after next restart.

"18"..."33"	Power limit value in dBm for GSM low bands.
"18"..."30"	Power limit value in dBm for GSM high bands.

`<PL_limit3g>`(str)(NV)

Power Limitation 3G

This parameter is used to set the power limit.
Setting takes effect after next restart.

"18"..."24"	Power limit value in dBm for WCDMA bands.

`<PL_limit4g>`(str)(NV)

Power Limitation 4G

This parameter is used to set the power limit.
Setting takes effect after next restart.

"18"..."24"	Power limit value in dBm for LTE bands.

`<PL_limitTdScdma>`(str)(NV)

Power Limitation TD-SCDMA

This parameter is used to set the power limit.
Setting takes effect after next restart.

"18"..."24"	Power limit value in dBm for TD-SCDMA bands.

`<PL_limit_psk>`(str)(NV)

Power Limitation 8 PSK (only for GSM)

This parameter is used to set the power limit 8 PSK.
Setting takes effect after next restart.

"18"..."27"	Power limit value in dBm only for GSM 8 PSK low bands.
"18"..."26"	Power limit value in dBm only for GSM 8 PSK high bands.

`<ropr>`(str)(NV)

Radio Output Power Reduction

According to 3GPP TS 45.005, it is permissible to reduce the the maximum (E)GPRS output power. The amount of the maximum (E)GPRS power reduction is configurable for the case of 4TX.
Setting takes effect after next restart.

“4“(D)	No power reduction with GMSK and 8PSK.
“5“	2 dB power reduction with GMSK (with 4 Tx), no power reduction for 8PSK.
“6“	4 dB power reduction with GMSK (with 4 Tx), no power reduction for 8PSK.
“7“	6 dB power reduction with GMSK (with 4 Tx), no power reduction for 8PSK.
“8“	Max. power reduction for GSMK and 8PSK (6dB for 4 Tx).

`<RemWakeLine>`(str)(NV)

Remote Wakeup line

This parameter is part of the `AT^SCFG` subcommands "RemoteWakeUp/Event/URC" and "RemoteWakeUp/Event/USB" specifiying the lines that may be used for Remote Wakeup, also referred to as host wakeup.
An external host application (the TE) may shut down its own module interfaces or other components in order to save power. If a call, data, or other request (URC) arrives, the TE can be notified of this event and be woken up by a state transition of a configurable remote wakeup line. Available as Remote Wakeup lines are all GPIO signals as well as the RING0 line.
When configuring a GPIO as Remote Wakeup line keep in mind that it is locked for other functions, such as

GPIO handler (see AT^SCPIN) or Low Current Indicator (see AT^SCFG "MEopMode/PowerMgmt/LCI" parameter <lci>).

Types of event:

- "RemoteWakeUp/Event/URC": The selected hardware line is toggled each time when a URC is generated.
  Note: If the AT command interface is in command mode URCs will be written to the USB transmit buffer, and the "RemoteWakeUp/Event/USB" event triggers a wakeup. However, if the AT command interface is in data mode URCs will not be written to the USB transfer buffer, and the "RemoteWakeUp/Event/USB" event would not be effective. Therefore, to allow Host Wakeup by URCs also during data mode, the "RemoteWakeUp/Event/URC" event has been implemented in addition to the "RemoteWakeUp/Event/USB". Once the "RemoteWakeUp/Event/URC" event is enabled it will be effective both in in command and data mode.
- "RemoteWakeUp/Event/USB": UE has any kind of data (incl. URCs) on a USB port to be transferred to the TE while USB is in SUSPEND state or DETACHED as specified in the "USB Specification Revision 2.0/3.0". The USB port has to be specified via <RemWakePort>.
  Note: If no hardware line is configured for this event type a remote wakeup as specified in the "USB Specification Revision 2.0/3.0" is executed. Both mechanisms are mutually exclusive.

The <RemWakeLine> parameter determines the line(s) that shall be toggled. For each Remote Wakeup event type you have the choice to specify the same line or different lines for all event types. The pulse duration of the Remote Wakeup signal is configurable via <RemWakePulse>.

“none“(D)	No hardware line is configured as Remote Wakeup signal.
"GPIO1"..."GPIO10"	GPIO toggles when the assigned event occurs. The GPIO is active high.
“RING0“	RING0 line toggles when the assigned event occurs. The RING0 line is active low. When using the RING0 line keep in mind that the options AT^SCFG "RemoteWakeUp/Event/..." and AT^SCFG "URC/Ringline" <urcRinglineCfg>="ASC0" are mutually exclusive (as both refer to the module's physical RING0 line).

<RemWakePortSet>(str)(NV)

Set of ports signaling Remote Wakeup Events

The <RemWakePortSet> parameter specifies whether the "RemoteWakeUp/Ports" configuration set with <RemWakePort> is volatile or non-volatile.

“current“	The currently used configuration (volatile).
“powerup“	The configuration used after powerup or restart (non-volatile).

<RemWakePort>(str)

Port

Only ports listed with <RemWakePort> try to wake up the TE when data is pending on this port. The supported ports are reported by the AT^SCFG test command in the line for "RemoteWakeUp/Ports".
Keep in mind that AT^SCFG "URC/DstIfc" specifies the port used for URC presentation, see parameter <urcDestIfc>. It is not recommended to remove this port from the <RemWakePort> list.

“acm1“(D)	Refers to USB0 set with AT^SSRVSET, parameter <Device>
“acm2“(D)	Refers to USB1 set with AT^SSRVSET, parameter <Device>
“acm3“(D)	Refers to USB2 set with AT^SSRVSET, parameter <Device>
“acm4“(D)	Refers to USB3 set with AT^SSRVSET, parameter <Device>
“rmnet0“(D)	WWAN adapter
“rmnet1“(D)	WWAN adapter

<RemWakePulse>(str)(NV)

Remote Wakeup Pulse Duration

Parameter specifies the pulse duration for a Remote Wakeup Event in 1/100 seconds.

"1"..."10"(D)..."100"

<CS>(str)(NV)

Card slot / USIM

AT^SCFG subcommand "SIM/CS" specifies the (U)SIM interface currently used. Usage of this command depends on whether the host application is designed to include an additional second (U)SIM interface. Only one of the supported (U)SIM interfaces can be used at a time. For details on how to connect the first and the second (U)SIM interface please refer to "PLAS9-W Hardware Interface Description, Version 01.005".

“NO_SIM“	No USIM interface is used, no matter whether a USIM is present in one of the slots.
“SIM_1“(D)	First (U)SIM slot is enabled regardless of whether a (U)SIM card is inserted. Access to another (U)SIM inserted in slot 2 is deactivated.
“SIM_2“	Second (U)SIM slot is enabled regardless of whether a (U)SIM card is inserted. Access to another (U)SIM inserted in slot 1 is deactivated.

To check the status of the (U)SIM and the (U)SIM interface you can take advantage of several URCs, such as AT^SIND "simstatus", AT^SCKS, AT^SSET.
When the configuration changes, the UE tries to start the selected (U)SIM interface, no matter whether a CCIN line is populated. Therefore, please note that the AT^SIND "simstatus" indicator and the AT^SCKS URCs will show up 3 times when the selected (U)SIM slot is empty. Both URCs will show a sequence of values 0, 1, 0 (e.g. "^SCKS: 0", "^SCKS: 1", "^SCKS: 0" and "+CIEV: simstatus,0", "+CIEV: simstatus,1", "+CIEV: simstatus,0"). If a (U)SIM is inserted both URCs will show value 1.

<SmsAcknl>(str)

SMS auto acknowledge

Parameter activates or deactivates the ability to automatically acknowledge an incoming short message directly routed to the TE.

“0“(P)	No automatic acknowledgement.
“1“	UE will automatically acknowledge an incoming short message directly routed to the TE / immediately displayed. This eliminates the need for the user to manually acknowledge such messages with AT+CNMA. Please keep in mind that you may lose an incoming short message if the interface is blocked.

<SmsRetrmTimeout>(num)(NV)

SMS retransmission timeout in seconds
If the UE fails to send an MO short message, a new attempt of re-transmitting it will be done after <SmsRetrmTimeout>. The total period during which the UE tries to send a short message is 180 seconds - after this time an attempt to send the message is dropped.
Default value is dependent of the provider configuration. Setting takes effect after next restart.

1...45

<TraceSim>(str)

Trace SIM

This parameter determines the QXDM tracing configuration for UICC related messages.

“none“(P)	No QXDM tracing of UICC related messages
“raw“	QXDM tracing of UICC related messages in raw format
“decoded“	QXDM tracing of UICC related messages in decoded format

<urcDestIfc>(str)(NV)

Parameter determines which interface will be used for URC presentation. Note that the recommended approach for a typical PLAS9-W application is using the default configuration. If changing the configuration please carefully read Section 1.4, AT Command Interpreter and Section 1.8, Unsolicited Result Code Presentation.
If the application port is not available, then it is not possible to select it.
If the modem interface is used, keep in mind, that if the interface is blocked by an active data connection, this connection should be periodically suspended to check for pending URCs.

“mdm“(D)	Use modem interface to output URCs.
“app“	Use application interface to output URCs.

<urcRinglineCfg>(str)(NV)

Parameter specifies the ring line to be used for signaling URCs both for idle interface and while interface is reserved, i.e. while busy on AT command execution or data transmission.
For details about URC presentation and related hardware signalization refer to Section 1.8, Unsolicited Result Code Presentation. For details on using the RING0 line to wake up the TE refer to "PLAS9-W Hardware Interface Description, Version 01.005".
Note: Setting is local for every AT command instance, i.e. for Modem (MDM) and Application (APP) services; for details refer to Section 1.4, AT Command Interpreter.

“off“	URCs do not activate a ring line.
“local“(D)	A virtual ring line will be activated on the same device where the URC appears.
“asc0“	RING0 line will be activated as Host Wakeup (low active). This option can be set only if the RING0 line is not configured with parameter <RemWakeLine>.

<urcRinglineDuration>(str)(NV)

Parameter determines how long the ring line shall be activated for URC signalization. The type of ring line depends on parameter <urcRinglineCfg>.
For details about URC presentation and related hardware signalization refer to Section 1.8, Unsolicited Result Code Presentation.

“2“(D)	Ring line will be activated for about 1s.
“on“	Ring line is always activated.
“off“	Ring line is always deactived.

Examples

EXAMPLE 1

The example shows how to activate or deactivate output power limitation using the AT^SCFG "Radio/Mtpl" command.
See parameters <PL_mode> and <PL_profile>.

```
^SYSSTART
AT^SCFG="Radio/Mtpl"                    Read "Radio/Mtpl" mode.
^SCFG: "Radio/Mtpl","0"                 Instant power limitation is still disabled.
OK
AT^SCFG="Radio/Mtpl",1,1                Activate Profile 1.
^SCFG: "Radio/Mtpl","1","1"             Instant power limitation is now enabled with profile 1.
OK
AT^SCFG="Radio/Mtpl",1,2                Switch profiles, and activate profile 2.
^SCFG: "Radio/Mtpl","1","2"             Instant power limitation is now enabled with profile 2,
                                        still using delivery default values.
OK
AT^SCFG="Radio/Mtpl",0                  Deactivate instant power limitation.
```

^SCFG: "Radio/Mtpl","0"	Instant power limitation is now disabled.
OK	

EXAMPLE 2

The example shows how to query or configure output power limitation using the AT^SCFG "Radio/Mtpl/2G" subcommand.
See parameters <PL_mode>, <PL_profile>, <PL_band2g>, <PL_limit2g>, <PL_limit_psk>.

^SYSSTART	
AT^SCFG="Radio/Mtpl/2G"	Read "Radio/Mtpl/2G" mode.
^SCFG: "Radio/Mtpl/2G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/2G",2,1	Query profile 1 settings. Delivery default settings are shown:
^SCFG: "Radio/Mtpl/2G","2","1","00000001",,"33","27"	
^SCFG: "Radio/Mtpl/2G","2","1","00000002",,"30","26"	
OK	
AT^SCFG="Radio/Mtpl/2G",3,1,1,,25,20	Profile 1: Configure max. RF output power limit of GSM 900 band to 25dBm and 8PSK to 20dBm.
^SCFG: "Radio/Mtpl/2G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/2G",3,1,2,,25,20	Profile 1: Configure max. RF output power limit of GSM 1800 band to 25dBm and 8PSK to 20dBm.
^SCFG: "Radio/Mtpl/2G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/2G",2,1	Query profile 1 settings.
.....	The response returns the old values as above (therefore omitted in this example).
AT+CFUN=1,1	Restart UE to enable the profile 1 settings configured above.
OK	
^SYSSTART	
AT^SCFG="Radio/Mtpl"	Read "Radio/Mtpl" mode.
^SCFG: "Radio/Mtpl","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/2G",2,1	Query profile 1 settings. Changed values are shown now.
^SCFG: "Radio/Mtpl/2G","2","1","00000001",,"25","20"	
^SCFG: "Radio/Mtpl/2G","2","1","00000002",,"25","20"	
OK	
AT^SCFG="Radio/Mtpl",1,1	Activate Profile 1.
^SCFG: "Radio/Mtpl","1","1"	Instant power limitation is now enabled with profile 1 and new limits as changed above.
OK	
AT^SCFG="Radio/Mtpl",1,2	Switch profiles, and activate profile 2.
^SCFG: "Radio/Mtpl","1","2"	Instant power limitation is now enabled with profile 2, still using delivery default values.
OK	
AT^SCFG="Radio/Mtpl",0	Deactivate instant power limitation.
^SCFG: "Radio/Mtpl","0"	Instant power limitation is now disabled.
OK	

EXAMPLE 3

The example shows how to query or configure output power limitation using the AT^SCFG "Radio/Mtpl/3G" subcommand.
See parameters <PL_mode>, <PL_profile>, <PL_band3g>, <PL_limit3g>.

^SYSSTART	
AT^SCFG="Radio/Mtpl/3G"	Read "Radio/Mtpl/3G" mode.
^SCFG: "Radio/Mtpl/3G","0"	Instant power limitation is still disabled.

OK	
AT^SCFG="Radio/Mtpl/3G",2,1	Query profile 1 settings. Delivery default settings are shown:
^SCFG: "Radio/Mtpl/3G","2","1","00000001",,"24"	
^SCFG: "Radio/Mtpl/3G","2","1","00000004",,"24"	
^SCFG: "Radio/Mtpl/3G","2","1","00000010",,"24"	
^SCFG: "Radio/Mtpl/3G","2","1","00000020",,"24"	
^SCFG: "Radio/Mtpl/3G","2","1","00000080",,"24"	
OK	
AT^SCFG="Radio/Mtpl/3G",3,1,1,,23	Profile 1: Configure max. RF output power limit of WCDMA 2100 (BC1) band to 23dBm.
^SCFG: "Radio/Mtpl/3G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/3G",3,1,4,,23	Profile 1: Configure max. RF output power limit of WCDMA 1800 (BC3) band to 23dBm.
^SCFG: "Radio/Mtpl/3G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/3G",3,1,10,,23	Profile 1: Configure max. RF output power limit of WCDMA 850 (BC5) band to 23dBm.
^SCFG: "Radio/Mtpl/3G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/3G",3,1,20,,23	Profile 1: Configure max. RF output power limit of WCDMA 800 (BC6) band to 23dBm.
^SCFG: "Radio/Mtpl/3G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/3G",3,1,80,,23	Profile 1: Configure max. RF output power limit of WCDMA 900 (BC8) band to 23dBm.
^SCFG: "Radio/Mtpl/3G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/3G",2,1	Configure profile 1 settings.
.....	The response returns the old values as above (therefore omitted in this example).
AT+CFUN=1,1	Restart UE to enable the profile 1 settings configured above.
OK	
^SYSSTART	
AT^SCFG="Radio/Mtpl/3G"	Read "Radio/Mtpl/3G" mode.
^SCFG: "Radio/Mtpl/3G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/3G",2,1	Configure profile 1 settings. Changed values are shown now.
^SCFG: "Radio/Mtpl/3G","2","1","00000001",,"23"	
^SCFG: "Radio/Mtpl/3G","2","1","00000004",,"23"	
^SCFG: "Radio/Mtpl/3G","2","1","00000010",,"23"	
^SCFG: "Radio/Mtpl/3G","2","1","00000020",,"23"	
^SCFG: "Radio/Mtpl/3G","2","1","00000080",,"23"	
OK	
AT^SCFG="Radio/Mtpl",1,1	Activate Profile 1.
^SCFG: "Radio/Mtpl","1","1"	Instant power limitation is now enabled with profile 1 and new limits as changed above.
OK	
AT^SCFG="Radio/Mtpl",1,2	Switch profiles, and activate profile 2.
^SCFG: "Radio/Mtpl","1","2"	Instant power limitation is now enabled with profile 2, still using delivery default values.
OK	
AT^SCFG="Radio/Mtpl",0	Deactivate instant power limitation.
^SCFG: "Radio/Mtpl","0"	Instant power limitation is now disabled.
OK	

EXAMPLE 4

The example shows how to query or configure output power limitation using the AT^SCFG "Radio/Mtpl/4G" subcommand.
See parameters <PL_mode>, <PL_profile>, <PL_band4g-1>, <PL_band4g-2>, <PL_limit4g>.

```
^SYSSTART
AT^SCFG="Radio/Mtpl/4G"                    Read "Radio/Mtpl/4G" mode.
^SCFG: "Radio/Mtpl/4G","0"                 Instant power limitation is still disabled.
OK
AT^SCFG="Radio/Mtpl/4G",2,1                Query profile 1 settings. Delivery default settings are
                                           shown:
^SCFG: "Radio/Mtpl/4G","2","1","00000001","00000000","24"
^SCFG: "Radio/Mtpl/4G","2","1","00000004","00000000","24"
^SCFG: "Radio/Mtpl/4G","2","1","00000010","00000000","24"
^SCFG: "Radio/Mtpl/4G","2","1","00000040","00000000","24"
^SCFG: "Radio/Mtpl/4G","2","1","00000080","00000000","24"
^SCFG: "Radio/Mtpl/4G","2","1","00020000","00000000","24"
^SCFG: "Radio/Mtpl/4G","2","1","00040000","00000000","24"
^SCFG: "Radio/Mtpl/4G","2","1","00080000","00000000","24"
^SCFG: "Radio/Mtpl/4G","2","1","02000000","00000000","24"
^SCFG: "Radio/Mtpl/4G","2","1","08000000","00000000","24"
^SCFG: "Radio/Mtpl/4G","2","1","00000000","00000020","24"
^SCFG: "Radio/Mtpl/4G","2","1","00000000","00000040","24"
^SCFG: "Radio/Mtpl/4G","2","1","00000000","00000080","24"
^SCFG: "Radio/Mtpl/4G","2","1","00000000","00000100","24"
OK
AT^SCFG="Radio/Mtpl/4G",3,1,1,0,23         Profile 1: Configure max. RF output power limit of
                                           LTE B1 band to 23dBm.
^SCFG: "Radio/Mtpl/4G","0"                 Instant power limitation is still disabled.
OK
AT^SCFG="Radio/Mtpl/4G",3,1,4,0,23         Profile 1: Configure max. RF output power limit of
                                           LTE B3 band to 23dBm.
^SCFG: "Radio/Mtpl/4G","0"                 Instant power limitation is still disabled.
OK
AT^SCFG="Radio/Mtpl/4G",3,1,10,0,23        Profile 1: Configure max. RF output power limit of
                                           LTE B5 band to 23dBm.
^SCFG: "Radio/Mtpl/4G","0"                 Instant power limitation is still disabled.
OK
AT^SCFG="Radio/Mtpl/4G",3,1,40,0,23        Profile 1: Configure max. RF output power limit of
                                           LTE B7 band to 23dBm.
^SCFG: "Radio/Mtpl/4G","0"                 Instant power limitation is still disabled.
OK
AT^SCFG="Radio/Mtpl/4G",3,1,80,0,23        Profile 1: Configure max. RF output power limit of
                                           LTE B8 band to 23dBm.
^SCFG: "Radio/Mtpl/4G","0"                 Instant power limitation is still disabled.
OK
AT^SCFG="Radio/Mtpl/4G",3,1,20000,0,23     Profile 1: Configure max. RF output power limit of
                                           LTE B18 band to 23dBm.
^SCFG: "Radio/Mtpl/4G","0"                 Instant power limitation is still disabled.
OK
AT^SCFG="Radio/Mtpl/4G",3,1,40000,0,23     Profile 1: Configure max. RF output power limit of
                                           LTE B19 band to 23dBm.
^SCFG: "Radio/Mtpl/4G","0"                 Instant power limitation is still disabled.
OK
AT^SCFG="Radio/Mtpl/4G",3,1,80000,0,23     Profile 1: Configure max. RF output power limit of
                                           LTE B20 band to 23dBm.
^SCFG: "Radio/Mtpl/4G","0"                 Instant power limitation is still disabled.
OK
```

AT^SCFG="Radio/Mtpl/4G",3,1,2000000,0,23	Profile 1: Configure max. RF output power limit of LTE B26 band to 23dBm.
^SCFG: "Radio/Mtpl/4G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/4G",3,1,8000000,0,23	Profile 1: Configure max. RF output power limit of LTE B28 band to 23dBm.
^SCFG: "Radio/Mtpl/4G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/4G",3,1,0,20,23	Profile 1: Configure max. RF output power limit of LTE B38 band to 23dBm.
^SCFG: "Radio/Mtpl/4G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/4G",3,1,0,40,23	Profile 1: Configure max. RF output power limit of LTE B39 band to 23dBm.
^SCFG: "Radio/Mtpl/4G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/4G",3,1,0,80,23	Profile 1: Configure max. RF output power limit of LTE B40 band to 23dBm.
^SCFG: "Radio/Mtpl/4G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/4G",3,1,0,100,23	Profile 1: Configure max. RF output power limit of LTE B41 band to 23dBm.
^SCFG: "Radio/Mtpl/4G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/4G",2,1	Read profile 1 settings.
.....	The response returns the old values as above (therefore omitted in this example).
AT+CFUN=1,1	Restart UE to enable the profile 1 settings configured above.
OK	
^SYSSTART	
AT^SCFG="Radio/Mtpl/4G"	Read "Radio/Mtpl/4G" mode.
^SCFG: "Radio/Mtpl/4G","0"	Instant power limitation is still disabled.
OK	
AT^SCFG="Radio/Mtpl/4G",2,1	Read profile 1 settings. Changed values are shown now.
^SCFG: "Radio/Mtpl/4G","2","1","00000001","00000000","23"	
^SCFG: "Radio/Mtpl/4G","2","1","00000004","00000000","23"	
^SCFG: "Radio/Mtpl/4G","2","1","00000010","00000000","23"	
^SCFG: "Radio/Mtpl/4G","2","1","00000040","00000000","23"	
^SCFG: "Radio/Mtpl/4G","2","1","00000080","00000000","23"	
^SCFG: "Radio/Mtpl/4G","2","1","00020000","00000000","23"	
^SCFG: "Radio/Mtpl/4G","2","1","00040000","00000000","23"	
^SCFG: "Radio/Mtpl/4G","2","1","00080000","00000000","23"	
^SCFG: "Radio/Mtpl/4G","2","1","02000000","00000000","23"	
^SCFG: "Radio/Mtpl/4G","2","1","08000000","00000000","23"	
^SCFG: "Radio/Mtpl/4G","2","1","00000000","00000020","23"	
^SCFG: "Radio/Mtpl/4G","2","1","00000000","00000040","23"	
^SCFG: "Radio/Mtpl/4G","2","1","00000000","00000080","23"	
^SCFG: "Radio/Mtpl/4G","2","1","00000000","00000100","23"	
OK	
AT^SCFG="Radio/Mtpl",1,1	Activate Profile 1.
^SCFG: "Radio/Mtpl","1","1"	Instant power limitation is now enabled with profile 1 and new limits as changed above.
OK	
AT^SCFG="Radio/Mtpl",1,2	Switch profiles, and activate profile 2.
^SCFG: "Radio/Mtpl","1","2"	Instant power limitation is now enabled with profile 2, still using delivery default values.

```
OK
AT^SCFG="Radio/Mtpl",0                  Deactivate instant power limitation.
^SCFG: "Radio/Mtpl","0"                 Instant power limitation is now disabled.
OK
```

EXAMPLE 5

The example shows how to query or configure output power limitation using the AT^SCFG "Radio/Mtpl/TdScdma" subcommand.
See parameters <PL_mode>, <PL_profile>, <PL_bandTdScdma>, <PL_limitTdScdma>.

```
^SYSSTART
AT^SCFG="Radio/Mtpl/TdScdma"            Read "Radio/Mtpl/TdScdma" mode.
^SCFG: "Radio/Mtpl/TdScdma","0"         Instant power limitation is still disabled.
OK
AT^SCFG="Radio/Mtpl/TdScdma",2,1        Query profile 1 settings. Delivery default settings are
                                        shown:
^SCFG: "Radio/Mtpl/TdScdma","2","1","00000001",,"24"
^SCFG: "Radio/Mtpl/TdScdma","2","1","00000020",,"24"
OK
AT^SCFG="Radio/Mtpl/TdScdma",3,1,1,,23  Profile 1: Configure max. RF output power limit of
                                        TD-SCDMA 2000 B34 (BANDA) band to 23dBm.
^SCFG: "Radio/Mtpl/TdScdma","0"         Instant power limitation is still disabled.
OK
AT^SCFG="Radio/Mtpl/TdScdma",3,1,20,,23 Profile 1: Configure max. RF output power limit of
                                        TS-SCDMA 1900 B39 (BANDF) band to 23dBm.
^SCFG: "Radio/Mtpl/TdScdma","0"         Instant power limitation is still disabled.
OK
AT^SCFG="Radio/Mtpl/TdScdma",2,1        Configure profile 1 settings.
......                                  The response returns the old values as above (there-
                                        fore omitted in this example).
AT+CFUN=1,1                             Restart UE to enable the profile 1 settings configured
                                        above.
OK
^SYSSTART
AT^SCFG="Radio/Mtpl/TdScdma"            Configure "Radio/Mtpl/TdScdma" mode.
^SCFG: "Radio/Mtpl/TdScdma","0"         Instant power limitation is still disabled.
OK
AT^SCFG="Radio/Mtpl/TdScdma",2,1        Read profile 1 settings. Changed values are shown
                                        now.
^SCFG: "Radio/Mtpl/TdScdma","2","1","00000001",,"23"
^SCFG: "Radio/Mtpl/TdScdma","2","1","00000020",,"23"
OK
AT^SCFG="Radio/Mtpl",1,1                Activate Profile 1.
^SCFG: "Radio/Mtpl","1","1"             Instant power limitation is now enabled with profile 1
                                        and new limits as changed above.
OK
AT^SCFG="Radio/Mtpl",1,2                Switch profiles, and activate profile 2.
^SCFG: "Radio/Mtpl","1","2"             Instant power limitation is now enabled with profile 2,
                                        still using delivery default values.
OK
AT^SCFG="Radio/Mtpl",0                  Deactivate instant power limitation.
^SCFG: "Radio/Mtpl","0"                 Instant power limitation is now disabled.
OK
```

2.14 AT^SSRVSET Service Interface Configuration

PLAS9-W offers numerous services such as two AT command instances MDM (Modem) and APP (Application). For AT command instances MDM and APP refer to Section 1.4, AT Command Interpreter and AT^SQPORT.
PLAS9-W also offers numerous devices such as USB related channels. USB related channels are part of the UE's USB composition, which can be enabled or disabled.
Hence, AT^SSRVSET serves to configure which service is mapped onto which device. These mappings are stored in Service Sets. A number of fixed (i.e. predefined) Service Sets and some customer configurable Service Sets are available.
Information provided by the active Service Set is evaluated during PLAS9-W restart.

The UE does not support mapping of any available service to every device. Therefore, it is highly recommended to exclusively use the mappings specified in the following table.

After changing the AT^SSRVSET configuration make sure that all device / interface relevant AT commands and settings match. For example, please check, and if needed, modify AT^SCFG subcommands "URC/DstIfc", "URC/Ringline" and "MEopMode/ExpectDTR".

Table 2.6: Validated and released Service/Device Mappings

Service Set	MDM	APP
<SetNum> 2 USB only	USB0	USB1
<SetNum>s ≥ 10 Customer Configurable	USB0	USB1

Syntax

Test Command

AT^SSRVSET=?

Response(s)

OK

Read Command

AT^SSRVSET?

Response(s)

^SSRVSET:<SetNum>, "usbcomp", <comp>, <usbLangId>, <usbVendorId>, <usbProductId>, <usbManufacturer>, <usbProduct>, <usbSerialNo>
^SSRVSET:<SetNum>, "srvmap", <Service>, <Device>
^SSRVSET:...
OK
ERROR
+CME ERROR: <err>

Write Command

Determine or query the Service Set used during next UE restart. Only a valid Service Set can be activated, i.e. at least one AT command service (i.e. MDM or APP) mapping needs to be provided. Otherwise "actSrvSet" subcommand will return an <SrvSetError> code.

AT^SSRVSET="actSrvSet"[, <SetNum>]

Response(s)

If <SetNum> omitted write command is used to query the setting:
^SSRVSET:<SetNum>
OK
If <SetNum> is given write command is used to change the setting:
OK

Write Command (Continued)

Determine or query the Service Set used during next UE restart. Only a valid Service Set can be activated, i.e. at least one AT command service (i.e. MDM or APP) mapping needs to be provided. Otherwise "actSrvSet" subcommand will return an <SrvSetError> code.

AT^SSRVSET="actSrvSet"[, <SetNum>]

Response(s)

In case of an error:
^SSRVSET:"ERROR", <SrvSetError>

OK

Write Command

Generate list of all devices available as part of a certain Service Set.

AT^SSRVSET="listSrvSetDev", <SetNum>

Response(s)

^SSRVSET:"fixDev" , <SetNum>, <Device>[, <Device>, ...]
^SSRVSET:"usbDev" , <SetNum>, <Device>[, <Device>, ...]
^SSRVSET:"muxDev" , <SetNum>, "NONE"
Or in case of an error:
^SSRVSET:"ERROR", <SrvSetError>

OK

Write Command

Query details of service interface configuration currently used by the UE. The configuration data was initially taken from the Service Set database and cannot be changed without UE restart.

AT^SSRVSET="current"

Response(s)

^SSRVSET:"usbcomp", <comp>, <usbLangId>, <usbVendorId>, <usbProductId>, <usbManufacturer>, <usbProduct>, <usbSerialNo>
^SSRVSET:"srvmap", <Service>, <Device>, "NONE"
^SSRVSET:...
Or in case of an error:
^SSRVSET:"ERROR", <SrvSetError>

OK

Write Command

Determine USB composition for a given customer configurable Service Set. This way a USB composition is to be used if the given Service Set is activated for next UE restart.
If parameter <comp> is set to "NONE", the service set does not use a USB composition. Hence, no USB related devices can be mapped to a service. If a device provided as part of a USB composition is used in any mapping of the given Service Set the "usbcomp" subcommand will return an <SrvSetError> code.
If no further parameters are provided this subcommand queries the USB composition used by the UE.

AT^SSRVSET="usbcomp"[, <SetNum>, <comp>]

Response(s)

In case of query of available USB composition:
[^SSRVSET:"usbcomp", <comp>, <usbLangId>, <usbVendorId>, <usbProductId>, <usbManufacturer>, <usbProduct>, <usbSerialNo>]

In case of an error:
^SSRVSET:"ERROR", <SrvSetError>

OK

Write Command

Determine a service - device mapping for a given customer configurable Service Set. This way connects a service to a device related device if the given Service Set is used during UE restart.
If no devices are provided (i.e. parameters <Device> are set to "NONE"), a mapping of the service is deleted if one exists, if not the "srvmap" subcommand will return with <SrvSetError>=3.
It is not possible to map a <Device> to more than one service. "srvmap" subcommand will return an <SrvSetError> code.
Take special care when changing the mapping of the currently active Service Set for use after next UE restart.
It is not allowed to invalidate the active Service Set by deleting the last AT command service (i.e. MDM or APP) mapping. "srvmap" subcommand will return an <SrvSetError> code in this case.

AT^SSRVSET="srvmap", <SetNum>, <Service>, <Device>

Response(s)

In case of an error:
^SSRVSET:"ERROR", <SrvSetError>

OK

Write Command

Dismiss all service - device mappings for a given customer configurable Service Set. If no further parameter is provided this subcommand clears all customer configurable Service Sets. However, it is not allowed to clear the mappings of the currently active Service Set, i.e. which will be used during next UE restart. "clear" subcommand will return an <SrvSetError> code in this case.

AT^SSRVSET="clear"[, <SetNum>]

Response(s)

In case of an error:
^SSRVSET:"ERROR", <SrvSetError>

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<SetNum>(num)(NV)

Service Set Number

The Service Set number can be seen as an index into the Service Set database.

2(D)	Service Set with fixed configuration for accessing USB only.
10...12	Customer configurable Service Sets.

<comp>(str)(NV)

USB Composition Identifier

USB composition identifier.

“NONE“	No USB composition dedicated to a Service Set. Hence, no USB related devices are available to be mapped to a service.
“0061“	This USB composition identifier enumerates the following devices: 4*CDC-ACM (USB0..3), 1*CDC-ACM (USB4 only reserved) and 2*CDC-ECM (WWAN adapters). For details on the CDC-ECM adapters refer to AT^SWWAN.

<usbLangId>(str)(NV)

Language ID

Please refer to "USB Language Identifiers (LANGIDs) [.PDF!]." to find the language IDs currently defined for USB devices. If parameter <usbLangId> is not specified, the default value of the UE's standard USB Device Descriptor configuration applies (US English).
Parameter shall be given in HEX format, maximum 4 characters.

<usbVendorId>(str)(NV)

Vendor ID

This parameter represents the Vendor ID obtained from the USB Implementers Forum. The Vendor ID will, together with the Product ID, be transmitted to the host during USB enumeration. If the parameter <usbVendorId> is not specified, the default value of the UE's standard USB Device Descriptor configuration applies.
Parameter shall be given in HEX format, maximum 4 characters.

<usbProductId>(str)(NV)

Product ID

Product ID (PID) defined by the Customer Application manufacturer to identify the USB device.
The Product ID will, together with the Vendor ID, be transmitted to the host during USB enumeration. If parameter <usbProductId> is not specified, the default value of UE's standard USB Device Descriptor applies.
Parameter shall be given in HEX format, maximum 4 characters.

<usbManufacturer>(str)(NV)

Manufacturer name

Optional manufacturer string defined by the Customer Application manufacturer. If parameter <usbManufacturer> is not specified, the default value of the UE's standard USB Device Descriptor configuration applies.
Parameter length: maximum 63 characters.

<usbProduct>(str)(NV)

Product string

Optional product name defined by the Customer Application manufacturer. If parameter <usbProduct> is not specified, the default value of the UE's standard USB Device Descriptor configuration applies.
Parameter length: maximum 63 characters.

<usbSerialNo>(str)(NV)

Device serial number

Optional serial number. Empty string if not used, like in the case of the UE's standard USB Device Descriptor configuration.
A serial number enables the host to assign the same virtual COM port to the USB device even though the device is connected to another USB port. This eliminates the need for the host to load the driver again.
Parameter length: maximum 4 characters.

<Service>(str)(NV)

List of possible services provided by the UE.

“APP“	Application instance referred to as "Application" if queried with AT^SQPORT. In the quick reference tables it is named APP.
“MDM“	Modem instance referred to as "Modem" if queried with AT^SQPORT. In the quick reference tables it is named MDM.

<Device>(str)(NV)

List of devices provided by the UE.

“NONE“	Special value which is used to indicate that there is no device mapping.
“USB0“	
“USB1“	
“USB2“	Not used in preconfigured Service Sets <SetNum>, but can be selected in a customized Service Set (with <SetNum> ≥ 10). If not used, take care that AT^SCFG "MEopMode/ExpectDTR" feature remains activated for USB2. For details see parameter <expDtrPort>.
“USB3“	Not used in preconfigured Service Sets <SetNum>, but can be selected in a customized Service Set (with <SetNum> ≥ 10). If not used, take care that AT^SCFG "MEopMode/ExpectDTR" feature remains activated for USB3. For details see parameter <expDtrPort>.

<SrvSetError>(num)

Service Set Error

Error result codes.

1	Error cause unknown
2	Parameter out of range
3	Operation not supported
4	No AT command service would be accessible after UE restart
5	Invalid service name
6	Invalid device name
8	Storage failure

Examples

EXAMPLE 1

Query details of service interface configuration currently used by the UE.

`AT^SSRVSET="current"`	For example, if Service Set 2 was active during last start-up of the UE the following information will be provided.
`^SSRVSET: "usbcomp","0061","","1E2D","0061","Cinterion","LTE Modem",""`	
`^SSRVSET: "srvmap","MDM","USB0"`	
`^SSRVSET: "srvmap","APP","USB1"`	
`OK`	

EXAMPLE 2

Configure the customer settings in last row of Table 2.6, Validated and released Service/Device Mappings into Service Set 10.

`^SYSSTART`	After UE restart ...
`AT^SSRVSET="actSrvSet"`	... assure to run a Service Set other than the one to configure
`^SSRVSET: 10`	If not running the right Service Set ...
`OK`	
`AT^SSRVSET="actSrvSet",2`	... switch to Service Set 2.
`OK`	However, the new setting is activated after next UE restart only, ...
`AT+CFUN=1,1`	... therefore, force UE restart.
`OK`	
`^SYSSTART`	The newly selected Service Set is now active.
`AT^SSRVSET="usbcomp",10, "0061"`	Determine the USB composition to be used by Service Set 10.
`OK`	
`AT^SSRVSET="srv-map",10,"MDM" ,"USB0"`	MDM service is accessible via USB0 device.
`OK`	
`AT^SSRVSET="srv-map",10,"APP" ,"USB1"`	APP service is accessible via USB1 device.
`OK`	
`AT^SSRVSET= "actSrvSet",10`	Activate the configured Service Set 10.
`OK`	Consequently, it will be used after next UE restart.

3. Status Control Commands

The AT Commands described in this chapter allow the external application to obtain various status information from the PLAS9-W.

3.1 AT+CEER Extended Error Report

AT+CEER returns an extended error report regarding the reason of the last

- call release
- failure to set up a call (both mobile originated or terminated)
- failure to modify a call by using Supplementary Services
- failed attempt to activate, register, query, deactivate or deregister a Supplementary Service
- unsuccessful PS attach or unsuccessful PDP context activation
- PS detach or PDP context deactivation

The release cause report <report> is a single line containing the cause information given by the network in textual format.

Syntax

Test Command

```
AT+CEER=?
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

Exec Command

```
AT+CEER
```

Response(s)

```
+CEER: <report>
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CEER=<reset>
```

Response(s)

```
OK
ERROR
+CME ERROR
```

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]
3GPP TS 24.008 [38]

Parameter Description

<report>(str)

release cause report

Reason for the last call release or call failure. See Section 3.1.1, List of status codes for extended error report. Both CS and PS domain call types are reported. Cause data is captured from Call Manager events and cached locally to later use by this command.

<reset>(num)	
0	Reset the extended error report to initial value.

3.1.1 List of status codes for extended error report

CS internal cause
No cause information available (default)
Phone is offline
No service available
Network release, no reason given
Received incoming call
Client ended call
UIM not present
Access attempt already in progress
Access failure, unknown source
Concur service not supported by network
No response received from network
GPS call ended for user call
SMS call ended for user call
Data call ended for emergency call
Rejected during redirect or handoff
Lower-layer ended call
Call origination request failed
Client rejected incoming call
Client rejected setup indication
Network ended call
No funds available
No service available
Full service not available
Maximum packet calls exceeded
Video connection lost
Video protocol closed after setup
Video protocol setup failure
Internal error

CS network cause
Unassigned/unallocated number
No route to destination
Channel unacceptable
Operator determined barring
Normal call clearing
User busy
No user responding
User alerting, no answer
Call rejected
Number changed
Non selected user clearing
Destination out of order
Invalid/incomplete number
Facility rejected
Response to status enquiry
Normal, unspecified
No circuit/channel available
Network out of order
Temporary failure
Switching equipment congestion
Access information discarded
Requested circuit/channel not available
Resources unavailable, unspecified
Quality of service unavailable
Requested facility not subscribed
Incoming calls barred within the CUG
Bearer capability not authorized
Bearer capability not available
Service/option not available
Bearer service not implemented
ACM >= ACM max
Requested facility not implemented
Only RDI bearer is available
Service/option not implemented
Invalid transaction identifier value
User not member of CUG
Incompatible destination
Invalid transit network selection
Semantically incorrect message
Invalid mandatory information
Message non-existent/not implemented

CS network cause
Message type not compatible with state
IE non-existent/not implemented
Conditional IE error
Message not compatible with state
Recovery on timer expiry
Protocol error, unspecified
Interworking, unspecified

CS network reject
IMSI unknown in HLR
Illegal MS
IMSI unknown in VLR
IMEI not accepted
Illegal ME
GPRS services not allowed
GPRS and non GPRS services not allowed
MS identity cannot be derived
Implicitly detached
PLMN not allowed
Location area not allowed
Roaming not allowed
GPRS services not allowed in PLMN
No suitable cells in location area
MSC temporary not reachable
Network failure
MAC failure
Synch failure
Congestion
GSM authentication unacceptable
Service option not supported
Requested service option not subscribed
Service option temporary out of order
Call cannot be identified
No PDP context activated
Semantically incorrect message
Invalid mandatory information
Message type non-existent
Message type not compatible with state
Information element non-existent
Message not compatible with state
RR release indication
RR random access failure

CS network reject
RRC release indication
RRC close session indication
RRC open session failure
Low level failure
Low level failure no redial allowed
Invalid SIM
No service
Timer T3230 expired
No cell available
Wrong state
Access class blocked
Abort message received
Other cause
Timer T303 expired
No resources
Release pending
Invalid user data

PS internal cause
Invalid connection identifier
Invalid NSAPI
Invalid primary NSAPI
PDP establish timeout
Invalid field
SNDCP failure
RAB setup failure
No GPRS context
PDP activate timeout
PDP modify timeout
PDP inactive max timeout
PDP lowerlayer error
PDP duplicate
Access technology change
PDP unknown reason

PS network cause
LLC or SNDCP failure
Insufficient resources
Missing or unknown APN
Unknown PDP address or PDP type
User authentication failed
Activation rejected by GGSN

PS network cause
Activation rejected, unspecified
Service option not supported
Requested service option not subscribed
Service option temporary out of order
NSAPI already used (not sent)
Regular deactivation
QoS not accepted
Network failure
Reactivation required
Feature not supported
Semantic error in the TFT operation
Syntactical error in the TFT operation
Unknown PDP context
PDP context without TFT already activated
Semantic errors in packet filter
Syntactical errors in packet filter
Invalid transaction identifier
Semantically incorrect message
Invalid mandatory information
Message non-existent/not implemented
Message type not compatible with state
IE non-existent/not implemented
Conditional IE error
Message not compatible with state
Protocol error, unspecified

Other release cause
Call barred

PS LTE cause
Operator Determined Barring
Insufficient resources
Unknown or missing APN
Unknown PDN type
User authentication failed
Request rejected by Serving GW or PDN GW
Request rejected, unspecified
Service option not supported
Requested service option not subscribed
Service option temporarily out of order
PTI already in use
Regular deactivation

PS LTE cause
EPS QoS not accepted
Network failure
Reactivation required
Feature not supported
Semantic error in the TFT operation
Syntactical error in the TFT operation
Invalid EPS bearer identity
Semantic errors in packet filter(s)
Syntactical errors in packet filter(s)
EPS bearer context without TFT already activated
PTI mismatch
Last PDN disconnection not allowed
PDN type IPV4 only allowed
PDN type IPV6 only allowed
Single address bearers only allowed
ESM information not received
PDN connection does not exist
Multiple PDN connection for given APN not allowed
Collision with network initiated request
Unsupported QCI value
Invalid PTI value
Symantically invalid message
Invalid mandatory information
Message type non-existent or not implemented
Message type not compatible with the protocol state
Information element non-existent or not implemented
Conditional IE error
Message not compatible with the protocol state
Protocol error, unspecified
APN restriction value incompatible with active EPS bearer context
No Failure

PS LTE local cause
IMSI unknown in HSS
Illegal UE
IMEI not accepted
Illegal ME
EPS services not allowed
EPS services and non-EPS services not allowed
UE identity cannot be derived by the network
Implicitly Detached
PLMN not allowed

PS LTE local cause
Tracking area not allowed
Roaming not allowed in this tracking area
EPS services not allowed in this PLMN
No Suitable cells in tracking area
MSC temporarily not reachable
Network failure
CS Domain Not available
ESM failure
MAC failure
Synch failure
Congestion
UE security capabilities mismatch
Security mode rejected, unspecified
Not Authorized for this CSG
Non-EPS authentication unacceptable
CS fallback call EST not allowed
CS domain temporarily not allowed
No EPS bearer context activated
Unknown EPS bearer context
Semantically incorrect message
Invalid mandatory information
Message type non-existent or not implemented
Message type not compatible with the protocol state
Information element non-existent or not implemented
Conditional IE error
Message not compatible with the protocol state
Protocol error, unspecified
Released AT RRC
Signal Connection Released
EMM detached
EMM attach failed
EMM attach started
NAS service request failed
ESM activate dedicated bearer reactivater by network
Lower layer failure
ESM sync up with network
Network activater dedicated bearer with ID of deffered bearer
BAD OTA message
DS rejected the call
Context transferred due to IRAT
DS explicit deactivation
ESM MSGR failure

PS LTE local cause
Local Cause not Available
Rejected due to connected state
Nas Service request failed, no throttle
EMM T3417 expired
EMM T3417 ext expired
Nas LRRC UL data CNF failure TXN
Nas LRRC UL data CNF failure HO
Nas LRRC UL data CNF failure CONN release
Nas LRRC UL data CNF failure RLF
Nas LRRC UL data CNF failure control Not CONN
NAS LRRC connection EST success
NAS LRRC connection EST failure
NAS LRRC connection EST failure, aborted
NAS LRRC connection EST failure, access barrer
NAS LRRC connection EST failure, CELL resel
NAS LRRC connection EST failure, config failure
NAS LRRC connection EST failure, timer expired
NAS LRRC connection EST failure, link failure
NAS LRRC connection EST failure, not camped
NAS LRRC connection EST failure, SI failure
NAS LRRC connection EST failure, CONN reject
NAS LRRC connection release normal
NAS LRRC connection release RLF
NAS LRRC connection release CRE failure
NAS LRRC connection release QOS during CRE
NAS LRRC connection release aborted
NAS LRRC connection release SIB read error
NAS LRRC connection release aborted IRAT Success
Nas Reject LRRC radio link failure
Nas service request failure, LTE network reject
Nas detach with reattach, LTE network detach
NAS detach without reattach, LTE network detach

3.2 AT^SIND Extended Indicator Control

AT^SIND controls the presentation of indicator event URCs. You can enable or disable URCs to be issued by the PLAS9-W each time the value of the related indicator changes, you can request the current status of all indicators, and you can also query the status of a single indicator.

Syntax

Test Command

```
AT^SIND=?
```

Response(s)

```
^SIND: (<indDescr>, (list of supported <indValue>s))[, (<indDescr>, (list of supported
<indValue>s))[, ...]], (list of supported <mode>s)
OK
```

Read Command

```
AT^SIND?
```

Response(s)

```
^SIND: <indDescr>, <mode>[, <indValue>]
[^SIND: <indDescr>, <mode>[, <indValue>]]
...

In case of <indDescr>="sendsms"
^SIND: sendsms, <mode>, <indValue>, <SmsMr>

In case of <indDescr>="eons"
^SIND: eons, <mode>, <indValue>, <eonsOperator>, <servProvider>, <servProviderType>

In case of <indDescr>="nitz"
^SIND: nitz, <mode>, <nitzUT>, <nitzTZ>[, <nitzDST>]

In case of <indDescr>="steerroam"
^SIND: steerroam, <mode>

In case of <indDescr>="ceer"
^SIND: ceer, <mode>, <ceerRelCauseGroup>1[, <ceerRelCauseGroup>2[, ...]]

In case of <indDescr>="simlocal"
^SIND: simlocal, <mode>, <indValue>slot_1, <indValue>slot_2

In case of <indDescr>="simread"
^SIND: simread, <mode>, <simreadCfgEfBitMask>, <simreadEfBitMask>

In case of <indDescr>="ltebot"
^SIND: ltebot, <mode>, <ltebotTimerstat>, <ltebotReason>, <APN>[, <ltebotReasonTxt>]

In case of <indDescr>="prov"
^SIND: prov, <mode>, <provMm>, <provCur>

OK
ERROR
+CME ERROR: <err>
```

Write Command

AT^SIND=<indDescr>, <mode>

Response(s)

^SIND: <indDescr>, <mode>[, <indValue>]

In case of: <indDescr>="eons" and <mode>=2
^SIND: eons, <mode>, <indValue>, <eonsOperator>, <servProvider>, <servProviderType>

In case of: <indDescr>="nitz" and <mode>=2
^SIND: nitz , <mode>, <nitzUT>, <nitzTZ>[, <nitzDST>]

In case of: <indDescr>="ltebot" and <mode>=2
^SIND: ltebot, <mode>, <ltebotTimerstat>, <ltebotReason>, <APN>[, <ltebotReasonTxt>]
OK
ERROR
+CME ERROR: <err>

Write Command

AT^SIND="ceer", <mode>[, <ceerRelCauseGroup>]

Response(s)

^SIND: ceer, <mode>, <ceerRelCauseGroup>$_1$[, <ceerRelCauseGroup>$_2$[, ...]]
OK
ERROR
+CME ERROR: <err>

Write Command

AT^SIND="simread", <mode>[, <simreadCfgEfBitMask>]

Response(s)

^SIND: simread, <mode>, <simreadCfgEfBitMask>, <simreadEfBitMask>
OK
ERROR
+CME ERROR: <err>

Write Command

AT^SIND="sendsms", <mode>

Response(s)

^SIND: sendsms, <mode>, <indValue>, <SmsMr>
OK
ERROR
+CME ERROR: <err>

Write Command

AT^SIND="prov", <mode>

Response(s)

^SIND: prov, <mode>, <provMm>, <provCur>
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Unsolicited Result Codes

URC 1

Format of the standard indicator:

```
+CIEV: <indDescr>, <indValue>
```

Value of an indicator has changed.

URC 2

Format of the "sendsms" indicator:

```
+CIEV: <indDescr>, <indValue>, <SmsMr>
```

The URC indicates that the UE has finished executing the AT commands for sending a short message.

URC 3

Formats of the "simdata" indicators:
For every USAT Proactive Command (PAC) tracked by AT^SIND="simdata" two different types of URCs are issued.

The first "+CIEV: "simdata"" URC is generated when a PAC is received from the (U)SIM Application. Its format follows the AT^SSTGI response, therefore showing different parameters for the PAC REFRESH and for the PACs OPEN_CHANNEL and CLOSE_CHANNEL.

```
+CIEV: <indDescr>, <cmdType>, <commandDetails>[, <pathLen>, <fileNum>,
<fileList>, <aidList>]
```

- PAC REFRESH
  "+CIEV: "simdata"" URC is issued, e.g. indicating that the content of one or more Elementary Files has been changed or the USIM performs a warm start (REFRESH type RESET).

URC 4

```
+CIEV: <indDescr>, <cmdType>, <commandDetails>, <text>, <iconQualifier>,
<iconId>
```

- PACs OPEN_CHANNEL and CLOSE_CHANNEL
  "+CIEV: "simdata"" URC is issued to indicate ongoing BIP activity.

URC 5

The second "+CIEV: "simdata"" URC is generated when PAC processing is completed by the UE and the Terminal Response is sent to the (U)SIM Application. Parameters <status> and <statAddInfo> reflect the content of the Terminal Response, similar to the AT^SSTR response. This allows the Customer Application to track problems with these PACs.

```
+CIEV: <indDescr>, <cmdType>, <commandDetails>, , , , , <status>, <statAddInfo>
```

- PACs REFRESH, OPEN_CHANNEL and CLOSE_CHANNEL "+CIEV: "simdata"" URC is indicated by <cmdType>=1 + terminate offset, which is equal to 100, similar to "^SSTN".

URC 6

Format of the "eons" indicator:

```
+CIEV: <indDescr>, <indValue>, <eonsOperator>, <servProvider>,
<servProviderType>
```

One URC is issued for each new LAI (Location Area Information) broadcast by the network.

URC 7

Format of the "nitz" indicator:

```
+CIEV: <indDescr>, <nitzUT>, <nitzTZ>[, <nitzDST>]
```

URC 8

Format of the "steerroam" indicator:

```
+CIEV: <indDescr>
```

URC 9

Format of the "ceer" indicator:

```
+CIEV: <indDescr>, <ceerRelCauseGroup>, <ceerReport>
```

URC 10

Format of the "simlocal" indicator:

```
+CIEV: <indDescr>, <indValue>slot_1, <indValue>slot_2
```

URC 11

Format of the "simread" indicator:

```
+CIEV: <indDescr>, <simreadEf>
```

The URC indicates that the UE has finished reading one of the Elementary Files on the (U)SIM specified with <simreadCfgEfBitMask> in the AT^SIND write command. For each Elementary File type one single URC will be issued.

URC 12

Format of the "ltebot" indicator:

```
+CIEV: <indDescr>, <ltebotTimerstat>, <ltebotReason>, <APN>[,
<ltebotReasonTxt>]
```

URC 13

Format of the "prov" indicator:

```
+CIEV: <indDescr>, <provMm>, <provCur>
```

Parameter Description

<indDescr>(str)

This section describes <indDescr> values and their associated <indValue> ranges.
For command input on the AT^SIND write command line <indDescr> values are handled as string type. In responses and URCs <indDescr> values are output without quotation marks.

“signal“	Channel bit error rate of the signal received: The parameter is always set to value 99. See also AT+CSQ.
“service“	Service availability: 0 Not registered to any network. 1 Registered to home network or, if "roam"=1 then registered to another network.
“message“	Unread short message at memory location <mem1>. Refer to AT+CPMS. 0 No unread message(s) available. 1 Unread message(s) available.
“roam“	Roaming indicator: 0 Registered to home network or not registered. 1 Registered to other network.
“smsfull“	Capacity of storage for received short messages: 0 The short message memory location <mem3> is still free or has just become free again. Refer to AT+CPMS. 1 All memory locations of <mem3> are used up.
“sendsms“	Short message sending status: 0 No error, short message successfully sent. 1 Short message not sent.

If enabled the "+CIEV: sendsms" URC indicates that the UE has finished executing the AT commands for sending a short message.

“simdata“

If the UE has Remote-USAT set to Automatic Response mode the (U)SIM Application activity is handled internally; for details refer to AT^SSTA, parameter <mode>. However, it is necessary for the Customer Application (TE) to be informed about some types of ongoing Proactive Commands (PAC) with their content and status.
Therefore, AT^SIND="simdata" provides URC notification for PAC types REFRESH, OPEN_CHANNEL and CLOSE_CHANNEL:

- PAC REFRESH is sent by the (U)SIM Application to notify the UE of changes to Elementary File(s) data on the (U)SIM. All data provided by the USIM is stored in one of many of its so-called Elementary Files. This data can be queried by the TE directly via AT+CRSM or implicitly via many AT commands presented by this document. For instance the (U)SIM's International Mobile Subscriber Identity (IMSI) can be queried via AT+CIMI, but actually is stored in EF_{IMSI}, as defined in 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16].
  However, be aware that the content of any Elementary File can be changed at any time by the network provider or the (U)SIM Application. For details refer to USAT feature "Data Download to USIM" in 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20]. If this happens the TE urgently needs to refresh its own copy of the changed data to ensure its safe and consistent use!
  Therefore, "+CIEV: "simdata"" URCs can be enabled in both Remote-USAT modes (Autoresponse mode and Explicit Response mode) indicating that the content of one or more Elementary Files has been changed.
- "+CIEV: "simdata"" URCs are also generated if PAC types OPEN_CHANNEL or CLOSE_CHANNEL are issued by the (U)SIM Application as part of its Bearer Independent Protocol (BIP) to access the Internet. This allows the Customer Application to track the BIP status and to indicate problems with these PACs to the TE.

For every PAC tracked by AT^SIND="simdata" two different types of URCs are issued:
First "+CIEV: "simdata"" URC is generated for the PAC received from the (U)SIM and second "+CIEV: "simdata"" URC containing the processing result of the Terminal Response sent to it.
The UE provides a limited storage to keep numerous "simdata" events received while AT^SIND setting was not enabled or UE-TE link was reserved, e.g. in online data mode. In case of storage overflow a special URC "+CIEV: "simdata",1,254" will be issued.

“eons“

Enhanced Operator Name String (EONS):
The Enhanced Operator Name String indicator feature allows the PLAS9-W to output various operator names for different PLMN identities. It also allows the output of a different operator name based on a subset of the registered network by using a range of Location Area Codes (LACs) or a single LAC. See also 3GPP TS 22.101 [47].
The EONS tables are stored in the USIM and will be read after SIM PIN authentication.
Following USIM Elementary Files are affected by the EONS feature:
EF_{SST} (USIM Service Table) - describes which features are active.
EF_{OPL} (Operator PLMN List) - contains the PLMN identification and location ID together with the index of the corresponding PNN record
EF_{PNN} (PLMN Network Name) - contains the full and short form version of the network name for the registered PLMN

The name displayed by the <eonsOperator> parameter depends on various sources of information prioritized in the list below. The highest priority has option 1. If an option is not available the next lower option from the list determines the displayed name. The priority is indicated by the <indValue>

parameter.
Prioritized sources determining the name displayed by <eonsOperator>:

<indValue> 0	Not registered.
<indValue> 1	Operator name from EF_{OPL} and EF_{PNN} in alphanumeric format.
<indValue> 2	Operator name in long or short format according to Common PCN Handset Specification (CPHS) [48] depending on availability and content of $EF_{ONString}$ (Operator Name String) and $EF_{OPShort}$ (Operator Name Short form).
<indValue> 3	Operator name received over the network via NITZ service in long and short alphanumeric format.
<indValue> 4	Operator name found in the UE's AT+COPN list, given in alphanumeric format.
<indValue> 5	Broadcast MCC-MNC (numeric format which consists of a 3-digit country code plus a 2- or 3-digit network code).
<indValue> 6	CSG (Closed Subscriber Group) Lookup.

“nitz“ Network Identity and Time Zone:
This indicator shows the time relevant information elements of an MM Information (MMI) or GMM Information (GMMI) message received from the network (see 3GPP TS 24.008 [38], ch. 9.2.15a and 9.4.19).
The AT^SIND test command indicates the maximum length of the "nitz" <indValue>. The network usually sends a NITZ indicator when the mobile attaches to the network, when it enters a location area with different time zone or when a daylight change occurs.
A NITZ indicator may consist of the following parameters: Universal Time (UT), local Time Zone (TZ), Daylight Saving Time (DST). All information elements of MMI/GMMI are optional and therefore, the presentation of the parameters <nitzUT>, <nitzTZ>, <nitzDST> varies with the network. For example, the network may send all three parameters UT, TZ, DST, or only UT and TZ or only TZ.

UT is indicated in usual date/time format and represents the current world time (GMT) at the moment when sent.
TZ is given as a positive (east) or negative (west) offset from UT in units of 15 minutes.
DST shows the number of hours added to the local TZ because of daylight saving time (summertime) adjustment. Usually DST is 1 hour but it can be also 2 hours in certain locations.

Example for time and time zone with DST:
+CIEV: nitz,"04/07/23,13:39:20",-28,1
In this example TZ is -28, showing a time offset of -7 hours (west) to Universal Time/GMT (which never changes for DST). DST is 1 which indicates that one hour was added to TZ because of Daylight Saving Time. If a network does not send the DST parameter the TZ value would be -32 (8 hours west) as would be done in winter:
+CIEV: nitz,"04/11/23,13:39:20",-32

Please be aware that although the last NITZ value can be looked up again via "AT^SIND=nitz,2" the returned values may be out of date. Especially the UT value is obsolete because there is no internal NITZ clock and therefore no continuation of UT.
NITZ values are lost when the UE detaches from network. Also when a manual network selection fails and the UE automatically falls back to the previous network the NITZ values cannot be recalled. Nevertheless an indicated time zone is valid until a new MMI/GMMI will trigger another NITZ indication.

“simstatus“	USIM status: 0 USIM removed. Note: Another way to verify the USIM connection is the "^SCKS" URC enabled with AT^SCKS. 1 USIM inserted. 3 USIM PIN required - USIM locked. USIM PIN must be entered to enable PLAS9-W to register to the network. 4 Personalization info ready - CHV (Card Holder Verification) data have been verified (if required). 5 USIM initialization completed - UE has finished reading USIM data.
“simlocal“	Availability of the physically connected USIM: 0 USIM removed. 1 USIM inserted. The availability of the (U)SIM is shown for the (U)SIM interfaces configurable with AT^SCFG="SIM/CS" parameter <CS>.
“psinfo“	Packet Switched status: "psinfo" indicates the status of the UE related to packet switched data calls. Please consider that some providers don't support the indication of HSDPA/ HSUPA. 0 GPRS/EGPRS not available in currently used cell 1 GPRS available in currently used cell 2 GPRS attached 3 EGPRS available in currently used cell 4 EGPRS attached 5 Camped on WCDMA cell 6 WCDMA PS attached 7 Camped on HSDPA capable cell 8 PS attached in HSDPA capable cell 9 Camped on HSDPA/HSUPA capable cell 10 PS attached in HSDPA/HSUPA capable cell 16 Camped on E-UTRAN capable cell 17 Attached in E-UTRAN capable cell
“pacsp“	PLMN mode bit status: : "pacsp" indicates the parsed PLMN mode bit value of the USIM Elementary File EF_{CSP} (Customer Service Profile) according to Common PCN Handset Specification (CPHS) [48]. 0 CSP PLMN mode bit off 1 CSP PLMN mode bit on 99 CSP PLMN mode bit not defined or USIM Elementary File EF_{CSP} not accessible The contents of the USIM Elementary File EF_{CSP} may be changed by the network in the background at any time via USIM Application Toolkit (USAT) procedure "Data download to USIM". For a detailed description please refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20]. Please note that URC presentation <mode> for this indicator is stored to non-volatile memory with AT&W, restored with ATZ and reset to '0' (disabled) by AT&F.
“steerroam“	Steering-of-roaming: The "steerroam" indicator supports so called "steering-of-roaming" ("SOR") techniques of some providers. If a UE roaming within a certain country tries to register to a VPLMN (visited PLMN), the VPLMN will ask the HLR of the subscribers home operator for authorization credentials of the subscriber. Steering-of-roaming means that instead of sending those credentials, the HLR sends back an error message which will make the VPLMN send back a location update reject to the UE. This location updating procedure is described in 3GPP TS 24.008 [38] chapter 4.4.4.9.

When UE is attempting to register into a PLMN and get updating rejected with reject cause 17 then UE stays in limited service on the configured network, UE may reattempt network registration four times, and after that UE will inform the TE via Steering-of-roaming indication URC +CIEV: "steerroam" that the registration attempt has failed.
When the UE is in manual PLMN selection mode (see AT+COPS) the TE has to start a new manual PLMN search to select a different network or switch to automatic PLMN selection mode.
When UE is in automatic PLMN selection mode (see AT+COPS) UE itself attempts a PLMN search to select a different network.

“iccid“

USIM identification number:
"iccid" indicator shows the USIM identification number stored in the USIM Elementary File EF_{ICCID}.
The AT^SIND test command indicates the maximum length of the "iccid" <indValue>.
Please note that URC presentation <mode> for this indicator is stored to non-volatile memory with AT&W, restored with ATZ and reset to '0' (disabled) by AT&F.

“euiccid“

USIM embedded identification number:
"euiccid" indicator shows the USIM embedded identification number stored in the USIM Elementary File $EF_{EUICCID}$.
The AT^SIND test command indicates the maximum length of the "euiccid" <indValue>.

“imsi“

International Mobile Subscriber Identity:
The "imsi" indicator shows the IMSI stored in the USIM Elementary File EF_{IMSI}.
The AT^SIND test command indicates the maximum length of the "imsi" <indValue>.
Please note that URC presentation <mode> for this indicator is stored to non-volatile memory with AT&W, restored with ATZ and reset to '0' (disabled) by AT&F.

“pagingcoor“

Paging coordination:
Paging coordination is a network feature which allows the network to page (alert) the UE about incoming CS calls while the UE is receiving PS data transmissions
The indicator notifies the UE of the capabilities currently present in the network, i.e. it can show one of the single values listed below or the sum of some of them.

0	No coordination
1	WCDMA
2	NMO 1
4	DTM support
8	BSS PAGING COORD
16	LTE
99	Undefined e.g. transitional state or PS data not supported by the network

“ceer“

Extended Error Report:
"ceer" delivers an extended error / release cause report as a single line containing the cause information given by the network in textual format.
The URC "CIEV: ceer,<ceerRelCauseGroup>,<ceerReport>" shows the same information as the standard command AT+CEER. If enabled the indicator will show up each time when a release cause is detected, wherease AT+CEER only polls the release cause of the latest event. The major benefit is that "ceer" URCs can be used for better analysis and tracing.

“simread“	Notification of end of reading Elementary Files on the (U)SIM: If enabled the URC "CIEV: simread, <simreadEf>" indicates that the UE has completed reading and verifying the accessibility of a specific Elementary File (EF) on the (U)SIM. The purpose of this URC is that the access to selected Elementary Files will be reported earlier than the access to the entire (U)SIM as indicated by the "^SSIM READY" URC (see AT^SSET). The resulting time advantage can be used, for example, to cut the time until the UE is able to set up an emergency call. See also parameters <simreadEfBitMask> and <simreadCfgEfBitMask>.
“ltebot“	Status of LTE back-off timer: The "ltebot" indicator shows up each time when the T3402 timer starts (<ltebotTimerstat> 1) and expires (<ltebotTimerstat> 0). It notifies the user whether the UE is backing off from LTE. For details on the T3402 timer please refer to see 3GPP TS 24.301 [40], table 10.2. The duration of the timer is 12 minutes. During this period the UE will not try to attach to LTE unless a manual AT+CGATT=0 and AT+CGATT=1 is performed. Yet, before the timer expires, it is possible that the UE registers with UMTS or GSM UMTS instead of LTE. The "ltebot" indicator is almost exclusively triggered by a wrong APN (in case of no LTE rights on the subscription or no LTE coverage, it is not started). The indicator includes the following parameters: <ltebotTimerstat>, <ltebotReason>, <APN>, <ltebotReasonTxt>. The values of <ltebotReason> and the content of <ltebotReasonTxt> are operator dependent. Examples for wrong APN given with AT+CGDCONT: +CIEV: ltebot,1,33,"invalid name","Requested service option not subscribed" +CIEV: ltebot,1,27,"invalid name","Unknown or missing APN" In addition to the "ltebot" indicator, you can activate the "ceer" indicator that also shows the reason when the the UE fails to attach to the LTE. Example for wrong APN given with AT+CGDCONT: +CIEV: ceer,7,"Unknown or missing APN"
“prov“	Provider configuration mismatch: The "prov" indicator delivers the provider configuration mismatch status via URC. +CIEV: prov,<provMm>,<provCur> The AT^SIND test command indicates the maximum length of the "prov" <indValue>. For provider configuration details see ATI61. Changing the provider configuration is done by AT^SCFG parameter "MEopMode/Prov/Cfg" (see <provCfg>). Please note that URC presentation <mode>=1 for this indicator is enabled by powerup default.

<indValue>(num)

Integer type value as specified above for the corresponding <indDescr>.

<mode>(num)

Set or query URC presentation mode of a specific indicator <indDescr>.
Please note, that some indicator types allow the <mode> to be stored to non-volatile memory with AT&W, restored with ATZ and reset to '0' (disabled) by AT&F. See indicator descriptions whether or not AT&W, AT&F and ATZ are effective.

0(P)	Disables the presentation of a specific URC.

1	Enables the presentation of a specific URC. The URC will be buffered in the UE when the UE-TE link is reserved (e.g. in online data mode), and flushed to the TE when the UE-TE link is free again. Otherwise, the URC will be forwarded directly to the TE.
2	Requests the presentation mode of the URC status and the current value of a single indicator type.

`<aidList>`(str)

String containing a list of USIM Application Ids on which the ongoing PAC Refresh will be performed. If the list is empty PAC Refresh will be performed on the current USIM Application.

`<SmsMr>`(num)

Reference of short message most recently sent. See parameter `<mr>` of `AT+CMSS`.

`<eonsOperator>`(str)(+CSCS)

Operator name determined by the source of information. The source is indicated as `<indValue>`. All possible sources (`<indValue>`) are listed in the description of the "eons" indicator.

`<servProvider>`(str)(+CSCS)

Service Provider Name according to the status settings (USIM Service No. 17) in the USIM Service Table (SST) of the USIM.
Service Provider Name (SPN) will be read from EF_{SPN}. Service Provider Display Information (SPDI) will be read from EF_{SPDI} list.

`<servProviderType>`(num)

Service Provider Type according to Registered Public Land Mobile Network (RPLMN) and Home Public Land Mobile Network (HPLMN).

0	Service Provider Name will not be displayed (EF_{SPN} is empty or not available).
1	Service Provider Name will be displayed. RPLMN is the HPLMN.
2	Service Provider Name will be displayed. One entry of SPDI list is equal to the RPLMN.

`<nitzUT>`(str)(+CSCS)

Universal Time delivered as part of the "nitz" Indicator. Refer to `<indDescr>`.

`<nitzTZ>`(num)

Time Zone delivered as part of the "nitz" Indicator. Refer to `<indDescr>`.

`<nitzDST>`(num)

Adjustment for Daylight Saving Time as part of the "nitz" Indicator. Displayed only when received from network. Refer to `<indDescr>`.

<ceerRelCauseGroup>(num)

Release Cause Group.
To enable the URC "CIEV: ceer,<ceerRelCauseGroup>,<ceerReport>" activate <mode> "1", and either select single <ceerRelCauseGroup> values, or choose value "99" for all release causes.
For each single <ceerRelCauseGroup> value the AT^SIND write command needs to be executed. The responses of the AT^SIND write or read command, however, then will list all activated single values. If only one <ceerRelCauseGroup> or value 99 was activated, the AT^SIND write and read command responses contain just this one value. <ceerRelCauseGroup> value "0" can be used to clear all activated values.

0(P)	Clear activated <ceerRelCauseGroup> values.
1	CS Internal Cause.
2	CS Network Cause.
3	CS Network Reject.
4	PS Internal Cause.
5	PS Network Cause.
6	Other Release Cause.
7	PS LTE Cause.
8	PS LTE Local Cause.
99	All Release Causes. Note that if value "99" is set selecting a single release cause will have no effect. Before activating single release cause values first set <ceerRelCauseGroup> "0".

Example: Activating <ceerRelCauseGroup>s 4, 5 and 6:

```
AT^SIND=ceer,1,4
^SIND: ceer,1,4          # Response shows selected <ceerRelCauseGroup> value.
OK
AT^SIND=ceer,1,5
^SIND: ceer,1,4,5        # Response shows all <ceerRelCauseGroup> values currently selected.
OK
AT^SIND=ceer,1,6
^SIND: ceer,1,4,5,6      # Response shows all <ceerRelCauseGroup> values currently selected.
OK
```

<ceerReport>(str)

Release cause information given by the network in textual format.

<simreadCfgEfBitMask>(num)

As part of AT^SIND write command, this parameter determines the type(s) of EF to be read when the UE is reading data from the (U)SIM. You may set the value of a specific EF type, or sum up the values of the EF types you may want to be reported. With <mode>= 0 the parameter <simreadCfgEfBitMask> will be set to "0". Parameter <simreadCfgEfBitMask> can only be set if <mode>= 1.

0(P)	No USIM Elementary File.
1	USIM Elementary File EF_{SMS}.
2	USIM Elementary File EF_{FDN}.
4	USIM Elementary File EF_{SDN}.
255	All USIM Elementary Files listed above. This value can be set only in the write command, it will not be reported in the URC "CIEV: simread, <simreadEf>".

<simreadEfBitMask>(num)

As part of AT^SIND read or write command, this parameter indicates the Elementary Files (EF) already read from the (U)SIM. The value is either a single EF type, or the sum of the EF types already read, or 0.

0	No USIM Elementary File read.
1	USIM Elementary File EF_{SMS}.
2	USIM Elementary File EF_{FDN}.
4	USIM Elementary File EF_{SDN}.

<simreadEf>(num)

As part of the URC CIEV: simread, the <simreadEf> parameter reports a specific EF type that the UE has just read. For each Elementary File type one single URC will be issued.

1	USIM Elementary File EF_{SMS}.
2	USIM Elementary File EF_{FDN}.
4	USIM Elementary File EF_{SDN}.

<ltebotTimerstat>(num)

Status of LTE back-off timer.

0	LTE back-off timer is not running, UE is using LTE (if available).
1	LTE back-off timer (12 minute T3402 timer) is running. The UE will not try to attach to LTE until it expires.

<ltebotReason>(num)

Rejection cause value given from the network that caused the module to back-off from LTE. Value is dependent on the operator. Value is 0 if attached to LTE.

<APN>(str)

Last APN attempted for LTE attachment, successful or otherwise.

<ltebotReasonTxt>(str)

Rejection cause value <ltebotReason> in text form. Displayed only if text form is available. Text is dependent on operator.

<provMm>(num)

Provider configuration mismatch.

0	No provider mismatch.
1	Provider mismatch.

<provCur>(str)

Current provider. The fallback configuration is indicated by a "*".

“fallb*“	Fallback provider profile.
“tmode“	*EXAMPLE !* Provider T-Mobile
“vdfde“	*EXAMPLE !* Provider Vodafone
“...“	Next possible provider ...
“...“	Next possible provider ...

3.3 AT+WS46 Select wireless network

The AT+WS46 command is intended for reading the current status of the network selection. The write command has no effect. To select the network please use the AT+COPS command.

Syntax

Test Command

AT+WS46=?

Response(s)

+WS46: (list of supported<n>s)
OK

Read Command

AT+WS46?

Response(s)

+WS46:<n>
OK

Write Command

AT+WS46=<n>

Response(s)

OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<n>(num)	
12	GSM digital cellular (GERAN only)
22	UTRAN only
25	3GPP Systems (GERAN, UTRAN and E-UTRAN)
28	E-UTRAN only
29	GERAN and UTRAN

4. Serial Interface Control Commands

The AT Commands described in this chapter allow the external application to determine various settings related to the PLAS9-W's serial interface.

4.1 AT&C Set Data Carrier Detect (DCD) line mode

AT&C controls the behavior of the UE's DCD line.

Syntax

Exec Command
AT&C<value>
Response(s)
OK

PIN	MDM	APP	✈	Last
+	+	+	+	-

Parameter Description

<value>(num)(&V)(&W)	
1(&F)(D)	DCD line shall be on only when data carrier signal is present.

4.2 AT&D Set Data Terminal Ready (DTR) line mode

AT&D determines how the UE responds if DTR line is changed from ON to OFF state during data mode.

Syntax

Exec Command
AT&D[<value>]
Response(s)
OK

PIN	MDM	APP	✈	Last
+	+	-	+	-

Parameter Description

<value>(num)(&V)(&W)	
[0]	ME ignores status of DTR line.
2(&F)(D)	ON->OFF on DTR: Disconnect data call or PPP and change to command mode.

4.3 AT&S Set Data Set Ready (DSR) line mode

AT&S determines how the UE sets the DSR line depending on its communication state.

Syntax

Exec Command
AT&S[<value>]
Response(s)
OK

PIN	MDM	APP	✈	Last
-	+	-	+	-

Reference(s)
V.250

Parameter Description

<value>(num)(&V)(&W)	
[0](&F)(D)	DSR line is always ON
1	ME in command mode: DSR is OFF. ME in data mode: DSR is ON.

4.4 ATE AT Command Echo

ATE controls if the PLAS9-W echoes characters received from TE during AT command state.

Syntax

Exec Command

ATE[<value>]

Response(s)

OK
ERROR

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

V.250

Parameter Description

<value>(num)(&V)(&W)

0	Echo mode off
[1](&F)(D)	Echo mode on

4.5 AT+IPR Bit Rate

PLAS9-W does not provide UART support. Therefore, when using AT+IPR on a USB channel the AT+IPR write command always responds with "OK", but this setting will not be stored and will not have any effect. AT+IPR read command always returns 115200 bps.

Syntax

Test Command

```
AT+IPR=?
```

Response(s)

```
+IPR: ( ) , (list of supported selectable <rate>s)
OK
```

Read Command

```
AT+IPR?
```

Response(s)

```
+IPR: <rate>
OK
```

Write Command

```
AT+IPR=<rate>
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

V.250

Parameter Description

<rate>(num)(&V)(NV)

Bit rate per second (bps)

115200(D)

230400

460800

921600

4.6 AT^SQPORT Query Port Type

AT^SQPORT enables the Customer Application to query the type of AT command instance it is connected to. Further details on AT command instances and the different types of PLAS9-W devices can be found in Section 1.4, AT Command Interpreter and AT^SSRVSET.

Syntax

Test Command
AT^SQPORT=?
Response(s)
OK

Read Command
AT^SQPORT?
Response(s)
^SQPORT: <type> OK

Exec Command
AT^SQPORT
Response(s)
^SQPORT: <type> OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<type>(str)	
"Modem"	Main AT command instance, mainly intended for data transmission.
"Application"	Auxiliary AT command instance. It is recommended that this instance be used for controlling the PLAS9-W, e.g. for entering AT commands, receiving URCs, or sending and receiving short messages. For further details on URCs please refer to Section 1.8, Unsolicited Result Code Presentation.

5. Security Commands

The AT Commands described in this chapter allow the external application to determine various security related settings.

5.1 AT+CPIN PIN Authentication

The AT+CPIN read command returns an alphanumeric string indicating whether or not network authentication is required.

The write AT+CPIN command allows the PLAS9-W to store the entered password. This may be for example the SIM PIN1 to register to a GSM/UMTS/LTE network, or the SIM PUK1 to replace a disabled SIM PIN1 with a new one, or the PH-SIM PIN if the client has taken precautions for preventing damage in the event of loss or theft etc.

If SIM PIN1 authentication was successful and no SIM PIN1 request is pending the AT+CPIN? read command returns "READY", but the next AT+CPIN=<pin> write command request refers to SIM PIN2. As a result, whilst SIM PIN2 has not been given, each attempt to enter SIM PIN1 again leads to "+CME ERROR: incorrect password", thus decreasing the SIM PIN2 counter. Therefore, you are advised to check which password is requested by using the read command AT^SPIC? and the execute command AT^SPIC.

Syntax

Test Command

```
AT+CPIN=?
```

Response(s)

```
OK
```

Read Command

```
AT+CPIN?
```

Response(s)

```
+CPIN: <code>
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CPIN=<pin>[, <new pin>]
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<pin>(str)

Password (string type).
If the requested password was a PUK, such as SIM PUK1 or PH-FSIM PUK or another password, then <pin> must be followed by <new pin>.

<new pin>(str)

If the requested code was a PUK: specify a new password or restore the former disabled password.

<code>(text)

SIM PIN authentication	
READY	PIN has already been entered. No further entry needed.
SIM PIN	UE is waiting for SIM PIN1.
SIM PUK	UE is waiting for SIM PUK1 if PIN1 was disabled after three failed attempts to enter PIN1.
SIM PIN2	UE is waiting for PIN2.
SIM PUK2	UE is waiting for PUK2 to unblock a disabled PIN2.
Phone security locks set by client or factory	
PH-SIM PIN	UE is waiting for phone-to-SIM card password if "PS" lock is active and the client inserts other USIM, card than the one used for the lock. ("PS" lock is also referred to as phone or antitheft lock).
PH-FSIM PIN	UE is waiting for phone-to-very-first-SIM card password. Necessary when "PF" lock was set. When powered up the first time, UE locks itself to the first USIM card put into the card holder. As a result, operation of the mobile is restricted to this one USIM card (unless the PH-FSIM PUK is used as described below).
PH-FSIM PUK	UE is waiting for phone-to-very-first-USIM card unblocking password to be given. Necessary when "PF" lock is active and other than first USIM card is inserted.
PH-NET PIN	UE is waiting for network personalisation password
PH-NET PUK	UE is waiting for network personalisation unblocking password
PH-NETSUB PIN	UE is waiting for network subset personalisation password
PH-NETSUB PUK	UE is waiting for network subset unblocking password
PH-SP PIN	UE is waiting for service provider personalisation password
PH-SP PUK	UE is waiting for service provider personalisation unblocking password
PH-CORP PIN	UE is waiting for corporate personalisation password
PH-CORP PUK	UE is waiting for corprorate personalisation un-blocking password

Notes

- Successful PIN authentication only confirms that the entered PIN was recognized and correct. The output of the result code OK does not necessarily imply that the mobile is registered to the desired network.
  Typical example: PIN was entered and accepted with OK, but the UE fails to register to the network. This may be due to missing network coverage, denied network access with currently used USIM card, no valid roaming agreement between home network and currently available operators etc.
  PLAS9-W offers various options to verify the present status of network registration: For example, the AT+COPS command indicates the currently used network. With AT+CREG you can also check the current status and activate an unsolicited result code which appears whenever the status of the network registration changes (e.g. when the UE is powered up, or when the network cell changes).
- <pin> and <new pin> can also be entered in quotation marks (e.g. "1234").
- See AT+CPWD for information on passwords.
- See AT+CLCK for information on lock types.
- See AT+CPBS for information on write access to the FD phonebook with PIN2

5.2 AT+CLCK Facility Lock

AT+CLCK can be used to lock, unlock or interrogate a network or UE <facility>. The command can be aborted when network facilities are being set or interrogated.

Syntax

Test Command

AT+CLCK=?

Response(s)

+CLCK: list of supported <facility>s
OK

Write Command

AT+CLCK=<facility>, <mode>[, <password>][, <class>][, <data>]

Response(s)

If <mode> is 0 or 1 and command successful:
OK
If <mode>= 2 and command successful:
+CLCK: <status>[, <class>]
[+CLCK: <status>[, <class>]]
[+CLCK: ...]
If <mode>= 4 and no Network Lock "PN" is set:
+CLCK: ""
If <mode>= 4 and Network Lock "PN" is effective:
+CLCK: <data>[: <data>: <data>: ...]
If <mode>= 5,<password> and no Network Lock "PN" is set:
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	±	-

Reference(s)

3GPP TS 27.007 [45],
3GPP TS 22.004 [23],
3GPP TS 22.088 [31],
3GPP TS 23.088,
3GPP TS 24.088

Parameter Description

<facility>(str)

Phone security locks set by client or factory:

Primarily intended for the client to take safety precautions, "SC" can be configured individually.
Parameter <class> is not applicable to security locks.
See examples below for further details.

"SC"	SIM (lock SIM card). SIM requests password upon UE power-up and when this lock command is issued. <password>: SIM PIN1.
"PS"	PH SIM (lock PHone to SIM/UICC card). UE asks for <password> when other than current SIM/UICC card is inserted. <password>: PH-SIM PIN. This 8-digit code is unique for each device. The PH-SIM PIN is necessary to lock the UE to a SIM/UICC. The <password> is a self defined module specific password and must be unique for each device. Parameter <class> is not

applicable. Parameter <data> is not applicable. To allow for any later changes, it is the responsibility of the manufacturer to hold a database with the module specific passwords.
To avoid unauthorized use, the PH-SIM PIN should not be provisioned to end users.
Be careful to enter wrong <password> when unlock with <mode>=0 the UE. After having entered 10 times a wrong <password> the UE is blocked and there is no chance to unblock it !

“FD“

SIM Fixed Dialing Phonebook lock.
If "FD" lock is enabled numbers or public MMI *# codes can be used only if they start with matching numbers or characters stored in the "FD" phonebook. Numbers stored to the "FD" phonebook must not contain the call modifiers "I","i","*31#", "#31#".
The capacity of the "FD" phonebook is depending on the SIM card.
<password>: SIM PIN2 is mandatory for <mode>=0 (unlock) or <mode>=1 (lock).
Any attempt to dial a string not specified in the "FD" phonebook will be denied, causing an error result code. The type of result code varies depending on the type of service:
packet switched connections and *# codes for Supplementary Services and USSD.
"+CMS ERROR: operation not allowed" for SMS.

If "FD" lock is enabled the following applies:

- Handling of USSD:
  Access to Unstructured Supplementary Services is possible with ATD if the ATD dial string starts with a matching *# code stored in the "FD" phonebook.
- SMS can be sent only to phone numbers which are stored in the "fixed dialing numbers" phonebook "FD".
  If SMS numbers are missing in "FD" phonebook, indication is "+CMS ERROR: operation not allowed".

“PN“

Network Personalization.
This feature allows application manufacturers to lock a mobile to specific operators by activating a Network Personalization ("PN"). If the lock is enabled the mobile will accept only SIM/UICC cards from the given operators. The lock is activated by specifying the mobile country codes and mobile networks codes on command line.
The Customer SIM Lock feature is protected by depersonalization key. UE asks for <password> when other than specified operator SIM/UICC card is inserted.
<password>: PH-NET PIN.
This 8-digit code is unique for each device. To allow for any later changes, it is the responsibility of the manufacturer to hold a database with the module specific passwords.
To avoid unauthorized use, the PH-NET PIN should not be provisioned to end users.
Be careful to enter wrong <password> when unlock with <mode>=0 the UE. After having entered 10 times a wrong <password> the UE is blocked and there is no chance to unblock it ! Parameter <class> is not applicable.
Network Personalisation ("PN") is also applicable with AT^SCSL command.

Supplementary Service Call Barring:

Supplementary Service "Call Barring" allows to specify conditions under which calls will be disallowed by the network.
The availability of the Supplementary Services varies with the network. To benefit from call barring the client will need to subscribe them, though a limited number of call barring types may be included in the basic tariff package.
When you attempt to set a <facility> or <class> which is not provisioned, not yet subscribed to, or not supported by the module, the setting will not take effect regardless of the response returned. The responses in these

cases vary with the network (for example "OK", "+CME ERROR: operation not allowed", "+CME ERROR: operation not supported" etc.). To make sure check the extended error response with AT+CEER and the lock status with <mode>=2.
<password>: Network password supplied from the provider or operator. Usually there is one password which applies to all call barring options. For details contact your provider.

“AO“	BAOC (Bar All Outgoing Calls)
“OI“	BOIC (Bar Outgoing International Calls)
“OX“	BOIC-exHC (Bar Outgoing International Calls except to Home Country)
“AI“	BAIC (Bar All Incoming Calls)
“IR“	BIC-Roam (Bar Incoming Calls when Roaming outside the Home Country)
“AB“	All Barring services (applicable only for <mode>=0)
“AG“	All outGoing barring services (applicable only for <mode>=0)
“AC“	All inComing barring services (applicable only for <mode>=0)

<mode>(num)

0	Unlock (parameter <password> is mandatory).
1	Lock (parameter <password> is mandatory).
2	Query status.
4	Request Customer Network lock status. Required parameters: <facility>="PN",<mode>=4.
5	Set Customer Network lock into prepared state (Autolock). In this case, the Network lock data will be read from the first inserted SIM card and stored. Required parameters: <facility>="PN",<mode>=5,<password>. Setting takes effect after next restart.

<status>(num)

0	Lock is inactive
1	Lock is active

<password>(str)

Password string used to lock and to unlock a <facility>. Length and authority for passwords depend on the <facility> in question and are therefore listed in the section on parameter <facility>. Passwords which can be modified see AT+CPWD.
The <password> for <facility>="PS" is a self defined module specific password and must be unique for each device.
The <password> for <facility>="PN" is a self defined module specific password and must be unique for each device.

<class>(num)

Integer or sum of integers each representing a class of information, i.e. a bearer service, telecommunication service or bearer service group as defined in 3GPP TS 22.004 [23]. Values related to data connectivity are listed for compatibility reasons, but are not supported by PLAS9-W.

1	Voice
2	Class 2 ("Data") comprises all those individual data classes between 16 and 128, that are supported both by the network and the MS. This means, a setting made for class 2 applies to all individual data classes (if supported). In addition, you can assign a different setting to a specific class. For example, you can activate Call Forwarding for all data classes, but deactivate it for data class 64, "dedicated packet access".
4	Fax (only for compatibility reasons, not supported by PLAS9-W)

8	SMS
16	Data circuit sync
32	Data circuit async
64	Dedicated packet access
128	Dedicated PAD access
1...[7]...255	Combination of some of the above classes. For example, the default setting 7 represents the sum of the integers 1, 2 and 4 for voice, data and fax (fax only for compatibilty reasons) . The value 255 covers all classes. If parameter "class" is omitted, the default value 7 is used.

`<data>`(str)

Data of the allowed network operators. Parameter is mandatory for Network Personalization ("PN").
Each operator code consists of the "Mobile Country Code" MCC and the "Mobile Network Code" MNC, both separated by a dot, e.g. MCC1.MNC1 . If more than one operator is entered on the same line, then a colon must be set between each operator code, e.g. MCC1.MNC1:MCC2.MNC2:MCC3.MNC3 . For example, for the three operators T-Mobile D1, Vodafone D2 and E-Plus you would enter the following data: 262.01:262.02:262.03
New operator entries will not be added to an existing list. If you need to add new operator entries please unlock the old one and send the complete list once again. Network Personalisation ("PN") is also applicable with `AT^SCSL` command.

Notes

- The `AT+CLCK` command offers the full range of `<class>` parameters according to the 3GPP Technical Specifications. However, when you attempt to use a service option which is not provisioned or not yet subscribed to, the setting will not take effect regardless of the response returned.
  The responses in these cases vary with the network (for example "OK", "Operation not allowed", "Operation not supported" etc.). To make sure check the extended error response with `AT+CEER` and the lock status with `<mode>`=2.
- The command has been implemented with the full set of `<class>` parameters according to 3GPP TS 27.007 [45]. For actual applicability of a desired Call barring service to a specific service or service group (a specific `<class>` value) please consult table A.1 of 3GPP TS 22.004 [23].
- If an outgoing Data Call is rejected due to an active `<facility>`="FD" barring supplementary service, the call will be terminated with result code NO CARRIER.
- In the airplane mode the write command version for the network related `<facility>` (AO, OI, OX, AI, IR, AB, AG and AC) is not supported. For remaining facilities the command is fully functional then.
- As stated above `<class>` 2 is intended only to send the data classes 16/32/64/128 to the network. However, the responses returned when the subscriber sets or queries the lock refer only to the status of the data classes received from the network. This means that the responses will display only those data classes between 16 and 128 which are supported by the network and currently activated. There will be no output for class 2, nor for classes which are not supported or not set.
- The parameter `<class>` will not be sent to the network if `<mode>`=2. Therefore it may happen that the response of the query command contains information about classes which were not requested, or it shows only the inactive status of the class 1 or 255. This means that the status is valid for all classes.
- Parameter `<class>` is also allowed by `<mode>`=2.
- For "PN" (Network Personalisation) value of `<facility>` parameter refer to `AT^SCSL` command.

Examples

EXAMPLE 1

Lock SIM card (`<facility>`="SC")

`AT+CLCK="SC",1,"9999"`	The "SC" parameter enables or disables the SIM PIN authentication (PIN1) when you power up the UE.
`OK`	SIM card locked. As a result, SIM PIN1 must be entered to enable UE to register to the network.

AT+CLCK="SC",0,"9999" OK	Unlocks SIM card. When powered up, UE registers to the network without requesting SIM PIN1. Note: Depending on the services offered by the provider, this feature is not supported by all SIM card types. If so, the command returns "ERROR" when you attempt to unlock the card.

To query the status of the SIM card lock:

AT+CLCK="SC",2 +CLCK: 1 OK	Query the status of SIM card lock. SIM card is locked. SIM PIN1 must be entered to enable UE to register to the network.

EXAMPLE 2

Phone locked to SIM card (<facility>="PS"):

AT+CPIN? +CPIN: READY OK	Make sure that PIN1 authentication is valid.

To lock the UE to the currently inserted SIM card use:

AT+CLCK="PS",1,"55555555" OK	Locks the UE to the current SIM card.

Optionally, query the status of the phone locked to SIM card:

```
AT+CLCK="PS",2
+CLCK: 1
OK
```

To operate the UE with the SIM card for which "PS" lock was activated:

AT+CPIN? +CPIN: SIM PIN OK AT+CPIN="9999" OK	No additional password is required for operation (SIM recognized by UE).

To operate the UE with other SIM card than the one used for the "PS" lock:
Enter PH-SIM PIN of present card, followed by "PS" lock password.

AT+CPIN? +CPIN: SIM PIN OK AT+CPIN="1111" OK	PIN authentication accepted.
AT+CPIN? +CPIN: PH-SIM PIN OK AT+CPIN="55555555" OK	"PS" phone lock password is required. "PS" phone lock password has been accepted. UE is fully operational now.

To deactivate the phone locked to SIM card:

AT+CLCK="PS",0,"55555555" OK	"PS" phone lock password has to be provided again. Now the UE can be used with any SIM card, without the need of the phone lock password.

EXAMPLE 3

Phone locked to Network (<facility>="PN"):

AT+CPIN? +CPIN: READY OK	Make sure that PIN1 authentication is valid.

To lock the UE to the currently inserted SIM card use:

```
AT+CLCK="PN",1,"66666666",      Locks the UE to Network "262.01".
,"262.01"
OK
```

Optionally, query the status of the phone locked to Network:

```
AT+CLCK="PN",2
+CLCK: 1
OK
```

Optionally, query the status of the locked Network (string is empty when no Network locked):

```
AT+CLCK="PN",4
+CLCK: "262.01"
OK
```

Optionally, activate the phone locked to Network using Autolock:

```
AT+CLCK="PN",5,"66666666"   Locks the UE to current Network.
OK                          Setting takes effect after next restart.
```

To operate the UE with the Network for which "PN" lock was activated:

```
AT+CPIN?
+CPIN: NET PIN
OK
AT+CPIN="9999"
OK                          No additional password is required for operation (SIM recognized by UE).
```

To operate the UE with other Network than the one used for the "PN" lock:
Enter PH-NET PIN of present card, followed by "PN" lock password.

```
AT+CPIN?
+CPIN: NET PIN
OK
AT+CPIN="1111"
OK                          PIN authentication accepted.
AT+CPIN?
+CPIN: PH-NET PIN           "PN" phone lock password is required.
OK
AT+CPIN="66666666"
OK                          "PN" phone lock password has been accepted. UE is fully operational now.
```

To deactivate the phone locked to Network:

```
AT+CLCK="PN",0,"66666666"   "PN" phone lock password has to be provided again.
OK                          Now the UE can be used with any SIM card, without the need of the phone lock password.
```

5.3 AT+CPWD Change Password

AT+CPWD allows to define a new password for a password protected <facility> lock function. Each password is a string of digits, the length of which varies with the associated <facility>. The test command returns a list of pairs which represent the available facilities and the maximum length of the associated password. See AT command AT+CLCK for more information on the various lock features.

To delete a password use the following syntax: at+cpwd=<facility>,<old password>

Syntax

Test Command

AT+CPWD=?

Response(s)

+CPWD: list of supported (<facility>, <password length>)
OK

Write Command

AT+CPWD=<facility>, <old password>, <new password>

Response(s)

New password has been registered for the facility lock function.
OK
If parameter <old password> was not correct:
+CME ERROR: 16 (+CME ERROR: incorrect password)
If the password for the selected <facility> has been invalidated due to too many failed attempts:
+CME ERROR: ...
If the network provider or network operator doesn't supply the Network Password:
+CME ERROR: 258 (+CME ERROR: retry operation)
If error is related to ME functionality:
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	±	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<facility>(str)

Phone security locks set by client or factory:

Primarily intended for the client to take safety precautions, passwords "SC" (SIM PIN) and "P2" (SIM PIN2) are usually predefined, but can be configured individually.

“SC“	SIM PIN. SIM requests password upon ME power-up and when this lock command is issued. If incorrectly entered three times, the SIM PUK is required to perform authentication. Input of the SIM PUK password is possible only with AT command AT+CPIN. <password length>: 4 to 8 digits.
“P2“	SIM PIN 2, e.g. required for authentication with facility lock "FD" (cf. AT+CLCK). If incorrectly entered three times, the SIM PUK 2 is required to perform authentication. Input of the SIM PUK 2 password is possible only with AT command AT+CPIN. <password length>: 4 to 8 digits.

Supplementary Service Call Barring:

The call barring supplementary service allows to specify conditions under which calls will be disallowed by the network.
The availability of the supplementary services varies with the network. To benefit from call barring the client will need to subscribe them, though a limited number of call barring types may be included in the basic tariff package.
<password length>: ThenNetwork password needs to be supplied from the network provider or network operator. Usually there is one 4 digit password which applies to all call barring options. For details contact your provider.

“AO“	BAOC (Bar All Outgoing Calls)
“OI“	BOIC (Bar Outgoing International Calls)
“OX“	BOIC-exHC (Bar Outgoing International Calls except to Home Country)
“AI“	BAIC (Bar All Incoming Calls)
“IR“	BIC-Roam (Bar Incoming Calls when Roaming outside the home country)
“AB“	All Barring services
“AG“	All outGoing barring services
“AC“	All inComing barring services

<password length>(num)

4...8	Length of password. The range of permitted length for a password depends on the associated <facility>. It is available from the test command response, or in the description of parameter <facility>. If the entered password is longer then the maximum password length it will be stripped to the maximum length and the remaining digits will be ignored.

<old password>(str)

Password specified for the facility.
Parameter <old password> can be ignored if no old password was allocated to the facility.
Take into account that a password may have already been set by factory, or that the service is subject to a password issued by the provider. See notes above or contact provider.

<new password>(str)

New password, which will be set if correct old password is provided.

Notes

- In the airplane mode the write command version for the network related <facility> (AO, OI, OX, AI, IR, AB, AG and AC) is not supported. For remaining facilities the command is fully functional then.
- As stated above there is usually a one 4-digit password for all call barring facilities. To change the password please use only the "AB" <facility> (All Barring services).

Examples

EXAMPLE 1

To change PIN1

```
AT+CPWD="SC","1111","2222"          (where "1111" = old PIN1 and "2222" = new PIN1)
OK                                  PIN1 password has been changed to "2222"
```

EXAMPLE 2

To change PIN2

```
AT+CPWD="P2","0000","8888"          (where "0000" = old PIN2 and "8888" = new PIN2)
OK                                  PIN2 password has been changed to "8888"
```

EXAMPLE 3

To set the password used to enable or disable Call Barring:

`AT+CPWD="AB","0000","3333"`	Requests the network to change the password for the call barring supplementary service.
`OK`	Even though issued for "AB" only the request applies to all other call barring services, too.

5.4 AT^SPIC Display PIN Counter

The AT^SPIC command can be used to find out whether the ME is waiting for a password and, if so, how many attempts are left to enter the password.

The execute command returns the number of attempts still available for entering the currently required password, for example the SIM PIN, SIM PUK, SIM PIN2 or SIM PUK2.

The read command AT^SPIC? indicates which password the number of attempts stated by the execute command actually refers to. Also, the write command may be used to query the counter for a specific password. It indicates the number of attempts still available for entering the password identified by <facility>, for example the SIM PIN, SIM PIN2, SIM PUK or SIM PUK2.

To check whether or not you need to enter a password use the read commands AT+CPIN? or AT^SPIC? . If the response to AT+CPIN? is "READY" the counter of the execute command AT^SPIC relates to PIN2. See last example. If PIN and PIN2 (e. g. AT+CPBS="FD","PIN2") are entered successfully no password is currently required and AT^SPIC read and execute commands return only OK.
If no USIM card is inserted the AT^SPIC read, execute and write commands return "+CME ERROR: SIM not inserted".

Syntax

Test Command

```
AT^SPIC=?
```

Response(s)

```
OK
```

Read Command

```
AT^SPIC?
```

Response(s)

```
^SPIC: <code>
OK
```

Exec Command

```
AT^SPIC
```

Response(s)

```
[^SPIC: <counter>]
OK
```

Write Command

```
AT^SPIC=<facility>[, <pin_puk>]
```

Response(s)

```
^SPIC: <counter>
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<counter>(num)

Number of attempts left to enter the currently required password. This number will be counted down after each failure.

<facility>(str)	
Password for which the corresponding PIN counter is to be displayed.	
“SC“	SIM PIN if parameter <pin_puk> is omitted or set to 0. SIM PUK if parameter <pin_puk> is set to 1.
“PS“	PH-SIM PIN current retries if parameter <pin_puk> is omitted or set to 0. PH-SIM PIN maximum retries if parameter <pin_puk> is set to 1. PH-SIM PUK is not supported.
“P2“	SIM PIN2 if parameter <pin_puk> is omitted or set to 0. SIM PUK2 if parameter <pin_puk> is set to 1.
“PN“	Network Personalisation. PH-NET PIN current retries if parameter <pin_puk> is omitted or set to 0. PH-NET PIN maximum retries if parameter <pin_puk> is set to 1. PH-NET PUK is not supported.

<pin_puk>(num)	
[0]	Show PIN counter for given <facility>.
1	Show PUK counter for given <facility>="SC" or "P2". Show maximum retries PIN counter for given <facility>="PS" or "PN".

<code>(text)	
Identification of the currently required password.	
SIM PIN	ME is waiting for SIM PIN1.
SIM PUK	ME is waiting for SIM PUK1 if PIN1 was disabled after three failed attempts to enter PIN1.
SIM PIN2	ME is waiting for PIN2, when the attempt to access PIN2 requiring features was acknowledged with "+CME ERROR: SIM PIN2 required" (e.g. if the user attempts to edit the FD phonebook by using AT+CPBS="FD","PIN2").
SIM PUK2	ME is waiting for PUK2 to unblock a disabled PIN2. Necessary if preceding command was acknowledged with "+CME ERROR: SIM PUK2 required".
PH-SIM PIN	ME is waiting for 8-digit code to unlock the UE to a SIM/UICC if "PS" lock is active and user inserts other SIM card than the one used for the lock. For details see AT+CLCK="PS".
PH-SIM PUK	Not supported.
PH-NET PIN	ME is waiting for Network Personalisation. For details see AT+CLCK="PN", AT^SCSL="PN", AT+CPIN and AT+CPWD for further information.
PH-NET PUK	Not supported.

Notes

- Whenever the required password changes, <counter> changes to reflect that change. Please refer to the examples below.
- See also chapters AT+CLCK, AT^SCSL, AT+CPIN and AT+CPWD for further information on locks and passwords.

Examples

EXAMPLE 1

The user fails to provide a correct SIM PIN three times. The counter decreases each time. After the counter reaches zero, the SIM PUK is required. After each failure to enter a correct SIM PUK, the counter decreases.

```
at+cpin?
+CPIN: SIM PIN
```

```
OK                                          Currently required password is PIN1.
at^spic?
^SPIC: SIM PIN
OK                                          Currently required password is PIN1.
at^spic
^SPIC: 3
OK                                          3 attempts left.
at+cpin="9999"
+CME ERROR: incorrect password
at^spic
^SPIC: 2                                    2 attempts left.
OK
at+cpin="9999"
+CME ERROR: incorrect password
OK
at^spic
^SPIC: 1                                    1 attempt left.
OK
at+cpin="9999"
+CME ERROR: incorrect password
at+cpin?
+CPIN: SIM PUK
OK                                          Now required password is PUK1.
at^spic
^SPIC: 10
OK                                          10 attempts left for PUK1.
at+cpin="01234567","1234"
+CME ERROR: incorrect password
at^spic
^SPIC: 9
OK                                          9 attempts left for PUK1.
```

EXAMPLE 2

Though a mobile is locked to Network Personalisation ("PN"), the user attempts to operate it with another SIM card. The user correctly enters the SIM PIN of the SIM card currently inserted:

```
at+cpin="9999"
OK
at+cpin?
+CPIN: PH-NET PIN                           ME is waiting for the Network Personalisation password.
OK
at^spic
^SPIC: 10                                   10 attempts left.
OK
at^spic="PN",1
^SPIC: 10                                   Maximum retries PIN counter.
OK
at+cpin="11110000"
+CME ERROR: operation failed
at^spic
^SPIC: 9                                    9 attempts left.
OK
at+cpin="11110000"
+CME ERROR: operation failed
and so on ...
at^spic
^SPIC: 1                                    1 attempt left.
```

```
OK
at^spic?
^SPIC: PH-NET PIN                    Displayed counter refers to Network Personalisation
                                     password.
OK

at+cpin="12345678"                   The password is a self defined module specific pass-
                                     word.
OK
```

EXAMPLE 3

This example shows that after successful SIM PIN1 authentication the counter of the AT^SPIC execute and read command refers to SIM PIN2, i.e. it does not reflect the status of SIM PIN1. This may be a problem if the user enters a wrong PIN1 and is not aware that the number of attempts left to enter SIM PIN1 is counted down.

```
+CREG: 0
at+cpin="1234"
OK
+CREG: 2

+CREG: 1                             The mobile ist properly registered to the network.
at+cpin?
+CPIN: READY                         The AT+CPIN? read command confirms that SIM
                                     PIN1 authentication was successful.
at^spic
^SPIC: 3                             As SIM PIN1 authentication was successful, the
                                     counter relates to SIM PIN2 and correctly indicates
                                     that the user has 3 attempts to enter SIM PIN2.
OK
AT^SPIC?                             Likewise, the read command notifies that the ME is
                                     waiting for SIM PIN2.
^SPIC: SIM PIN2
OK
at+clck="SC",0,"456789"              First attempt to enter a wrong SIM PIN1.
+CME ERROR: incorrect password
at^spic
^SPIC: 3                             SIM PIN1 authentication is still valid, and the counter
                                     relates to SIM PIN2.
at+clck="SC",0,"456789"              Second attempt to enter a wrong SIM PIN1.
+CME ERROR: incorrect password
at^spic
^SPIC: 3                             SIM PIN1 authentication is still valid, and the counter
                                     relates to SIM PIN2.
at+clck="SC",0,"456789"              Third attempt to enter a wrong SIM PIN1.
+CME ERROR: incorrect password

+CREG: 0                             SIM PIN1 authentication is no longer valid.
at^spic
^SPIC: 10                            This time, after the SIM PIN1 code has been dis-
                                     abled, the counter indicates the status of SIM PIN1
                                     and notifies that 10 attempts are left to enter the SIM
                                     PUK.
```

To avoid conflicts we recommend to use the AT^SPIC read and write commands rather than the execute command only. The read command clearly states the currently required password, and the write command may be used to get the counter for a specific <facility>, in this case for example "P2".

5.5 AT^SCSL Customer SIM Lock

The AT^SCSL command controls the Customer SIM Lock feature. This feature allows application manufacturers to lock a mobile to specific operators by activating a Network Personalization ("PN"). If the lock is enabled the mobile will accept only SIM cards from the given operators.
The lock is activated by specifying the mobile country codes and mobile networks codes on command line. The Customer SIM Lock feature is protected by a depersonalization key.
If a SIM card is inserted AT^SCSL is SIM PIN protected, i.e., changing or querying any settings requires SIM PIN authentication. If no SIM card is inserted AT^SCSL is not SIM PIN protected, i.e., all settings can be changed and queried without SIM PIN authentication. The benefit for application manufacturers is that Customer SIM Lock can be set during production.

Syntax

Test Command

AT^SCSL=?

Response(s)

OK

Write Command

AT^SCSL=<facility>, <action>[, <password>, <data>]

Response(s)

If <action>= 2 and no Customer SIM Lock has been programmed yet:
^SCSL: ""
If <action>= 2, Customer SIM Lock is effective and command is successful:
^SCSL: "<data>[: <data>: <data>: ...]"
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
±	+	+	+	-

Parameter Description

<facility>(str)

"PN"	Network Personalisation (= Customer SIM Lock). *Be careful to enter wrong <password> when unlock with <action>=0 the UE.* *After having entered 10 times a wrong <password> the UE is blocked and there is no chance to unblock it !*

<action>(num)

0	Delete programmed SIM lock data (unlock) and disable the personalization. Required parameters: <facility>="PN",<action>=0,<password>. Removing the Customer SIM Lock deletes all <data>, i.e. the entire list of operators.
1	Program given Customer SIM Lock data and activate lock. Required parameters: <facility>="PN",<action>=1,<password>,<data>.
2	Request Customer SIM Lock status. Required parameters: <facility>="PN",<action>=2.

<password>(str)

8-digit depersonalization key associated with the device.
The depersonalization key is necessary for programming a Customer SIM Lock. It can also be used to unlock a Customer SIM Lock in order to operate the mobile with a SIM other than the one associated with the Customer SIM Lock. See note below.
The <password> is a self defined module specific password and must be unique for each device.
To allow for any later changes, it is the responsibility of the manufacturer to hold a database with the module specific passwords. To avoid unauthorized use, the <password> should not be provisioned to end users.
The password is not needed for <action>=2.

<data>(str)

Data of the allowed network operators.
Each operator code consists of the "Mobile Country Code" MCC and the "Mobile Network Code" MNC, both separated by a dot, e.g. MCC1.MNC1 . If more than one operator is entered on the same line, then a colon must be set between each operator code, e.g. MCC1.MNC1:MCC2.MNC2:MCC3.MNC3 . For example, for the three operators T-Mobile D1, Vodafone D2 and E-Plus you would enter the following data: 262.01:262.02:262.03
New operator entries will not be added to an existing list, but overwrite all old entries. If you need to add new operator entries please send the complete list once again.

Notes

- Usage of the Customer SIM Lock features may be restricted by existing facility locks, such as a factory set SIM lock.
- When reprogramming an active SIM lock, first delete the current SIM Lock and request the new SIM Lock.
- As described above the depersonalization key <password> is needed for programming a Customer SIM Lock with AT^SCSL.
  It can also be used to unlock an existing Customer SIM Lock in order to operate the mobile with a SIM other than the one associated with the Customer SIM Lock. In such case, if the user inserts an unsupported SIM and enters PIN1 the ME returns OK, although access to SIM related commands (such as dialing out, access to phonebooks, SMS etc.) will be denied. If then the read command AT+CPIN? is executed the ME will request the PH-NET PIN, i.e. the <password>. After entering the <password> the ME can be operated with the new SIM. To avoid unauthorized use, the <password> should not be provisioned to end users.

Example

The example shows how to use the <password> which is self defined and must be module specific. Configuring and removing the Customer SIM Lock is then possible.

```
AT^SCSL="PN",2                                  Request status.
^SCSL: ""                                       SIM lock disabled.
OK
AT^SCSL="PN",1,"12345678","262.01:262.02"       Program Customer SIM Lock.
OK
AT^SCSL="PN",2                                  Request status
^SCSL: "262.01:262.02"                          SIM lock is enabled.
OK
AT^SCSL="PN",0,"12345678"                       Remove Customer SIM Lock.
OK
```

6. Identification Commands

The AT Commands described in this chapter allow the external application to obtain various identification information related to the PLAS9-W and linked entities.

6.1 ATI Display product identification information

The ATI execute command delivers a product information text.

Syntax

Exec Command

ATI

Response(s)

Cinterion
PLAS9-W
REVISION xx.yyy
OK

Exec Command

ATI1

Response(s)

Cinterion
PLAS9-W
REVISION xx.yyy
A-REVISION xx.zzz.cc
OK

Exec Command

ATI2

Response(s)

UICC Application Identification <applId>
OK
ERROR
+CME ERROR: <err>

Exec Command

ATI3

Response(s)

L-REVISION xx.zzz.cc
OK

Exec Command

ATI61

Response(s)

[<provCfg> <mdmSwVer>]
[<provCfg> <mdmSwVer>]
[...]
xxx.<cProvCfg>
MIMG <mdmImage>
OK

Exec Command

ATI176

Response(s)

<imeisv_number>
OK

PIN	MDM	APP	✈	Last
±	+	+	+	-

Reference(s)

ITU-T V.250 [13]

Parameter Description

<applId>(num)

UICC application types. A single value or a combination of the following values is possible.
For example, the response value 0x03 represents the sum of the integers 0x01 and 0x02 (GSM application and USIM application).

0x01	GSM application
0x02	USIM application
0x04	ISIM application
0x08	CSIM application

ATI2 command requires SIM-PIN to be provided.

<provCfg>(text)

Possible provider configuration.
For details on how to change the provider configuration see AT^SCFG parameter "MEopMode/Prov/Cfg" (see <provCfg>).
The fallback configuration is indicated by a "*".

<mdmSwVer>(text)

Modem software version number.

<cProvCfg>(text)

Current provider configuration.

<mdmImage>(text)

Modem image.

<imeisv_number>(num)

IMEISV (International Mobile station Equipment Identity and Software Version number) conforming to the format: <IMEI>.<SVN>. For information on IMEISV refer to 3GPP TS 23.003 and 3GPP TS 27.007 [45].

Notes

- The "Revision" information consists of the following parts: Version xx and variant yyy of software release.
- "A-REVISION xx.zzz.cc" information consists of the following parts:
  Application Revision Number 'xx' as an assignment to customer application. '01' indicates no customer application.
  Application Revision Version 'zzz' as an assignment to changes in customer application.
  'cc' as an additional number, e.g. defined by customer.

6.2 AT+CGMI Request manufacturer identification

AT+CGMI returns a manufacturer identification text. See also: AT+GMI.

Syntax

Test Command
AT+CGMI=?
Response(s)
OK

Exec Command
AT+CGMI
Response(s)
Cinterion OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)
3GPP TS 27.007 [45]

6.3 AT+GMI Request manufacturer identification

AT+GMI returns a manufacturer identification text. See also: AT+CGMI.

Syntax

Test Command
AT+GMI=?
Response(s)
OK

Exec Command
AT+GMI
Response(s)
Cinterion OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)
ITU-T V.250 [13]

6.4 AT+CGMM Request model identification

AT+CGMM returns a product model identification text. Command is identical with AT+GMM.

Syntax

Test Command
AT+CGMM=?
Response(s)
OK

Exec Command
AT+CGMM
Response(s)
PLAS9-W OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)
3GPP TS 27.007 [45]

6.5 AT+GMM Request model identification

AT+GMM returns a product model identification text. Command is identical with AT+CGMM.

Syntax

Test Command
AT+GMM=?
Response(s)
OK

Exec Command
AT+GMM
Response(s)
PLAS9-W OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)
ITU-T V.250 [13]

6.6 AT+CGMR Request revision identification of software status

AT+CGMR delivers a product firmware version identification. Command is identical with AT+GMR.

Syntax

Test Command
AT+CGMR=?
Response(s)
OK

Exec Command
AT+CGMR
Response(s)
REVISION <xx.yyy> OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)
3GPP TS 27.007 [45]

Parameter Description

<xx.yyy>(text)

Version xx and variant yyy of software release.

6.7 AT+GMR Request revision identification of software status

AT+GMR delivers a product firmware version identification. Command is identical with AT+CGMR.

Syntax

Test Command
AT+GMR=?
Response(s)
OK

Exec Command
AT+GMR
Response(s)
REVISION <xx.yyy> OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)
ITU-T V.250 [13]

Parameter Description

<xx.yyy>(text)

Version xx and variant yyy of software release.

6.8 AT+CGSN Request International Mobile Equipment Identity (IMEI)

AT+CGSN returns the International Mobile Equipment Identity (IMEI). Command is identical with AT+GSN.

Syntax

Test Command
AT+CGSN=?
Response(s)
OK

Exec Command
AT+CGSN
Response(s)
<sn> OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)
3GPP TS 27.007 [45]

Parameter Description

<sn>(text)

IMEI used to identify mobile equipment when used on a mobile network.

6.9 AT+GSN Request International Mobile Equipment Identity (IMEI)

AT+GSN returns the International Mobile Equipment Identity (IMEI). Command is identical with AT+CGSN.

Syntax

Test Command
AT+GSN=?
Response(s)
OK

Exec Command
AT+GSN
Response(s)
<sn> OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)
ITU-T V.250 [13]

Parameter Description

<sn>(text)

IMEI used to identify mobile equipment when used on a mobile network.

6.10 AT+CIMI Request International Mobile Subscriber Identity (IMSI)

AT+CIMI delivers the International Mobile Subscriber Identity (IMSI). The IMSI permits the TE to identify the individual SIM attached to the UE.

Syntax

Test Command

```
AT+CIMI=?
```

Response(s)

```
OK
```

Exec Command

```
AT+CIMI
```

Response(s)

```
<imsi>
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<imsi>(text)

International Mobile Subscriber Identity

6.11 AT^SINFO Information Output

The AT^SINFO command delivers general product information text.

Syntax

Test Command

AT^SINFO=?

Response(s)

OK

Read Command

AT^SINFO?

Response(s)

^SINFO: "BldC/Ident", <BldCIdent>
^SINFO: "OSS"
^SINFO: "ProvCfg/Ident", <ProvCfgIdent>
^SINFO: "RPM", <RpmFlag>, <RpmN1>, <RpmT1>, <RpmF1>, <RpmF2>, <RpmF3>, <RpmF4>, <RpmLR-1>, <RpmLR-2>, <RpmLR-3>, <RpmC-BR-1>, <RpmC-R-1>, <RpmC-PDP-1>, <RpmC-PDP-2>, <RpmC-PDP-3>, <RpmC-PDP-4>, <RpmVer>, <RpmOrigin>
OK
ERROR
+CME ERROR: <err>

Write Command

Display Build Collection

AT^SINFO="BldC/Ident"

Response(s)

^SINFO: "BldC/Ident", <BldCIdent>
OK
ERROR
+CME ERROR: <err>

Write Command

Open Source Software

AT^SINFO="OSS"

Response(s)

^SINFO: "OSS", <OpenSourceSoftware>
OK
ERROR
+CME ERROR: <err>

Write Command

Display Provider Configuration

AT^SINFO="ProvCfg/Ident"

Response(s)

^SINFO: "ProvCfg/Ident", <ProvCfgIdent>
OK
ERROR
+CME ERROR: <err>

Write Command

Display loaded RPM (Radio Policy Manager) parameters

AT^SINFO="RPM"

Response(s)

^SINFO: "RPM", <RpmFlag>, <RpmN1>, <RpmT1>, <RpmF1>, <RpmF2>, <RpmF3>, <RpmF4>, <RpmLR-1>, <RpmLR-2>, <RpmLR-3>, <RpmC-BR-1>, <RpmC-R-1>, <RpmC-PDP-1>, <RpmC-PDP-2>, <RpmC-PDP-3>, <RpmC-PDP-4>, <RpmVer>, <RpmOrigin>
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<BldCIdent>(str)

Build Collection Identification.

<OpenSourceSoftware>(str)

Open Source Software (OSS).
AT read command prints out in plain text all information about free and open source software used in module firmware. The text being printed out includes following information:
- List of product variants the information printed out applies to.
- For each addressed software package the package name, copyright information, used licenses and text of associated licenses.
- Other instructions and information resulting from licensing of used free or open source software packages.
The text being printed out might be huge in number of lines of text. It is on UE to be able to deal with text output of this dimension.

<ProvCfgIdent>(str)

Provider Configuration Identification.

<RpmFlag>(str)

The AT^SINFO "RPM" command returns the loaded RPM (Radio Policy Manager) parameters specified in the GSMA "TSG.34/TS.34 - IoT Device Connection Efficiency Guidelines", as of Version 1.x, chapter 8. For further information see also the GSMA "TSG.35/TS.35 - IoT Device Connection Efficiency Test Book".
See also AT^SCFG "MEopMode/SRPOM" parameter <srpom>.

“0“	RPM disabled
“1“	RPM enabled

<RpmN1>(str)

Max number of SW resets per hour allowed by RPM following "permanent" MM/GMM/EMM reject.

“0“	Requirement disabled.
"1"..."255"	Number of resets per hour.

`<RpmT1>`(str)

T1. Average time before RPM resets modem following permanent MM/GMM/EMM reject.

“0“	Requirement disabled.
"1"..."255"	Defines in 6 min increments the time to reset after receiving a permanent MM/GMM/EMM reject, i.e. MM#2.

`<RpmF1>`(str)

F1. Max. number of PDP Activation Requests per Hour allowed by RPM following a PDP Activation Ignore Scenario.

“0“	Requirement disabled.
"1"..."255"	Defines in 6 min increments the time to reset after receiving a permanent MM/GMM/EMM reject, i.e. MM#2.

`<RpmF2>`(str)

F2. Max number of PDP Activation Requests per Hour allowed by RPM following a "Permanent" PDP Activation Reject.

“0“	Requirement disabled.
"1"..."255"	Max. attempts allowed.

`<RpmF3>`(str)

F3. Max number of PDP Activation Requests per Hour allowed by RPM following a "Temporary" PDP Activation Reject.

“0“	Requirement disabled.
"1"..."255"	Max. attempts allowed.

`<RpmF4>`(str)

F4. Max number of PDP Activation/Deactivation Requests per Hour allowed by RPM.

“0“	Requirement disabled.
"1"..."255"	Max. attempts allowed.

`<RpmLR-1>`(str)

LR-1. Leak rate for C-BR-1.

“0“	C-BR-1 shall not be decremented.
"1"..."255"	Defines number of hours before C-BR-1 is decremented by 1.

`<RpmLR-2>`(str)

LR-2. Leak rate for C-R-1.

“0“	C-R-1 shall not be decremented.
"1"..."255"	Defines number of hours before C-R-1 is decremented by 1.

`<RpmLR-3>`(str)

LR-3. Leak rate for C-R-3.

“0“	C-PDP-1 TO C-PDP-4 shall not be decremented.
"1"..."255"	Defines number of hours before C-PDP-1 TO C-PDP-4 is decremented by 1.

`<RpmC-BR-1>`(str)

C-BR-1. Counter related to N1.

"1"..."255"	Indicate number of control actions triggered by N1.

`<RpmC-R-1>`(str)

C-R-1. Counter related to T1.

"1"..."255"	Indicate number of control actions triggered by T1.

`<RpmC-PDP-1>`(str)

C-PDP-1. Counter related to F1.

"1"..."255"	Indicate number of control actions triggered by F1.

`<RpmC-PDP-2>`(str)

C-PDP-2. Counter related to F2.

"1"..."255"	Indicate number of control actions triggered by F2.

`<RpmC-PDP-3>`(str)

C-PDP-3. Counter related to F3.

"1"..."255"	Indicate number of control actions triggered by F3.

`<RpmC-PDP-4>`(str)

C-PDP-4. Counter related to F4.

"1"..."255"	Indicate number of control actions triggered by F4.

`<RpmVer>`(str)

RPM version implemented on the device

`<RpmOrigin>`(str)

Origination of RPM parameters

“0“	UE's memory
“1“	USIM

Note

- If parameter `<RpmFlag>` of the `AT^SINFO`="RPM" command is disabled ("0"), all other parameters are invalid ("--").

7. Network Service Commands

The AT Commands described in this chapter are related to various network services.

7.1 AT+COPN Read operator names

The AT+COPN command returns the list of operator names from the UE. Each operator code <numericn> that has an alphanumeric equivalent <alphan> in the UE memory is returned.

Syntax

Test Command

```
AT+COPN=?
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

Exec Command

```
AT+COPN
```

Response(s)

```
+COPN: <numericn>,<alphan>
[+COPN: ...]
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<numericn>(str)

Operator in numeric format

<alphan>(str)(+CSCS)

Operator in long alphanumeric format

7.2 AT+COPS Operator Selection

AT+COPS queries the present status of the PLAS9-W's network registration and allows to determine whether automatic or manual network selection shall be used.

Three operator selection modes are available with AT+COPS:

- Automatic
  PLAS9-W searches for the home operator automatically. If successful the PLAS9-W registers to the home network. If the home network is not found, PLAS9-W goes on searching. If a permitted operator is found, PLAS9-W registers to this operator.
  If no operator is found the PLAS9-W remains unregistered.
- Manual
  Desired operator can be determined using the AT+COPS write command. If the operator is found, PLAS9-W registers to it immediately. If the selected operator is forbidden, the PLAS9-W remains unregistered.
- Manual/automatic
  The UE first tries to find the operator determined via AT+COPS write command. If the UE fails to register to this operator, then it starts to select another (permitted) operator automatically.

The AT+COPS test command lists sets of five parameters, each representing an operator present in the network. A set consists of

- an integer indicating the availability of the operator,
- long alphanumeric format of the operator's name,
- short alphanumeric format of the operator's name,
- numeric format representation of the operator and
- an integer indicating the access technology of the operator.

Any of the parameters may be unavailable and will then be an empty field (,,). The list of operators comes in the following order: Home network, networks referenced in SIM and other networks.
The operator list is followed by a list of the supported <mode>s and <format>s. These lists are delimited from the operator list by two commas.
The response to the AT+COPS test command is independent of the settings made with <mode>. and <rat>. The AT+COPS test command will return a list of operators with the supported <rat>s.
Under certain conditions the UE has not enough resources to perform a network scan in the background. In such case, the AT+COPS test command is denied with error, for example during location update, data traffic in PS connections etc.

The response to the AT+COPS read command depends on the registration status. If the UE is not registered, the read command returns only the current <mode>. If the UE is registered the response returns the currently selected operator and the currently set format. and the currently used <rat>.

The AT+COPS write command forces an attempt to select and register to a network operator. If the selected operator is not available, no other operator will be selected (except <mode>=4). The selected operator name <format> will apply to further read commands, too.

Syntax

Test Command

AT+COPS=?

Response(s)

+COPS: [list of supported (<opStatus>, long alphanumeric <opName>, short alphanumeric <opName>, numeric <opName>, <rat>)s], , (list of supported <mode>s), (list of supported <format>s)
OK
ERROR
+CME ERROR:<err>

Read Command

AT+COPS?

Response(s)

+COPS:<mode>[, <format>[, <opName>][, <rat>]]
OK
ERROR
+CME ERROR:<err>

Write Command

AT+COPS=<mode>[, <format>[, <opName>[, <rat>]]]

Response(s)

OK
ERROR
+CME ERROR:<err>

Write Command

When <mode>=0:

AT+COPS=[<mode>[, <format>[, <opName>[, <rat>]]]]

Response(s)

OK
ERROR
+CME ERROR:<err>

Write Command

When <mode>=1 or 4:

AT+COPS=<mode>, <format>, <opName>[, <rat>]

Response(s)

OK
ERROR
+CME ERROR:<err>

Write Command

When <mode>=2 (deregistering from network):

AT+COPS=<mode>

Response(s)

OK
ERROR
+CME ERROR:<err>

Write Command

When <mode>=3 (changing only <format>):

AT+COPS=[<mode>], <format>[, <opName>][, <rat>]

Response(s)

OK
ERROR
+CME ERROR:<err>

PIN	MDM	APP	✈	Last
+	+	+	-	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<opStatus>(num)

Operator Status

0	Unknown
1	Operator available
2	Current operator
3	Operator forbidden

<opName>(str)(+CSCS)(&V)

Operator Name

If test command: Operator name in long alphanumeric format, short alphanumeric format and numeric format.
If read command: Operator name as per <format>.
If write command: Operator name in numeric format.

<mode>(num)(&V)(NV)

Only Parameter values 0 and 1 are stored in the non-volatile memory of the PLAS9-W.

0(D)	Automatic mode; <opName> field is ignored.
1	Manual operator selection The AT+COPS write command requires <opName> in numeric format, i.e. <format> shall be 2. When using this mode keep in mind that only the <mode> parameter is non-volatile, but not the selected <opName>. After restarting the UE the network will be selected according to the priority order specified in 3GPP TS 23.122: "Last Registered PLMN", "Home PLMN", "Preferred PLMN" (related USIM elementary files are EF_LOCI, EF_IMSI, EF_PLMNwAcT). The same priority order applies when swapping the USIM during operation.
2	Manually deregister from network and remain unregistered until <mode>=0 or 1 or 4 is selected. After setting command AT+COPS=2 wait for <regStatus> 0, e.g. indicated by the "+CREG: 0" URC before executing any further network service related AT commands.
3	Set only <format> (for AT+COPS read command).
4	Manual / automatic selection (<opName> field shall be present); if manual selection fails, automatic mode (<mode>=0) is entered.

<rat>(num)(&V)(NV)

Radio Access Technology (RAT)

By delivery default, the <rat> parameter is set to an automatic selection mode which enables the UE to select either UTRAN (UMTS) or GSM GSM or E-UTRAN, depending on the network coverage. This automatic mode for selecting <rat> remains enabled until you explicitly set either 0 for GSM or 2 for UTRAN either 0 for GSM or 7 for E-UTRAN This means, setting the <rat> parameter is a restriction, i.e. it forces the UE to select either UTRAN only or or GSM only GSM only or E-UTRAN only. The selected <rat> value will be stored in the non-volatile memory. If the selected <rat> is not available, the UE cannot register to a network.
The automatic <rat> selection mode can be restored any time by executing the AT+COPS write command without choosing a specific <rat>, i.e. simply by omitting the <rat> value. When you do so, it does not matter, which value(s) you select for other AT+COPS parameters. For example, an easy way is setting AT+COPS=0, which means both PLMN and RAT are automatically selected. Another way is giving the AT+COPS write command with any <mode>, <format>, or <opName>, but <rat> omitted.
Please consider that the AT+COPS? read command does not reflect whether <rat> was omitted or explicitly set. This is because the response to the AT+COPS? read command will always indicate the currently used <rat>.

0	GSM

2	UTRAN
3	GSM w/EGPRS Only in read command response, not intended for the AT+COPS write command.
4	UTRAN w/HSDPA Only in read command response, not intended for the AT+COPS write command.
6	UTRAN w/HSDPA and HSUPA Only in read command response, not intended for the AT+COPS write command.
7	E-UTRAN

<format>(num)(&V)(&W)	
0(&F)(D)	Long alphanumeric format of <opName>.
1	Short alphanumeric format of <opName>.
2	Numeric format of <opName>. This is the Location Area Identification (LAI) number, which consists of the 3-digit Mobile Country Code (MCC) plus the 2- or 3-digit Mobile Network Code (MNC).

Notes

- AT+COPS=? shows PLMNs as available (<opStatus>=1) as long as a location update was not rejected and the PLMNs are not written to the forbidden PLMN list (SIM EF-FPLMN).
- The AT+COPS write command can be entered in an restricted mode, e.g.
  - whilst no SIM is present
  - or before PIN entry when a SIM with PIN enabled is present.
  AT+COPS test and read commands are not allowed in restricted mode.
  The AT+COPS write command in restricted mode must specify a valid <mode>, such as modes 0 (automatic), 1 (manual) and 4 (manual-automatic). Modes 2 (deregister) and 3 (set format) are invalid in restricted mode.

7.3 AT+CPOL Preferred Operator List

AT+CPOL read command queries the list of the preferred operators.
AT+CPOL write command allows to edit the list of the preferred operators.
The response of AT+CPOL read command also depends on the setting of AT+CPLS.
If <index> is given but <operator> is left out, the entry is deleted.

Syntax

Test Command

```
AT+CPOL=?
```

Response(s)

```
+CPOL:(list of supported <index>s), (list of supported <format>s)
OK
ERROR
+CME ERROR: <err>
```

Read Command

```
AT+CPOL?
```

Response(s)

```
+CPOL: <index>, <format>, <operator>[, <gsm>, <gsm_compact>, <utran>, <e-utran>]
+CPOL: ...
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CPOL=[<index>][, <format>[[, <operator>][, <gsm>, <gsm_compact>, <utran>, <e-utran>]]]
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<index>(num)

The order number of the operator in the SIM preferred operator list.

<format>(num)

0	Long alphanumeric format <operator>
1	Short alphanumeric format <operator>
2(P)	Numeric format <operator>

<operator>(str)

The operator in the format specified in <format>.

<gsm>(num)	
0	AcT GSM disabled
1	AcT GSM enabled

<gsm_compact>(num)	
0	AcT GSM Compact disabled

<utran>(num)	
0	AcT UTRAN disabled
1	AcT UTRAN enabled

<e-utran>(num)	
0	AcT E-UTRAN disabled
1	AcT E-UTRAN enabled

Note

- The Access Technology selection parameters <gsm>, <gsm_compact>, <utran>, <e-utran> are required for SIM cards or UICCs containing PLMN selector with Access Technology.

7.4 AT+CPLS Select Preferred Operator List

AT+CPLS is used to select a preferred PLMN list defined in Elementary Files of the SIM card or active application of the USIM. The setting takes effect for the AT+CPOL command.

Syntax

Test Command

```
AT+CPLS=?
```

Response(s)

```
+CPLS:(list of USIM supported <plmn-selector>s)
OK
```

Read Command

```
AT+CPLS?
```

Response(s)

```
+CPLS: <plmn-selector>
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CPLS=<plmn-selector>
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	-	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<plmn-selector>(num)	
0(P)	User controlled PLMN with $EF_{PLMNwAcT}$/$EF_{PLMNsel}$
1	Operator controlled PLMN selector with $EF_{OPLMNwAcT}$
2	HPLMN selector with $EF_{HPLMNwAcT}$

7.5 AT+CREG Network Registration Status

AT+CREG serves to monitor the PLAS9-W's network registration status. Information can be reported by the AT+CREG? read command and by +CREG: URCs.

Syntax

Test Command

```
AT+CREG=?
```

Response(s)

```
+CREG: (list of supported<urcMode>s)
OK
```

Read Command

```
AT+CREG?
```

Response(s)

```
+CREG: <urcMode>, <regStatus>[, <netLac>, <netCellId>[, <AcT>]]
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CREG=<urcMode>
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Unsolicited Result Codes

URC 1

If <urcMode>=1 and there is a change in the UE's network registration status:

```
+CREG: <regStatus>
```

URC 2

If <urcMode>=2 and there is a change of the UE's network registration status or at least one of the additional network information elements:

```
+CREG: <regStatus>[, <netLac>, <netCellId>[, <AcT>]]
```

Parameter Description

<urcMode>(num)(&V)(&W)	
[0](&F)	Disable +CREG URC.
1	Enable URC +CREG:<regStatus> to report status of network registration.
2	Enable URC +CREG:<regStatus>[,<netLac>,<netCellId> [, <AcT>]] to report status of network registration including location information. Parameters <netLac>, <netCellId> <AcT> will only be displayed if available.

<regStatus>(num)(&V)	
0	Not registered, UE is currently not searching for new operator. There is a technical problem. User intervention is required. Yet, emergency calls can be made if any network is available. Probable causes: • no SIM card available • no PIN entered • no valid Home PLMN entry found on the SIM
1	Registered to home network.
2	Not registered, but UE is currently searching for a new operator. UE searches for an available network. Failure to log in until after more than a minute may be due to one of the following reasons: • No network available or insufficient Rx level. • UE has no access rights to the networks available. • Networks from the SIM list of allowed networks are around, but login fails due to one of the following reasons: - #11 ... PLMN not allowed - #12 ... Location area not allowed - #13 ... Roaming not allowed in this location area After this, the search will be resumed (if automatic network search is enabled). • The Home PLMN or an allowed PLMN is available, but login is rejected by the cell (reasons: Access Class or LAC). If at least one network is available, emergency calls can be made.
3	Registration denied • If automatic network search is enabled: Authentication or registration fails after Location Update Reject due to one of the following reasons: - #2 ... IMSI unknown at HLR - #3 ... Illegal MS - #6 ... Illegal UE Either the SIM or the UE are unable to log into any network. User intervention is required. Emergency calls can be made, if any network is available. • Only if manual network search is enabled: Manual registration fails after Location Update Reject due to the following reasons: - #2 ... IMSI unknown at HLR - #3 ... Illegal MS - #6 ... Illegal UE - #11 ... PLMN not allowed - #12 ... Location area not allowed - #13 ... Roaming not allowed in this location area No further attempt is made to search or log into a network. Emergency calls can be made if any network is available.
4	Unknown, e.g. out of GSM/UMTS/LTE coverage.
5	Registered, roaming. UE is registered at a foreign network (national or international network)

<netLac>(str)

Two byte location area code in hexadecimal format (e.g. "00C1" equals 193 in decimal).

<netCellId>(str)

Cell ID in hexadecimal format:
- 16 bit for 2G
- 28 bit for 3G or 4G

<AcT>(num)

Radio access technology

0	GSM
2	UTRAN
3	GSM w/EGPRS
4	UTRAN w/HSDPA
6	UTRAN w/HSDPA and HSUPA
7	E-UTRAN

Example

AT+CREG=1	Activate URC mode.
OK	
AT+COPS=0	Force UE to automatically search a network operator.
OK	
+CREG: 2	URC reports that UE is currently searching.
+CREG: 1	URC reports that operator has been found.

7.6 AT+CESQ Extended Signal Quality

The AT+CESQ command returns received signal quality parameters. If the current serving cell is not a GERAN cell, <rxlev> and <ber> are set to value 99. If the current serving cell is not a UTRA FDD or UTRA TDD cell, <rscp> is set to 255. If the current serving cell is not a UTRA FDD cell, <ecno> is set to 255. If the current serving cell is not an E-UTRA cell, <rsrq> and <rsrp> are set to 255.

Syntax

Test Command

```
AT+CESQ=?
```

Response(s)

```
+CESQ: (list of supported <rxlev>s), (list of supported<ber>s), (list of supported<rscp>s), (list of supported<ecno>s), (list of supported<rsrq>s), (list of supported<rsrp>s)
OK
```

Exec Command

```
AT+CESQ
```

Response(s)

```
+CESQ: <rxlev>, <ber>, <rscp>, <ecno>, <rsrq>, <rsrp>
OK
ERROR
```

PIN	MDM	APP	✈	Last
+	+	+	-	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<rxlev>(num)

Received signal strength level (see 3GPP TS 45.008 [49] subclause 8.1.4). For 2G networks only

0	rssi < -110 dBm
1	-110 dBm ≤ rssi < -109 dBm
2	-109 dBm ≤ rssi < -108 dBm
...	
61	-50 dBm ≤ rssi < -49 dBm
62	-49 dBm ≤ rssi < -48 dBm
63	-48 dBm ≤ rssi
99	not known or not detectable

<ber>(num)

Channel bit error rate (in percent). For 2G networks only

0..7	as RXQUAL values in the table in 3GPP TS 45.008 [49] subclause 8.2.4
99	not known or not detectable

<rscp>(num)

Received signal code power (see 3GPP TS 25.133 [41] subclauses 9.1.1.3 and 9.1.1.1.3) For 3G networks only

0	rscp < -120 dBm
1	-120 dBm ≤ rscp < -119 dBm
2	-119 dBm ≤ rscp < -118 dBm

...	
94	-27 dBm ≤ rscp < -26 dBm
95	-26 dBm ≤ rscp < -25 dBm
96	-25 dBm ≤ rscp
255	not known or not detectable

`<ecno>`(num)

Ratio of the received energy per PN chip to the total received power spectral density (see 3GPP TS 25.133 [41] subclause 9.1.2.3) For 3G networks only

0	Ec/Io < -24 dB
1	-24 dB ≤ Ec/Io < -23.5 dB
2	-23.5 dB ≤ Ec/Io < -23 dB
...	
47	-1 dB ≤ Ec/Io < -0.5 dB
48	-0.5 dB ≤ Ec/Io < 0 dB
49	0 dB ≤ Ec/Io
255	not known or not detectable

`<rsrq>`(num)

Reference signal received quality (see 3GPP TS 36.133 [50] subclause 9.1.7). For 4G networks only

0	rsrq < -19.5 dB
1	-19.5 dB ≤ rsrq < -19 dB
2	-19 dB ≤ rsrq < -18.5 dB
...	
32	-4 dB ≤ rsrq < -3.5 dB
33	-3.5 dB ≤ rsrq < -3 dB
34	-3 dB ≤ rsrq
255	not known or not detectable

`<rsrp>`(num)

Reference signal received power (see 3GPP TS 36.133 [50] subclause 9.1.4). For 4G networks only

0	rsrp < -140 dBm
1	-140 dBm ≤ rsrp < -139 dBm
2	-139 dBm ≤ rsrp < -138 dBm
...	
95	-46 dBm ≤ rsrp < -45 dBm
96	-45 dBm ≤ rsrp < -44 dBm
97	-44 dBm ≤ rsrp
255	not known or not detectable

7.7 AT+CSQ Signal Quality

The AT+CSQ execute command indicates the received signal strength <rssi> and the channel bit error rate <ber>.

Syntax

Test Command

AT+CSQ=?

Response(s)

+CSQ: (list of supported <rssi>s), (list of supported<ber>s)
OK

Exec Command

AT+CSQ

Response(s)

+CSQ: <rssi>,<ber>
OK

PIN	MDM	APP	✈	Last
+	+	+	-	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<rssi>(num)

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

According to 3GPP TS 27.007 [45], the <rssi> value is not applicable to 3G and 4G networks. Please use AT+CESQ instead, or AT^SMONI.

Note for 3G only: With a view to employing AT+CSQ also for 3G networks the PLAS9-W has been designed to show a <rssi> value derived from the 3G specific RSCP parameter shown by AT^SMONI. Nevertheless, please consider that connection quality in 3G networks is depending on further factors. For example, despite good <rssi> or RSCP values for signal quality, data throughput may vary depending on the number of subscribers sharing the same cell. It is therefore recommended to use also AT^SMONI which delivers additional information, in particular the values RSCP, EC/n0, SQual and SRxLev RX level.

<ber>(num)

0..7	as RXQUAL values in the table in 3GPP TS 45.008 [49], section 8.2.4 (for GSM network only).
99	not known or not detectable.

7.8 AT+CTZU Automatic Time Zone Update

The AT+CTZU command enables and disables automatic time zone update via NITZ (if supported by the network).

When AT+CTZU is set to 1, the Real Time Clock (RTC) on the UE is updated with the network time every time when the UE receives a NITZ message. Any changes to the RTC using the command AT+CCLK will be wiped out by the network time.

When AT+CTZU is set to 0, AT+CCLK can be used to set the RTC. The newly set time will not be overwritten by the network time.

The AT^SIND command can also be used to get NITZ information, for details see "nitz" indicator. Unlike AT+CTZU, AT^SIND settings have no effect for the RTC. See AT+CCLK for examples.

Syntax

Test Command

```
AT+CTZU=?
```

Response(s)

```
+CTZU:(list of supported <n>s)
OK
```

Read Command

```
AT+CTZU?
```

Response(s)

```
+CTZU: <n>
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CTZU=<n>
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Unsolicited Result Code

Format of the unsolicited result code:

```
+CTZU:<nitzUT>, <nitzTZ>[, <nitzDST>]
```

The URC indicates the RTC update from network time, and contains the time relevant information elements of the NITZ message.

Parameter Description

<n>(num)	
0(&F)(P)	Disable automatic time zone update via NITZ. Suppress unsolicited result codes.
1	Enable automatic time zone update via NITZ. Output unsolicited result codes.

<nitzUT>(str)

Universal Time delivered as part of the NITZ message.

<nitzTZ>(num)

Time Zone delivered as part of the NITZ message.
Positive (east) or negative (west) offset from the UTC in units of 15 minutes.

<nitzDST>(num)

Adjustment for Daylight Saving Time as part of the NITZ message. Displayed only when received from network. Indicates whether <nitzTZ> includes daylight savings adjustment.

0	No daylight savings adjustment included.
1	+1 hour (equals 4 quarters in <nitzTZ>) adjustment for daylight saving time included.
2	+2 hours (equals 8 quarters in <nitzTZ>) adjustment for daylight saving time included.

7.9 AT^SMONI Monitoring Serving Cell

The AT^SMONI command supplies information of the serving cell.

Syntax

Test Command

AT^SMONI=?

Response(s)

OK

Exec Command

AT^SMONI

Response(s)

See: Section 7.9.1, AT^SMONI Responses

OK

PIN	MDM	APP	✈	Last
-	+	+	-	-

7.9.1 AT^SMONI Responses

UE is not connected:

- UE is camping on a GSM (2G) cell and registered to the network:

```
Syntax:
^SMONI:
ACT,ARFCN,BCCH,MCC,MNC,LAC,cell,C1,C2,NCC,BCC,GPRS,PWR,RXLev,ARFCN,TS,timAdv,dBm,Q,ChM
od
Example:
^SMONI: 2G,990,-75,262,03,0139,02C9,28,28,3,0,G,0,-104,NOCONN
```

- UE is camping on a UMTS (3G FDD) cell and registered to the network:

```
Syntax:
^SMONI: ACT MODE,UARFCN,PSC,EC/n0,RSCP,MCC,MNC,LAC,cell,SQual,SRxLev,CSGid,TransportCh,
SF,Slot,EC/n0,RSCP,ComMod,HSUPA,HSDPA
Example:
^SMONI: 3G FDD,10737,131,-7.5,-103,260,01,7D3D,C80BC9A,21,11,--,NOCONN
```

- UE is camping on a UMTS (3G TD-SCDMA) cell and registered to the network:

```
Syntax:
^SMONI: ACT MODE,UARFCN,CPID,MCC,MNC,LAC,cell,EC/n0,RSSI,RSCP,TimAdv
Example:
^SMONI: 3G TDS,10054,0,460,04,002D,75BCD15,-2.27,-76.21,-78.48,0,NOCONN
```

- UE is camping on a LTE (4G) cell and registered to the network:

```
Syntax:
^SMONI: ACT,EARFCN,Band,DL bandwidth,UL bandwidth,Mode,MCC,MNC,TAC,Global Cell ID,Phys-
ical Cell ID,Srxlev,RSRP,RSRQ,LTEA,Conn_state
Example:
^SMONI: 4G,6300,20,10,10,FDD,262,02,BF75,0345103,350,33,-94,-7,0,NOCONN
```

- UE is searching and could not (yet) find a suitable GSM (2G) cell:

```
Syntax:
^SMONI: ACT,ARFCN,BCCH,MCC,MNC,LAC,cell,C1,C2,NCC,BCC,GPRS,ARFCN,TS,timAdv,dBm,Q,ChMod
Example:
^SMONI: 2G,SEARCH,SEARCH
```

- UE is searching and could not (yet) find a suitable UMTS (3G) or 3G FDD cell:

```
Syntax:
^SMONI: ACT(MODE),UARFCN,PSC,EC/n0,RSCP,MCC,MNC,LAC,cell,SQual,SRxLev,CSGid,Trans-
portCh, SF,Slot,EC/n0,RSCP,ComMod,HSUPA,HSDPA
Example:
^SMONI: 3G,SEARCH,SEARCH
or
^SMONI: 3G FDD,SEARCH,SEARCH
```

- UE is searching and could not (yet) find a suitable UMTS (3G TDS) cell:

```
Syntax:
^SMONI: ACT MODE,UARFCN,CPID,MCC,MNC,LAC,cell,EC/n0,RSSI,RSCP,TimAdv
Example:
^SMONI: 3G TDS,SEARCH,SEARCH
```

- UE is searching and could not (yet) find a suitable LTE (4G) cell:

```
Syntax:
^SMONI: ACT,EARFCN,Band,DL bandwidth,UL bandwidth,Mode,MCC,MNC,TAC,Global Cell ID,Phys-
ical Cell ID,Srxlev,RSRP,RSRQ,LTEA,Conn_state
Example:
^SMONI: 4G,SEARCH
```

- UE is searching and could not (yet) find a suitable cell:

```
Example:
^SMONI: Searching
```

- UE is camping on a GSM (2G) cell but not registered to the network:

```
Syntax:
^SMONI:
ACT,ARFCN,BCCH,MCC,MNC,LAC,cell,C1,C2,NCC,BCC,GPRS,PWR,RXLev,ARFCN,TS,timAdv,dBm,Q,ChM
od
Example:
^SMONI: 2G,673,-89,262,07,4EED,A500,16,16,7,4,G,5,-107,LIMSRV
```

- UE is camping on a UMTS (3G FDD) cell but not registered to the network:

```
Syntax:
^SMONI: ACT Mode,UARFCN,PSC,EC/n0,RSCP,MCC,MNC,LAC,cell,SQual,SRxLev,CSGid,TransportCh,
SF,Slot,EC/n0,RSCP,ComMod,HSUPA,HSDPA
Example:
^SMONI: 3G FDD,10564,96,-7.5,-79,262,02,0143,00228FF,-92,-78,--,LIMSRV
```

- UE is camping on a UMTS (3G TD-SCDMA) cell but not registered to the network:

```
Syntax:
^SMONI: ACT MODE,UARFCN,CPID,MCC,MNC,LAC,cell,EC/n0,RSSI,RSCP,TimAdv
Example:
^SMONI: 3G TDS,10054,0,460,04,002D,75BCD15,-2.36,-76.14,-78.50,0,LIMSRV
```

- UE is camping on a LTE (4G) cell but not registered to the network:

```
Syntax:
^SMONI: ACT,EARFCN,Band,DL bandwidth,UL bandwidth,Mode,MCC,MNC,TAC,Global Cell ID,Phys-
ical Cell ID,Srxlev,RSRP,RSRQ,LTEA,Conn_state
Example:
^SMONI: 4G,6300,20,10,10,FDD,262,02,BF75,0345103,350,33,-94,-7,0,LIMSRV
```

UE has a dedicated channel (for example call in progress):

- GSM (2G) cell:

```
Syntax:
^SMONI:
ACT,ARFCN,BCCH,MCC,MNC,LAC,cell,C1,C2,NCC,BCC,GPRS,PWR,RXLev,ARFCN,TS,timAdv,dBm,Q,ChM
od
Example:
^SMONI: 2G,852,-80,262,03,4E2D,6C2D,28,32,3,5,E,0,-104,816,1,3,-71,0,A_FR
```

- UMTS (3G FDD) cell:

```
Syntax:
^SMONI: ACT MODE,UARFCN,PSC,EC/n0,RSCP,MCC,MNC,LAC,cell,SQual,SRxLev,CSGid,TransportCh,
SF,Slot,EC/n0,RSCP,ComMod,HSUPA,HSDPA
Example:
^SMONI: 3G FDD,10737,131,-5,-93,260,01,7D3D,C80BC9A,21,11,--,DPCH,256,4,-5,-93,0,00,00
```

- UMTS (3G TD-SCDMA) cell:

```
Syntax:
^SMONI: ACT MODE,UARFCN,CPID,MCC,MNC,LAC,cell,EC/n0,RSSI,RSCP,TimAdv
Example:
^SMONI: 3G TDS,10054,89,460,04,002D,75BCD15,-2.18,-76.39,-78.56,42,CONN
```

- LTE (4G) cell:

```
Syntax:
^SMONI: ACT,EARFCN,Band,DL bandwidth,UL bandwidth,Mode,MCC,MNC,TAC,Global Cell ID,Phys-
ical Cell ID,TX_power,RSRP,RSRQ,LTEA,Conn_state,CA_DL
Example:
^SMONI: 4G,6300,20,10,10,FDD,262,02,BF75,0345103,350,90,-94,-7,1,CONN,1
```

Columns for GSM (2G) Serving Cell parameters:

Column	Description
ACT	Access Technology
ARFCN	ARFCN (Absolute Radio Frequency Channel Number) of the BCCH carrier
BCCH	Receiving level of the BCCH carrier in dBm (level is limited from -110dBm to -47dBm)
MCC	Mobile Country Code (first part of the PLMN code)
MNC	Mobile Network Code (second part of the PLMN code)
LAC	Location Area Code
cell	Cell ID
C1	Coefficient for base station selection
C2	Coefficient for base station selection
NCC	PLMN colour code
BCC	Base station colour code
GPRS	GPRS state
PWR	Maximal power level used on RACH channel in dBm
RxLev	Minimal receiving level (in dBm) to allow registration

Columns for GSM (2G) Dedicated Channel parameters:

Column	Description
ARFCN	ARFCN (Absolute Radio Frequency Channel Number) of the BCCH carrier
TS	Timeslot number
timAdv	Timing advance in bits
dBm	Receiving level of the traffic channel carrier in dBm
Q	Receiving quality (0-7)
ChMod	Channel mode (--: Signalling, S_HR: Half rate, S_FR: Full rate, S_EFR: Enhanced Full Rate, A_HR: AMR Half rate, A_FR: AMR Full rate)

Columns for UMTS (3G FDD) Serving Cell parameters:

Column	Description
ACT MODE	Access Technology and used Mode
UARFCN	UARFCN (UTRAN Absolute Radio Frequency Channel Number) of the BCCH carrier
PSC	Primary Scrambling Code
EC/n0	Carrier to noise ratio in dB = measured Ec/Io value in dB. Please refer to 3GPP 25.133, section 9.1.2.3, Table 9.9 for details on the mapping from EC/n0 to EC/Io.
RSCP	Received Signal Code Power in dBm
MCC	Mobile Country Code (first part of the PLMN code)
MNC	Mobile Network Code (second part of the PLMN code)
LAC	Location Area Code, see note
cell	Cell ID
SQual	Quality value for base station selection in dB (see 3GPP 25.304)
SRxLev	RX level value for base station selection in dB (see 3GPP 25.304)
CSGid	Closed Subscriber Group id

Columns for UMTS (3G TD-SCDMA) Serving Cell parameters:

Column	Description
ACT MODE	Access Technology and used Mode
UARFCN	UARFCN (UTRAN Absolute Radio Frequency Channel Number) of the BCCH carrier
CPID	Cell Parameters Id
MCC	Mobile Country Code (first part of the PLMN code)
MNC	Mobile Network Code (second part of the PLMN code)
LAC	Location Area Code, see note
EC/n0	Carrier to noise ratio in dB = measured Ec/Io value in dB. Please refer to 3GPP 25.133, section 9.1.2.3, Table 9.9 for details on the mapping from EC/n0 to EC/Io.
RSSI	Received Signal Strength Indicator
RSCP	Received Signal Code Power in dBm
TimAdv	Timing Advanced

Columns for UMTS (3G FDD) Dedicated Channel parameters:
Note: Transport channels in downlink are considered.

Column	Description
TransportCh	Transport Channel Type (DPCH, FDPCH, HSDSCH, EDCH)
SF	Spreading Factor (4,8,16,32,64,128,256,512)
Slot	Slot Format for DPCH (0-16) (see 3GPP TS 25.211 V7.10.0 Table 11) Slot Format for FDPCH (0-9) (see 3GPP TS 25.211 V7.10.0 Table 16C)
EC/n0	Carrier to noise ratio in dB
RSCP	Received Signal Code Power in dBm
ComMod	Compressed Mode (0-1) (indicates valid transmission gap pattern)
HSUPA	HSUPA Status (a.k.a. E-DCH Status) indicated by xy: x = Cell Capability Indicator: 0 - HSUPA capability not indicated, 1 - HSUPA Capable Cell. Please consider that some providers/MNOs don't support this flag and that it is provided "for display indication only". See 3GPP TS 25.331 [43] (later than version 6.9.0) section 10.2.48.8.8. y = UE Call Status: 0 - HSUPA inactive, 1 - HSUPA active
HSDPA	HSDPA Status (a.k.a. HSDSCH Status) indicated by xy: x = Cell Capability Indicator: 0 - HSDPA capability not indicated, 1 - HSDPA Capable Cell. Please consider that some providers/MNOs don't support this flag and that it is provided "for display indication only". See 3GPP TS 25.331 [43] (later than version 6.8.0), section 10.2.48.8.8. y = UE Call Status: 0 - HSDPA inactive, 1 - HSDPA suspended, 2 - HSDPA active, 6 - HSDPA+ active

Columns for LTE (4G) Serving Channel parameters:
Note: LTE TDD and LTE FDD are delivering the same parameters.

Column	Description
ACT MODE	Access Technology and used Mode
EARFCN	E-UTRA Absolute Radio Frequency Channel Number
Band	E-UTRA frequency band (see 3GPP 36.101)
DL bandwith	DL bandwith
UL bandwith	UL bandwith
Mode	FDD or TDD
MCC	Mobile Country Code (first part of the PLMN code)
MNC	Mobile Network Code (second part of the PLMN code)
TAC	Tracking Area Code (see 3GPP 23.003 Section 19.4.2.3)
Global Cell ID	Global Cell ID
Physical Cell ID	Physical Cell ID
Srxlev	RX level value for base station selection in dB (see 3GPP 25.304)
RSRP	Reference Signal Received Power (see 3GPP 36.214 Section 5.1.1.)
RSRQ	Reference Signal Received Quality (see 3GPP 36.214 Section 5.1.2.)

Column	Description
LTEA	Serving cell is LTE-A cell 0 - cell does not support Carrier Aggregation 1 - cell does support Carrier Aggregation
Conn_state	Connection state. Can be one of following: CONN, LIMSRV, NOCONN or SEARCH

Columns for LTE (4G) Dedicated Channel parameters:
Note: LTE TDD and LTE FDD are delivering the same parameters.

Column	Description
ACT MODE	Access Technology and used Mode
EARFCN	E-UTRA Absolute Radio Frequency Channel Number
Band	E-UTRA frequency band (see 3GPP 36.101)
DL bandwith	DL bandwith
UL bandwith	UL bandwith
Mode	FDD or TDD
MCC	Mobile Country Code (first part of the PLMN code)
MNC	Mobile Network Code (second part of the PLMN code)
TAC	Tracking Area Code (see 3GPP 23.003 Section 19.4.2.3)
Global Cell ID	Global Cell ID
Physical Cell ID	Physical Cell ID
TX power	Used Uplink Power in 1/10 dBm
RSRP	Reference Signal Received Power (see 3GPP 36.214 Section 5.1.1.)
RSRQ	Reference Signal Received Quality (see 3GPP 36.214 Section 5.1.2.)
LTEA	Serving cell is LTE-A cell 0 - cell does not support Carrier Aggregation 1 - cell does support Carrier Aggregation
Conn_state	Connection state. Can be one of following: CONN, LIMSRV, NOCONN or SEARCH
CA_DL	0 - No DL Carrier Aggregation 1 - DL Carrier Aggregation with 2 Carriers

All parameters for Carrier Aggregation are displayed in accordance with signaling by the radio network.

7.9.2 Service states

Depending on the service state, an additional textual output is generated (refer also to the response examples):

- "SEARCH" (Searching) - The MS is searching, but could not (yet) find a suitable cell. This output appears after restart of the MS or after loss of coverage.
- "NOCONN" (No connection) - The MS is camping on a cell and registered to the network. The service state is 'idle', i.e. there is no connection established or a dedicated channel in use.
- "LIMSRV" (Limited Service) - The MS is camping on a cell but not registered to the network. The MS enters this state, for example, when
  - no SIM card is inserted, or PIN has not been given,
  - neither Home PLMN nor any other allowed PLMN are found,
  - registration request was not answered or denied by the network (use command AT+CREG to query the registration status),
  - authentication failed.

7.10 AT^SMONP Monitoring Neighbour Cells

The AT^SMONP supplies information of active cells and all neighbour cells. The active cell information will be delivered additively because an UE can be situated in Soft Handover or Softer Handover.

Syntax

Test Command

AT^SMONP=?

Response(s)

OK

Exec Command

AT^SMONP

Response(s)

See: Section 7.10.1, AT^SMONP Responses

OK

PIN	MDM	APP	✈	Last
-	+	+	-	-

Notes

- Due to the fact that not all necessary information of the neighbour cells can be decoded during a connection, there are several constraints to be considered:
  - Only neighbour cells that have already been visible in IDLE mode will be further updated, as long as they are still included in the list.
  - Though new neighbour cells can be added to the list (e.g. due to handover), their C1 and C2 parameters cannot be displayed until the connection is released. In this case "-" is presented for C1 and C2.
- The neighbour cells have the same PLMN as the serving cell. In case of searching for a network the serving cell can change and the UE shows different sets of neighbour cells depending on the PLMN of the serving cell.
- Parameters for which no values are available are shown as "-".

7.10.1 AT^SMONP Responses

- *In case of a GSM (2G) serving cell:*

```
Syntax:
2G:
ARFCN1,rs1,dBm1,MCC1,MNC1,NCC1,BCC1,C11,C21,LAC1,cell1,C311,C321
ARFCN2,rs2,dBm2,MCC2,MNC2,NCC2,BCC2,C12,C22,LAC2,cell2,C312,C322
...
ARFCNn,rsn,dBmn,MCCn,MNCn,NCCn,BCCn,C1n,C2n,LACn,celln,C31n,C32n
3G:
UARFCN1,PSC1,EC/n01,RSCP1
UARFCN2,PSC2,EC/n02,RSCP2
...
UARFCNn,PSCn,EC/n0n,RSCPn

4G:
EARFCN1,RSRQ1,RSRP1,PCI1
EARFCN2,RSRQ2,RSRP2,PCI2
...
EARFCNn,RSRQn,RSRPn,PCIn
```

```
Example:
2G:
658,51,-60,262,07,7,4,46,46,4EED,08B8,0,0
666,47,-64,262,07,7,1,42,42,4EED,A500,0,0
1006,37,-74,262,07,7,4,32,32,4EED,----,0,0
1021,36,-75,262,07,7,1,31,21,4EED,08B2,0,0
702,33,-78,262,07,7,3,28,28,4EED,A4F0,0,0
654,32,-79,262,07,7,5,27,27,4EED,1C3A,0,0
3G:
-----,---,-----,----
4G:
-----,-----,----,---
OK
```

- *In case of a 3G serving cell:*

```
Syntax:
3G:
UARFCN1,PSC1,EC/n01,RSCP1,SQual1,SRxLev1,set1,rank1
UARFCN2,PSC2,EC/n02,RSCP2,SQual2,SRxLev2,set2,rank2
...
UARFCNn,PSCn,EC/n0n,RSCPn,,SQualn,SRxLevn,setn,rankn

2G:
ARFCN1,RSSI1,NCC1,BCC1,SRxLev1,rank1
ARFCN2,RSSI2,NCC2,BCC2,SRxLev2,rank2
...
ARFCNn,RSSIn,NCCn,BCCn,SRxLevn,rankn

4G:
EARFCN1,RSRQ1,RSRP1,Srxlev1,PCI1,TDD1
EARFCN2,RSRQ2,RSRP2,Srxlev2,PCI2,TDD2
...
EARFCNn,RSRQn,RSRPn,Srxlevn,PCIn,TDDn


Example:
3G:
10786,49,-7.0,-75,22,37,AS,-9
10786,161,-24.0,-121,0,0,--,0
10786,54,-24.0,-121,0,0,--,0
10786,51,-24.0,-121,0,0,--,0
10786,62,-24.0,-121,0,0,--,0
10786,159,-24.0,-121,0,0,--,0
2G:
----,----,-,-,----,------
4G:
-----,-----,----,--,---,-
OK
```

- *In case of a 4G serving cell:*

```
Syntax:
4G:
EARFCN1,RSRQ1,RSRP1,Srxlev1,PCI1,RSSI1,Cell ID1,MCC1,MNC1,TAC1,DL_CAC1
EARFCN2,RSRQ2,RSRP2,Srxlev2,PCI2,RSSI2,Cell ID2,MCC2,MNC2,TAC2,DL_CAC2
...
```

```
EARFCN_n,RSRQ_n,RSRP_n,Srxlev_n,PCI_n,RSSI_n,Cell ID_n,MCC_n,MNC_n,TAC_n,DL_CAC_n

2G:
ARFCN_1,RSSI_1,NCC_1,BCC_1,SRxLev_1,rank_1
ARFCN_2,RSSI_2,NCC_2,BCC_2,SRxLev_2,rank_2
...
ARFCN_n,RSSI_n,NCC_n,BCC_n,SRxLev_n,rank_n

3G:
UARFCN_1,PSC_1,EC/n0_1,RSCP_1,SQual_1,SRxLev_1,set_1,rank_1
UARFCN_2,PSC_2,EC/n0_2,RSCP_2,SQual_2,SRxLev_2,set_2,rank_2
...
UARFCN_n,PSC_n,EC/n0_n,RSCP_n,,SQual_n,SRxLev_n,set_n,rank_n


Example 1:
4G:
1830,-12.6,-91,38,368,-60,368,262,03,C463,0
1830,-11.7,-93,36,262,-72,368,262,03,C463,0
1830,-10.9,-93,36,329,-73,368,262,03,C463,0
1830,-15.1,-96,33,261,-72,368,262,03,C463,0
2527,-9.5,-83,--,1,-57,----,---,---,----,1
2G:
----,--,----,-,-,----,-
3G:
-----,---,-----,----,--
OK

Example 2:
4G:
1830,-12.6,-91,38,368,-60,368,262,03,C463,0
1830,-11.7,-93,36,262,-72,368,262,03,C463,0
1830,-10.9,-93,36,329,-73,368,262,03,C463,0
1830,-15.1,-96,33,261,-72,368,262,03,C463,0
2527,-9.5,-83,--,1,-57,----,---,---,----,1
2G:
----,--,----,-,-,----,-
3G:
10564,---,-----,----,--
10688,---,-----,----,--
OK
```

Columns for GSM (2G) parameters:

Column	Description
ARFCN	Absolute Radio Frequency Channel Number of the BCCH carrier
rs	RSSI value 0 - 63 (RSSI = Received signal strength indication)
dBm	Receiving level in dBm
MCC	Mobile Country Code (first part of the PLMN code)
MNC	Mobile Network Code (second part of the PLMN code)
NCC	Network colour Code
BCC	Base Station colour code
C1	cell selection criterion

Column	Description
C2	cell reselection criterion
LAC	Location area code
cell	Cell identifier
C31	cell reselection criterion
C32	cell reselection criterion
SRxLev	RX level value for base station selection in dB (see 3GPP 25.304)
rank	Rank of this cell as neighbor for inter-RAT cell reselection

Columns for UMTS (3G) parameters:

Column	Description
UARFCN	UTRAN Absolute Radio Frequency Channel Number of the BCCH carrier
PSC	Primary Scrambling Code
EC/n0	Carrier to noise ratio in dB = measured Ec/Io value in dB. Please refer to 3GPP 25.133, section 9.1.2.3, Table 9.9 for details on the mapping from EC/n0 to EC/Io.
RSCP	Received Signal Code Power in dBm
SQual	Quality value for base station selection in dB (see 3GPP 25.304)
SRxLev	RX level value for base station selection in dB (see 3GPP 25.304)
set	3G neighbour cell set (AS: ASET, SN: Sync Nset, AN: Async Nset)
rank	Rank of this cell as neighbor for inter-RAT cell reselection

Columns for LTE (4G) parameters:

Column	Description
EARFCN	E-UTRA Absolute Radio Frequency Channel Number
RSRQ	Reference Signal Received Quality as measured by L1 in dB (see ETSI TS 136 214 version 10.1.0 Section 5.1.3.)
RSRP	Reference Signal Received Power as measured by L1 in dBm (see ETSI TS 136 214 version 10.1.0 Section 5.1.1.)
Srxlev	RX level value for base station selection in dB (see 3GPP 25.304)
PCI	Physical Cell ID
RSSI	Received Signal Strength Indication as measured by L1 in dBm
Cell ID	LTE Serving cell ID
MCC	Mobile Country Code
MNC	Mobile Network Code
TAC	Tracking Area Code (see 3GPP 23.003 Section 19.4.2.3)
DL_CAC	Indication, if the cell is a downlink cell for Carrier Aggregation 0 - cell is currently not used for DL Carrier Aggregation 1 - cell is currently used for DL Carrier Aggregation 2 - cell is used for DL Carrier Aggregation (is activated)

All parameters for Carrier Aggregation are displayed in accordance with signaling by the radio network.

7.11 AT^SNMON Network Monitoring

The AT^SNMON command can be used to monitor various network information.

Syntax

Test Command

AT^SNMON=?

Response(s)

^SNMON: "INS2G", (list of supported <action>s), (list of supported <rba2g>s)
^SNMON: "INS3G", (list of supported <action>s), (list of supported <rba3g>s)
^SNMON: "INS3GTDS", (list of supported <action>s), (list of supported <rbaTdScdma>s)
^SNMON: "INS4G", (list of supported <action>s), (list of supported <rba4g-1>s), (list of supported <rba4g-2>s)
^SNMON: "PDM", (list of supported <action>s), (list of supported <ta>s), (list of supported <nom>s), (list of supported <rac>s), (list of supported <dsac_avail>s), (list of supported <dsac_cs>s), (list of supported <dsac_ps>s), (list of supported <tac_avail>s), (range of supported <tac>s)
OK
ERROR
+CME ERROR: <err>

Write Command

Start informal network scan for 2G bands. Parameter <action> shall be 2.

AT^SNMON="INS2G", <action>[, <rba2g>]

Response(s)

^SNMON: "INS2G", <reserved>, <rba2g>, <cell_ID>, <lac>, <plmn>, <arfcn>, <rssi>, <dbm>

In case of no cell found for specific band then all values behind <rba2g> will be omitted:
^SNMON: "INS2G", <reserved>, <rba2g>

OK
ERROR
+CME ERROR: <err>

Write Command

Start informal network scan for 3G bands. Parameter <action> shall be 2.

AT^SNMON="INS3G", <action>[, <rba3g>]

Response(s)

^SNMON: "INS3G", <reserved>, <rba3g>, <cell_ID>, <lac>, <plmn>, <uarfcn>, <rscp>, <dbm>, <psc>

In case of no cell found for specific band then all values behind <rba3g> will be omitted:
^SNMON: "INS3G", <reserved>, <rba3g>

OK
ERROR
+CME ERROR: <err>

Write Command

Start informal network scan for 3G TD-SCDMA bands. Parameter <action> shall be 2.

AT^SNMON="INS3GTDS", <action>[, <rbaTdScdma>]

Response(s)

^SNMON: "INS3GTDS", <reserved>, <rbaTdScdma>, <cell_ID>, <lac>, <plmn>, <uarfcn>, <rscp>, <dbm>

Write Command (Continued)

Start informal network scan for 3G TD-SCDMA bands. Parameter <action> shall be 2.

AT^SNMON="INS3GTDS", <action>[, <rbaTdScdma>]

Response(s)

In case of no cell found for specific band then all values behind <rbaTdScdma> will be omitted:
^SNMON: "INS3GTDS", <reserved>, <rbaTdScdma>

OK
ERROR
+CME ERROR: <err>

Write Command

Start informal network scan for 4G bands. Parameter <action> shall be 2.

AT^SNMON="INS4G", <action>[, <rba4g-1>][, <rba4g-2>]

Response(s)

^SNMON: "INS4G", <reserved>, <rba4g-1>, <rba4g-2>, <cell_ID>, <tac>, <plmn>, <earfcn>, <pcid>, <bwdl>, <bwup>, <rsrp>, <rsrq>

In case of no cell found for specific band then all values behind <rba4g-1> and <rba4g-2> will be omitted:
^SNMON: "INS4G", <reserved>, <rba4g-1>, <rba4g-2>

OK
ERROR
+CME ERROR: <err>

Write Command

Start Packet Data Monitor. <action> shall be 2.

AT^SNMON="PDM", <action>

Response(s)

[^SNMON: "PDM", <reserved>, <ta>, <nom>, <rac>, <dsac_avail>, <dsac_cs>, <dsac_ps>, <tac_avail>, <tac>]
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	-	-

Reference(s)

3GPP TS 45.008 [49]

Parameter Description

<action>(num)

This parameter determines the action to be taken for the monitoring command.

0	Reset values
2	Query values

<reserved>(num)

0	Value returned in scan output responses. Value has no meaning and can be ignored.

<rba2g>(str)(NV)

<rba2g> determines the 2G frequency bands the UE is allowed to use. Values are given in *hexadecimal 32-bit-value order.* Every bit corresponds to a dedicated band number. Leading zeros are not necessary.

“1“	GSM 900
“2“	GSM 1800

<rba3g>(str)(NV)

<rba3g> determines the 3G frequency bands the UE is allowed to use. Values are given in *hexadecimal 32-bit-value order.* Every bit corresponds to a dedicated band number. Leading zeros are not necessary.

“1“	WCDMA 2100 (BC1)
“4“	WCDMA 1800 (BC3)
“10“	WCDMA 850 (BC5)
“20“	WCDMA 800 (BC6)
“80“	WCDMA 900 (BC8)

<rbaTdScdma>(str)(NV)

<rbaTdScdma> determines TD-SCDMA frequency band usage of the UE is allowed to use. Values are given in *hexadecimal 32-bit-value order* Every bit corresponds to a dedicated band number. Leading zeros are not necessary.

“1“	TD-SCDMA 2000 B34 (BANDA)
“20“	TD-SCDMA 1900 B39 (BANDF)

<rba4g-1>(str)(NV)

<rba4g-1> determines 4G frequency bands the UE is allowed to use. Values are given in *hexadecimal 32-bit-value order.* Every bit corresponds to a dedicated band number. Leading zeros are not necessary. The number range of <rba4g-1> covers band 1 to band 32.

“1“	LTE 2100 (B1)
“4“	LTE 1800 (B3)
“10“	LTE 850 (B5)
“40“	LTE 2600 (B7)
“80“	LTE 900 (B8)
“20000“	LTE 850 (B18)
“40000“	LTE 800 (B19)
“80000“	LTE 800 (B20)
“2000000“	LTE 850 (B26)
“8000000“	LTE 700 (B28)

<rba4g-2>(str)(NV)

<rba4g-2> determines 4G frequency bands the UE is allowed to use. Values are given in *hexadecimal 32-bit-value order.* Every bit corresponds to a dedicated band number. Leading zeros are not necessary. The number range of <rba4g-2> covers band 33 to band 64. If the UE does not support bands 33 to 64 the AT^SNMON test command returns the value range 0 - 0.

“20“	LTE 2600 (B38)
“40“	LTE 1900 (B39)
“80“	LTE 2350 (B40)
“100“	LTE 2550 (B41)

<cell_ID>(str)

Cell ID

16 bit length for GSM
28 bit length for UMTS
28 bit length for TDSCDMA
28 bit length for LTE

<lac>(str)

Location Area Code

Two byte location area code in hexadecimal format (e.g. "00C1" equals 193 in decimal) of the cell that was scanned.

<tac>(num)

Tracking Area Code (see 3GPP 23.003 Section 19.4.2.3)

<plmn>(str)

PLMN code

Public Land Mobile Network Code

<arfcn>(num)

Absolute Radio Frequency Channel Number of the BCCH carrier.

<uarfcn>(num)

UTRAN Absolute Radio Frequency Channel Number of the BCCH carrier.

<earfcn>(num)

E-UTRA Absolute Radio Frequency Channel Number

<rssi>(num)

Received signal level of the BCCH carrier. The indicated value is composed of the measured value in dBm plus an offset.
This is in accordance with a formula specified in 3GPP TS 45.008 [49]

<dbm>(str)

Signal Strength

signal strength in dBm

<rscp>(num)

Received Signal Code Power in dBm

<psc>(num)

Primary Scrambling Code

<pcid>(num)

Physical Cell ID

`<bwdl>`(num)

bandwidth in download direction

`<bwup>`(num)

bandwidth in upload direction

`<rsrp>`(num)

Reference Signal Received Power as measured by L1 in dBm (see ETSI TS 136 214 version 10.1.0 Section 5.1.1.)

`<rsrq>`(num)

Reference Signal Received Quality as measured by L1 in dB (see ETSI TS 136 214 version 10.1.0 Section 5.1.3.)

`<tac>`(num)

Tracking Area Code (see 3GPP 23.003 Section 19.4.2.3)

`<ta>`(num)

Timing Advance (TA)

-1(P)	Information is not available
0...63	

`<nom>`(num)

Network Operation Mode (NOM)

-1(P)	Information is not available
1	NOM1
2	NOM2
3	NOM3

`<rac>`(num)

Routing Area Code (RAC)

-1	Information is not available
0...255	

`<dsac_avail>`(num)

Domain Specific Access Control (DSAC) availibility

0	DSAC not available
1	DSAC available

`<dsac_cs>`(num)

Cell access status for CS domain

-1(P)	Information is not available
1	Normal access
2	Emergency calls only

3	No calls allowed
4	All calls allowed

<dsac_ps>(num)

Cell access status for PS domain

-1(P)	Information is not available
1	Normal access
2	Emergency calls only
3	No calls allowed
4	All calls allowed

<tac_avail>(num)

Tracking Area Code (TAC) availibility

0	TAC not available
1	TAC available

<tac>(num)

Tracking Area Code (TAC)

Hexadecimal encoded Tracking Area Code (see 3GPP 23.003 Section 19.4.2.3)

0000...FFFF

Notes

- The AT^SNMON="INS 4G " command can be used even if no SIM is present or no SIM-PIN was entered.
- The AT^SNMON="INS 4G " command depends on the registration state. A complete network scan is only possible if the module is not registered. To perform a complete scan it is recommended to deregister manually from the network.
- The AT^SNMON="INS 4G " command may be aborted internally by any other network related activity that interferes with the network scan.
- Some operators do not signal information about HSDPA and/or HSUPA during a cell scan.
- The time required for a network scan depends not only on the number of radio bands to be scanned, but also on ripple and existing ghost peaks on the scanned radio bands.

7.12 AT^SNCSGLS Operator CSG lists on USIM

The AT^SNCSGLS command supplies the CSG (Closed Subscriber Group) lists from USIM EF_{OCSGL}.

Syntax

Test Command

```
AT^SNCSGLS=?
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

Exec Command

```
AT^SNCSGLS
```

Response(s)

```
^SNCSGLS: <mcc>,<mnc>,<csgId>,<cti>
[^SNCSGLS: ...]
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	+	-

Parameter Description

<mcc>(str)

Mobile Country Code

<mnc>(str)

Mobile Network Code

<csgId>(str)

CSG ID belonging to the Operator CSG lists

<cti>(num)

CSG type indicator

7.13 AT^SNCSGSC Closed Subscriber Group Network Scan

AT^SNCSGSC queries the present status of the PLAS9-W's CSG networks registration and allows to register to a specific macro cell as well as query the current used macro cell.

The AT^SNCSGSC test command lists sets of six parameters, each representing a macro cell present in the network.
A set consists of

- numeric format representation of the operator country code
- numeric format representation of the operator network code
- an hexadecimal number indicating the macro cell id.
- an integer indicating the access technology of the operator.
- an integer indicating the access properties of the macro cell.
- an integer indicating the signal strength.

Reponse to AT^SNCSGSC read command depends on the registration status. If the UE is registered the response returns the currently registered status. Any of the parameters may be unavailable and will then be an empty field (-). The <mcc>,<mnc>,<netLac>,<netCellId>,<rat> are vaild if module is registered or camped to network. If <csgId> is not empty (-) it means that current serving cell is a femtocell with CSG support.

The AT^SNCSGSC write command forces an attempt to select and register to a manual selected macro cell. This result does not mean that registration to CSG cell is done with success or not. In order to get information if registration to CSG was done, it is needed to set the command AT+CREG= 2 before CSG registration. After executing the AT^SNCSGSC write command wait for URC with information that ME is registered to new cell. After that, it can be checked if this cell is CSG via AT^SNCSGSC read command. The network name can be checked via AT+COPS command.

Syntax

Test Command

```
AT^SNCSGSC=?
```

Response(s)

```
^SNCSGSC: [list of supported (<mcc>, <mnc>, <csgId>, <rat>, <cat>, <rssi>)]
OK
ERROR
+CME ERROR:<err>
```

Read Command

```
AT^SNCSGSC?
```

Response(s)

```
^SNCSGSC:<mcc>, <mnc>, <csgId>, <rat>, <netLac>, <netCellId>
OK
ERROR
+CME ERROR:<err>
```

Write Command

```
AT^SNCSGSC=<mcc>, <mnc>, <csgId>, <rat>
```

Response(s)

```
OK
ERROR
+CME ERROR:<err>
```

PIN	MDM	APP	✈	Last
-	+	+	-	-

Parameter Description

<rat>(num)	
0	GSM
1	UTRAN

<cat>(num)	
0	Unknown CSG list
1	Allowed CSG list
2	Operator CSG list

8. USIM Application Toolkit (USAT) Commands

This chapter describes AT commands and responses related to the PLAS9-W's USIM Application Toolkit (USAT) implementation.

USAT is a technology that allows an application running on the USIM to control the GSM/UMTS/LTE Mobile Engine (UE); it is specified in 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].
Remote USIM Application Toolkit, or short Remote-USAT, provides a link between an application running on the USIM and the Customer Application (TE). The purpose of Remote-USAT is to allow the TE to send AT commands to the USAT interface and to display dedicated USAT activity on the user interface of the TE. The overall scenario is illustrated in the context diagram below.

Following types of data are exchanged between the PLAS9-W and the application running on the USIM:

- Proactive commands (PACs) are sent from the USIM application to the UE. Some PAC types are executed by the UE itself, comparable with AT commands. Other PAC types are immediately forwarded to the TE, e.g. "DISPLAY TEXT".
- Terminal Response is the UE's answer to the last PAC, sometimes to be provided by the TE.
- Envelope commands are sent from the UE or TE to the USIM Application, such as "MENU SELECTION".

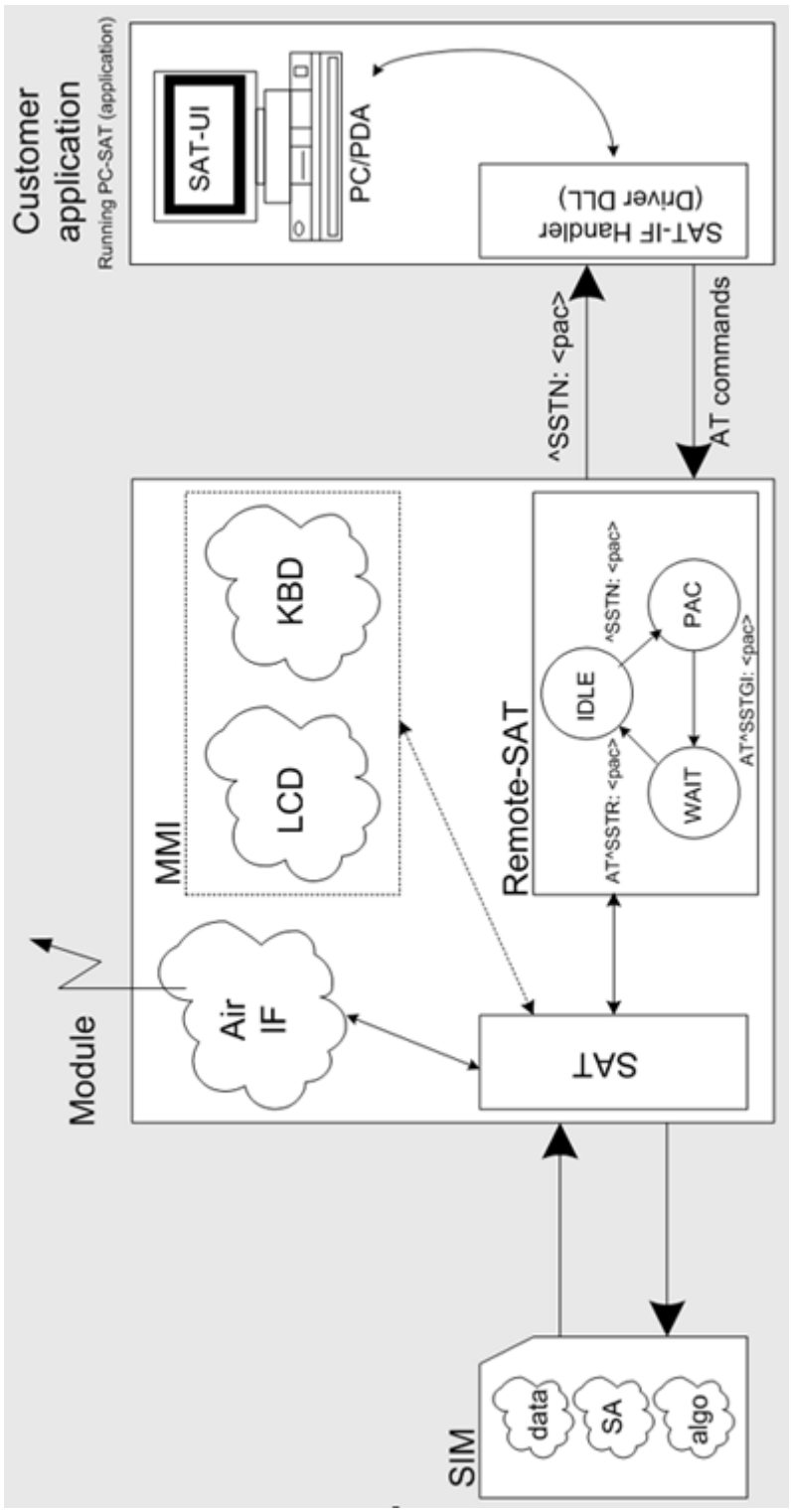

Figure 8.1: Remote-USAT Context Diagram

8.1 Usage of Remote-SAT

If USAT functionality is delivered by the USIM provider, the related USAT commands have to be handled. Otherwise other USIM functionality may not working correctly (e.g. SMS-PP downloads).
Therefore two possible modes are available.

8.1.1 Automatic Response Mode (AR Mode)

If the UE operates in this (default) mode, usage of any Remote-USAT AT commands is not necessary. In this case, all commands and responses are exchanged automatically between the UE and the USIM application. The type of Terminal Response (TR) to a USAT Proactive Command issued by the USIM application used in AR mode is listed at Table 8.6, Command Type Table, column "Auto Terminal Response". However, even while using AR Mode it is crucial to react on USAT REFRESH Proactive Commands, indicating that data read from the USIM has been changed!

Additionally a "+CIEV: "simdata"" URC is issued if a Refresh is rejected (<status> and <statAddInfo> are visible).
This URC is independent from Remote-USAT modes (Autoresponse mode and Explicit Response mode). This can happen if it is not possible to refresh an EF (e.g. EF_IMSI during a call). In this case the customer have to cancel all Calls as soon as possible and wait for the next Refresh command from the SIM card.
If the Refresh will not occour again, please restart the module to complete the Refresh request.
Therefore, enable handling of AT^SIND, using parameter <indDescr>="simdata" to get informed about USAT REFRESH events.
Furthermore it is recommended to activate the AT^SCKS URC, because for USAT REFRESH Type SIM RESET the same internally functionality as for physical remove and insertion of the USIM is done.

To take full advantage of Remote-USAT the ER mode has to be enabled using AT^SSTA=1. This setting is stored in the non-volatile memory and takes effect after next switch-on of the UE.

8.1.2 Explicit Response Mode (ER Mode)

As a Wireless Modem does not have an MMI, Remote-USAT differs from a phone implementation of USAT. It uses a special set of AT commands to pass data, e.g. a list of menu items, to the TE and to receive responses, e.g. a selected menu item.
The TE is required to monitor the status of an ongoing USAT Proactive Command (PAC) and, if required, sends appropriate AT commands, depending upon users input.
The "+CIEV: "simdata"" URC is issued if a Refresh is rejected (<status> and <statAddInfo> are visible).
This can happen if it is not possible to refresh an EF (e.g. EF_IMSI during a call). In this case the customer have to cancel all Calls as soon as possible and wait for the next Refresh command from the SIM card.
If the Refresh will not occour again, please restart the module to complete the Refresh request.

8.1.3 Character Sets

Strings are passed as UCS2 characters, but using the GSM alphabet is also possible. Use of GSM alphabet is not recommended since a USIM can contain text which might be not displayable, e.g. Greek characters. Use the AT^SSTA command to select the type of alphabet both for input and output. UCS is specified in ISO/IEC 10646. There are 2 and 4 octet versions available, of which only the 2-octet variant is used, known as UCS2. The 65536 positions in the 2-octet form of UCS are divided into 256 rows, each with 256 cells. The first octet of a character representation gives the row number, the second the cell number. The first row, row 0, contains exactly the same characters as ISO/IEC 8859-1. The first 128 characters are thus the ASCII characters. The octet representing an ISO/IEC 8859-1 character is easily transformed to the representation in UCS by putting a 0 octet in front of it. UCS includes the same control characters as ISO/IEC 8859 which are located in row 0.

8.1.4 USIM Update Initiated by the Network

If a Customer Application (TE) uses data of the USIM card please consider that the contents of all elementary files are subject to change at any time. This happens because the network can change the USIM data in the background via the USIM Application Toolkit (USAT) procedure "Data download to USIM". For a detailed description refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20]. In order to receive the information that an elementary file has been changed the TE has to activate Remote-USAT and needs to look for the USAT Proactive Command "REFRESH", Section 8.7, AT^SSTGI.

8.1.5 Icon Handling

Several USAT Proactive commands may provide an icon identifier. Icons are intended to enhance the MMI by providing graphical information to the user. The display of icons is optional for the UE.
The USIM indicates to the UE whether the icon replaces an alpha identifier or text string, or whether it accompanies it (icon qualifier).

If both an alpha identifier or text string, and an icon are provided with a proactive command, and both are requested to be displayed, but the UE is not able to display both together on the screen, then the alpha identifier or text string takes precedence over the icon.

If the USIM provides an icon identifier with a proactive command, then the UE shall inform the USIM if the icon could not be displayed by sending the response "Command performed successfully, but requested icon could not be displayed" (via AT^SSTR).

Icon data can be fetched directly from the USIM using the AT+CRSM command, for details please refer to 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16]. Icon data can be read from the USIM on system start then cached.

8.1.6 Using SMS Related AT Commands

UE activities triggered by USAT often end in sending or receiving short messages. Usually, a short message containing a service request is sent to the network, for example a request to send the latest news. Subsequently, the network returns a short message containing the requested information. This short message needs to be read by the Customer Application.

Set SMS text mode
AT+CMGF=1

Activate the display of a URC on every received SMS
AT+CNMI=1,1

If needed activate extended SMS text mode parameter output
AT+CSDH=1
This is useful in order to obtain more detailed header information along with the incoming SMS (e.g. SMS class). Please refer to 3GPP TS 23.038 [33] for details.

As a result, a URC will be output each time a short message is received
"+CMTI": "MT", 1 where
• the first parameter "MT" specifies the storage type of the SMS
• the second parameter contains a unique location number.
In the given example, the short message was stored to the memory type "MT" at location number 1.
The short message storage "MT" is a logical storage. For more detailed information please refer to AT+CPMS.

To read the SMS data use
AT+CMGR=<location>
where <location> is the location number of the received SMS, e.g. 1 in the example above.

To list all stored short messages use
AT+CMGL="ALL"

To delete a certain SMS after reading use
AT+CMGD=<location>

8.2 Remote-SAT States

In order to communicate with the SIM Application Toolkit it is necessary to use AT commands which are explained in detail in the following chapters. In general, the type of AT command which should be issued depends on the current state of the Remote-SAT interface.
The current state of Remote-SAT is determined by

1. the Remote-SAT operating mode (AR or ER mode),
2. the application running on the SIM,
3. the Customer Application (in case of ER mode only), and
4. internal actions of the UE (especially SAT and Call Control).

8.2.1 Remote-SAT State Transition Diagram

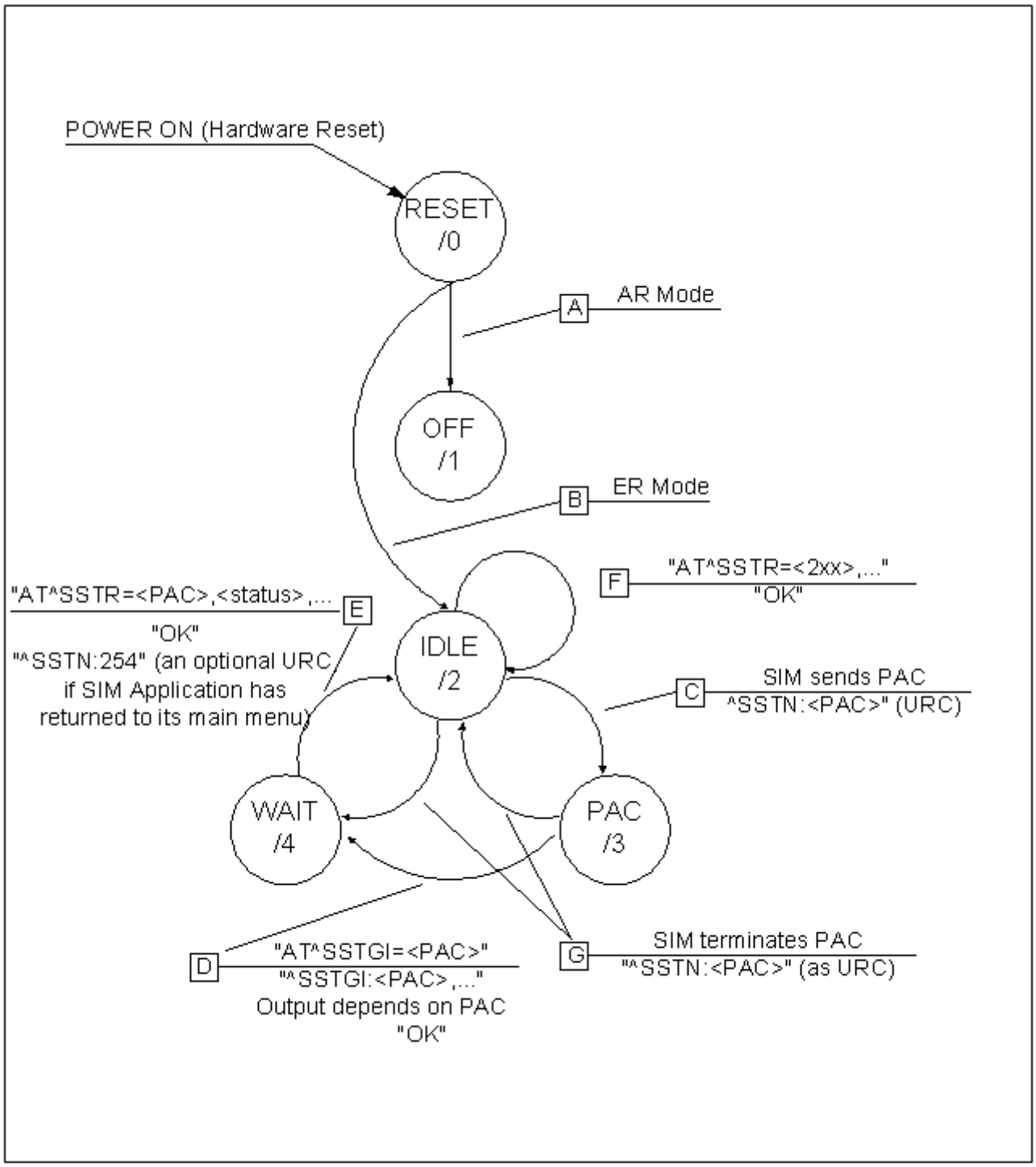

Figure 8.2: Remote-SAT State Transition Diagram

8.2.2 Remote-SAT State Transition Table

The following table outlines which AT commands can be issued during certain states. However, the test and read AT commands are available at any time. This way it is possible to determine the current state of the interface via AT^SSTA?.

Meaning of options usable in column "M/O/X" of the following tables:
M: The TE has to issue the AT command to get Remote-SAT service (mandatory).
O: Usage of AT command is optional.
X: Usage of AT command is not allowed or not useful at this time and may cause an error message.

Table 8.1: State: RESET description

RESET: State after power on the UE.		
AT command	M/O/X	Description
^SSTA=0,n	O	Enable AR Mode (with alphabet type <n>)
^SSTA=1,n	O	Enable ER Mode (with alphabet type <n>)
^SSTGI=<pac>	X	
^SSTR=<pac>	X	
^SSTR=<event>	X	

Table 8.2: State: OFF description

OFF: UE is in Auto Response Mode.		
AT command	M/O/X	Description
^SSTA=0,n	O	Enable AR Mode (with alphabet type <n>)
^SSTA=1,n	O	Enable ER Mode (with alphabet type <n>)
^SSTGI=<pac>	X	
^SSTR=<pac>	X	
^SSTR=<event>	X	

Table 8.3: State: IDLE description

IDLE: UE is in Explicit Response Mode.		
AT command	M/O/X	Description
^SSTA=0,n	O	Enable AR Mode (with alphabet type <n>)
^SSTA=1,n	O	Enable ER Mode (with alphabet type <n>)
^SSTGI=<pac>	O	Show PAC information
^SSTR=<pac>	X	
^SSTR=<event>	O	

Table 8.4: State: PAC description

PAC[1]: SIM application has issued a proactive command. This event is signalled to the TE via ^SSTN: <cmdType>.		
AT command	M/O/X	Description
^SSTA=0,n	O	Enable AR Mode (with alphabet type <n>)
^SSTA=1,n	O	Enable ER Mode (with alphabet type <n>)
^SSTGI=<pac>	M	Show PAC information
^SSTR=<pac>	X	
^SSTR=<event>	X	

Table 8.5: State: WAIT description

WAIT[1]: SIM application is waiting for the response to the ongoing proactive command.		
AT command	M/O/X	Description
^SSTA=0,n	O	Enable AR Mode (with alphabet type <n>)
^SSTA=1,n	O	Enable ER Mode (with alphabet type <n>)
^SSTGI=<pac>	O	Show PAC information
^SSTR=<pac>	M	
^SSTR=<event>	X	

1) To limit the time Remote-SAT is kept in states PAC or WAIT, any ongoing (but unanswered) PAC will be aborted after 5 minutes automatically. For details refer to AT^SSTA, parameter <userTOut>.

8.3 Remote-SAT Command Types

The Command Type value (cmdType) identifies the type of command or associated response passed between the TE and the UE.

cmdType is the parameter that comes first in AT commands, in responses to AT^SSTGI and AT^SSTR commands, and in the "^SSTN" URC. Also, the cmdType values may be used as Next Action Indicator for the SETUP MENU and for SELECT ITEM.

USAT implementation supports SAT class 3 (as specified by 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20] Release 99, letter class "c").

Table 8.6: Command Type Table

Proactive Toolkit commands vs. Terminal Responses			
Proactive Toolkit command (AT^SSTR=<cmdType>)	Terminal Response in Automatic Response Mode (see AT^SSTA=0)	Terminal Response user choices in Explicit Response Mode (see AT^SSTR=<cmdType>,<status>)	Terminal Response after user timeout in Explicit Response Mode (see URC ^SSTN: <cmdTerminateValue>)
REFRESH (1)	0,4	0	0
SET UP EVENT LIST (5)	0	0, 32, 48, 132	132
SET UP CALL (16)	0,4	0, 4, 16, 20, 32, 34, 35, 48, 132	132
SEND SS (17)	0,4	0, 4, 20, 32, 48, 132	132
SEND USSD (18)	0,4	0, 4, 20, 32, 48, 132	132
SEND SHORT MESSAGE (19)	0,4	0, 4, 32, 48, 132	132
SEND DTMF (20)	0,4	0, 4, 16, 32, 48, 132	132
LAUNCH BROWSER (21)	0,4,48	0, 4, 32, 34, 38, 48, 132, 138, 238, 239	132
PLAY TONE (32)	0,4	0, 4, 16, 32, 48, 132	132
DISPLAY TEXT (33)	0,4	0, 4, 16, 17, 18, 32, 48, 132	132
GET INKEY (34)	48	0, 4, 16, 17, 18, 19, 32, 48, 132	18
GET INPUT (35)	48	0, 4, 16, 17, 18, 19, 32, 48, 132	18
SELECT ITEM (36)	48	0, 4, 16, 17, 18, 19, 32, 48, 132	18
SET UP MENU (37)	0,4	0, 4, 32, 48, 132	132
SET UP IDLE MODE TEXT (40)	0,4	0, 4, 32, 48, 132	132
LANGUAGE NOTIFICATION (53)	0	0	0
OPEN CHANNEL (64)	0,4	0, 4, 16, 32, 48, 132	132
CLOSE CHANNEL (65)	0,4	0, 4, 16, 32, 48, 132	132
RECEIVE DATA (66)	0,4	0, 4, 16, 32, 48, 132	132
SEND DATA (67)	0,4	0, 4, 16, 32, 48, 132	132

8.4 AT^SSTA Remote-SAT Interface Activation

AT^SSTA write command can be used to determine the Remote-SAT activation mode <mode> and, if Explicit Response mode is enabled, to activate the Remote-SAT interface. Removing and inserting the SIM does not affect the activation status.
SAT commands which are not using the AT interface (non-MMI related SAT commands, e.g. PROVIDE LOCAL INFORMATION) are executed without activating Remote-SAT.
The read command can be used to request the current operating status and the used alphabet of the Remote-SAT interface.

Syntax

Test Command

AT^SSTA=?

Response(s)

^SSTA: (list of supported <state>s), (list of supported <Alphabet>s)
OK

Read Command

AT^SSTA?

Response(s)

^SSTA: <state>, <Alphabet>, <allowedInstance>, <SatProfile>, <userTOut>, <AppType>
OK

Write Command

AT^SSTA=<mode>[, <Alphabet>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<state>(num)

UE Remote-SAT interface states

0	RESET
1	OFF
2	IDLE
3	PAC
4	WAIT

<Alphabet>(num)(NV)

Setting becomes effective after restarting the UE.

0(D)	GSM character set Input of a character requests one byte, e.g. "Y".
1	UCS2 To display the 16 bit value of characters represented in UCS2 alphabet a 4 byte string is required, e.g. "0059" is coding the character "Y". For details please refer to ISO/IEC 10646.

<allowedInstance>(num)

Remote-SAT handling (i.e. "^SSTN" URC, AT^SSTGI and AT^SSTR sequence) is only usable via the serial channnel on which the Explicit Response (ER) mode was activated.
To change the serial channel execute AT^SSTA=1 on the desired channel and perform a restart.

0	Not applicable
1	SAT may be started on this instance via the write version of this command.

<SatProfile>(str)

SAT or USAT Terminal Profile according to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].
UE supports different profiles for 2G SIM and 3G USIM applications. The type of profile issued by AT^SSTA read command depends on the inserted SIM or USIM.
In case of no SIM is inserted the SAT Terminal Profile will be issued.
The profile tells the SIM Application which features (e.g. Proactive Commands) are supported by the SIM Application Toolkit implementation of the UE.

<userTOut>(num)

PAC user timeout in seconds.
To limit the time Remote-SAT is kept in states PAC or WAIT, any ongoing (but unanswered) proactive command will be aborted automatically after 5 minutes. In this case, the terminal response is either "ME currently unable to process command", or if applicable, "No response from user". In addition a URC "Terminate Proactive Command" will be sent to the external application.

<AppType>(num)

SIM Application type.
This parameter shows the type of SIM application currently running.

0	(U)SIM not inserted
1	2G Application (SAT)
2	3G Application (USAT)

<mode>(num)(NV)

Select Remote-SAT activation mode.
Setting becomes effective after restarting the UE. Removing and inserting the SIM does not affect the activation status.

0(D)	Automatic Response (AR) mode. All commands and responses are exchanged automatically between the UE and the SIM application. This eliminates the need to enter any Remote-SAT commands including the AT^SSTA command. If AR mode is enabled the UE enters the OFF state (<state>=1) after restart.
1	Explicit Response (ER) mode. This mode is intended for use with an MMI. If ER mode is enabled the MMI is required to handle, via UE's Remote-SAT interface, all commands and responses transmitted to or from the SIM or USIM. If ER mode is enabled the UE enters the IDLE state (<state>=2) after reboot.

8.5 ^SSTN SAT Notification

Unsolicited Result Codes

URC 1

Proactive command notification

^SSTN: <cmdType>

Every time the SIM Application issues an MMI relevant proactive command, via the UE, the TE will receive a notification. This indicates the type of proactive command issued.
AT^SSTGI must then be used by the TE to request the parameters of the proactive command from the UE.
Upon receiving the ^SSTGI response from the UE, the TE must send AT^SSTR to confirm the execution of the proactive command and provide any required user response, e.g. a selected menu item.

URC 2

Terminate proactive command notification

^SSTN: <cmdTerminateValue>

When the SIM Application has issued a proactive command to the UE, it is possible that this command will be terminated later. URC "^SSTN" is sent with a different proactive command type number (added terminate offset 100) to indicate the termination of the specified command.
The state changes to idle. Therefore the TE should avoid sending any further commands related to the terminated proactive command, e.g. AT^SSTGI or AT^SSTR.

URC 3

Notification to the TE when the SIM Application has finished a command cycle and does not issue a subsequent proactive command.

^SSTN: 254

The TE does not need to respond directly, i.e. AT^SSTR is not required. The next action is left as an implementation decision to the manufacturer of the Customer Application (TE). Examples:

- If a Toolkit menu "^SSTN: 37" (SET UP MENU) proactive command was received at startup, the customer application can return to this Toolkit menu again after receiving the "^SSTN: 254" URC.
- In a Windows Mobile environment, the ToolkitUI application can be closed after receiving this URC.

Important notes:

- The Idle Mode text transferred with the SET UP IDLE MODE TEXT proactive command should not be removed as a result of this URC.
- If the text transferred with the DISPLAY TEXT proactive command is coded with an immediate response object set to "1" (see parameter <immediateResponse> of the AT^SSTGI=33 command), the text should not be removed as a result of this URC.

URC 4

SIM reset notification

^SSTN: 255

Notification to the TE indicating that the SIM is lost, e.g. if a proactive command "REFRESH - SIM Reset" has been issued by the SIM Application, please refer to AT^SSTGI=1.
This URC should be used to set the Customer Application to its initial state since the SIM Application will start from the beginning, too.
The TE does not need to respond directly, i.e. related AT^SSTGI and AT^SSTR are neither required nor allowed.
After reset SIM PIN authentication is required.

Parameter Description

<cmdType>(num)

Proactive Command number

`<cmdTerminateValue>`(num)

Defined as `<cmdType>` + terminate offset. The terminate offset equals 100.

8.6 AT^SSTGI SAT Get Information

This command shall be used upon receipt of a URC "^SSTN" to request the parameters of the Proactive Command.
Then the TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed. AT^SSTR will also provide some user information, e.g. a selected menu item.
The Proactive Command type value specifies to which "^SSTN" the command is related.

Syntax

Test Command

```
AT^SSTGI=?
```

Response(s)

```
^SSTGI:(list of supported <state>s), (list of supported <cmdType>s)
OK
```

Read Command

```
AT^SSTGI?
```

Response(s)

```
^SSTGI: <state>,<cmdType>
OK
```

Write Command

```
AT^SSTGI=<cmdType>
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

`<state>`(num)

PLAS9-W Remote-SAT interface states

0	RESET
1	OFF
2	IDLE
3	PAC
4	WAIT

`<cmdType>`(num)

Related Proactive Command

8.7 AT^SSTGI SAT Get Information - Refresh (1)

The AT^SSTGI=1 command shall be used after receiving the URC "^SSTN: 1". This URC notifies the TE that one or more Elementary Files on the USIM have been changed as a result of a USIM application activity, usually caused by the network provider. The response to the AT^SSTGI=1 command indicates what type of USIM refresh has occurred. The change requires that the Elementary Files of the USIM be synchronized with the equivalent information (if any) stored inside the TE. Depending on the type of USIM refresh the TE may need to use the AT+CRSM command to read out the Elementary Files and store the refreshed information.

The response parameters <pathLen>, <fileNum> and <fileList> are mandatory if <commandDetails> equals 1 or 2. In all other cases they are optional and can be ignored.

Syntax

Write Command

```
AT^SSTGI=1
```

Response(s)

```
^SSTGI: <cmdType>,<commandDetails>[,<pathLen>,<fileNum>,<fileList>]
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<cmdType>(num)

1	Proactive command ID, see Section 8.3, Remote-SAT Command Types and Table 8.6.

<commandDetails>(num)

For every return value of <commandDetails> other than 4 (USIM Reset) the TE shall complete the proactive command cycle using AT^SSTR=1,0.

0	USIM Initialization and Full File Change Notification
1	File Change Notification
2	USIM Initialization and File Change Notification
3	USIM Initialization
4	Value "4" means USIM Reset, but the value itself never appears. This is because value "4" is mapped to the URC "^SSTN: 255" which will be sent when a USIM reset occurs. In this case, the TE does not need to respond, i.e. the USIM Refresh commands AT^SSTGI and AT^SSTR are neither required nor allowed. Instead, as the USIM application restarts, the Toolkit application inside the TE should also return to initial state after receiving the URC "^SSTN: 255". For more information on USIM reset and the URC "^SSTN: 255" refer to Section 8.5, ^SSTN SAT Notification.
5...255	Reserved values

<pathLen>(num)

Number of bytes coded in <fileList>

<fileNum>(num)

Number of updated Elementary Files (EF) with path given in <fileList>

<fileList>(str)

String containing Elementary File paths. Each path contains at least two file entries; each file entry (MF, EF or DF) consists of two bytes, e.g. '3F002FE2' or '3F007F206FAD'. Every path in the file description begins with the Master File (MF). There can be any number of Dedicated File (DF) entries between Master File and Elementary File.

Example

In general, the TE only needs to take care of USIM content synchronization if it is permanently interested in the latest contents of one or more specific USIM files, e.g. because the TE has its own cache for specific USIM information. In this case, the TE needs to know exactly the paths and file IDs of these specific USIM files. Paths and file IDs can be found in 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16] and ETSI TS 102 221 [17].

When <commandDetails> equals 0, 2 or 3 or the "^SSTN: 255" notification is received (refer to Section 8.5, ^SSTN SAT Notification), the TE shall synchronize its own cache for USIM information in any case.

When <commandDetails> equals 1, reloading the USIM information is only necessary if the TE finds that an important file is included in the Refresh <fileList>. For example, assuming that the TE is always interested in the latest contents of the "FD" (Fixed Dialing) phonebook, it has to know that EF_FDN is located at path "3F00\7F10\6F3B". Then, during normal operation, the TE should always check the Refresh <fileList>, if it includes the path and file ID of EF_FDN. An example is given below:

^SYSSTART	UE has been started.
AT+CLCK="FD",2	Request "FD" lock state.
+CLCK: 1	"FD" lock is enabled.
OK	
AT+CPBS="FD"	Select the "FD" phonebook.
OK	
AT+CPBR=1	Read first "FD" phonebook entry.
+CPBR: 1,"123",129,"ABC"	This is the "FD" phonebook content before Refresh.
OK	
^SSTN: 1	Indicates that a SIM Refresh has occurred.
AT^SSTGI=1	Request type of SIM Refresh.
^SSTGI: 1,1,6,1,"3F007F106F3B"	The Refresh <fileList> includes path and file ID 3F00\7F10\6F3B which corresponds to EF_FDN, indicating that its contents may have changed.
OK	
AT^SSTR=1,0	Terminate the proactive command.
OK	
^SSTN: 254	Session finished.
AT+CPBR=1	Read first "FD" phonebook entry.
+CPBR: 1,"0123456789",129,"ABC"	This is the "FD" phonebook content after the Refresh.
OK	

Please keep in mind that this process is only necessary if the TE has it's own cache for SIM/USIM information (e.g. SIM/USIM phonebook is cached inside the TE). If the TE does not have a cache for USIM information (e.g. USIM phonebook is read by the TE only at the user's request, directly from the USIM), it is not necessary to synchronize the content. The TE USIM content synchronization is not required for a proper operation of the UE. As long as the TE answers the "^SSTN: 1" notification with the commands AT^SSTGI=1 and AT^SSTR=1,0, the UE will use the latest USIM contents and will continue to work flawlessly, regardless of a possible TE USIM content synchronization.

8.8 AT^SSTGI SAT Get Information - Set Up Event List (5)

This command shall be used after receiving the URC ^SSTN: 5.
However, please refer to the note below.
The response informs the TE of the events that it must monitor within itself. If any of these events occur the TE must report them to the UE.

Syntax

Write Command

`AT^SSTGI=5`

Response(s)

`^SSTGI: <cmdType>, <commandDetails>, <eventList>`
`OK`
`ERROR`
`+CME ERROR: <err>`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

`<cmdType>`(num)

5	Proactive command ID, see Table 8.6, Command Type Table.

`<commandDetails>`(num)

This byte is RFU.

`<eventList>`(num)

The event list tells the TE which events have to be reported to the UE via the related commands AT^SSTR=(232, 233, 235, 236)

0...65535	Used as bit field
bit 1-4	RFU
bit 5	0: User Activity not in Event List
	1: Any user activity (keyboard press) has to be signaled to the UE
bit 6	0: Idle Screen Available not in Event List
	1: Any idle screen available event has to be signaled to the UE.
bit 7	RFU
bit 8	0: Language Selection not in Event List
	1: Language Selection events have to be signaled to the UE.
bit 9	0: Browser Termination not in Event List
	1: Browser Termination events have to be signaled to the UE
bit 10-16	RFU

Note

- It is possible to issue AT^SSTGI during states IDLE, PAC and WAIT for this proactive command without previously receiving a URC ^SSTN:`<cmdType>`, see `AT^SSTGI`.

8.9 AT^SSTGI SAT Get Information - Set Up Call (16)

This command shall be used after receiving the URC ^SSTN: 16. If the SIM Application attempts to set up a call it uses this response to inform the TE of the call parameters.

The sequence of events is as follows:
1. After the Remote-SAT notification 16 was issued the TE has to request the command parameter using AT^SSTGI=16.
2. If the SIM Application does not supply a confirmation text or icon parameter, the TE gives other information to the user, e.g. the telephone number. In this case refer to step 4.
3. If the SIM Application supplies a non empty confirmation text or icon parameter, the TE uses only these to ask the user whether or not he wishes to set up the call.
4. If the user confirms to set up the call, the response AT^SSTR=16,0 shall be sent.
5. If the user denies to set up the call, the response AT^SSTR=16,34 shall be sent.
6. After confirmation phase the TE may present a dialing animation on the screen until a mandatory parameter line ^SSTR: 16, <TermQualifier>, <TerminationCauseText> is issued.
7. If <TermQualifier> is not equal to 0 the call setup process has not been successfully. If <TerminationCause-Text> is not an empty string, this text shall be shown to the user for an appropriate time, e.g. 2 seconds. The text contains information regarding the dial termination cause, e.g. call barring through Call Control by SIM mechanism. If <TerminationCauseText> is an empty string, the TE shall give an own indication to the user.
8. If <TermQualifier> is equal to 0, the call setup process has been started:
If <TerminationCauseText> is not an empty string, this text shall be used to inform the user during the call setup. If <TerminationCauseText> is an empty string, <callSetupText> and/or <confirmationIconId> shall be used to inform the user during call setup. However, if <callSetupText> contains no data, too, no indication shall be shown.
9. The TE shall give the user an opportunity to end an ongoing call, set up by the Proactive Command. In this case the TE shall send an AT command to hang up the call.

Syntax

Write Command

```
AT^SSTGI=16
```

Response(s)

```
^SSTGI: <cmdType>, <commandDetails>, <confirmationText>, <calledNumber>,
<callSetupText>, <confirmationIconQualifier>, <confirmationIconId>,
<callSetupIconQualifier>, <callSetupIconId>
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<cmdType>(num)	
16	Proactive command ID, see Table 8.6, Command Type Table.

<commandDetails>(num)	
0	Set up call, but only if not currently busy on another call
1	Set up call, but only if not currently busy on another call, with redial
2	Set up call, putting all other calls (if any) on hold
3	Set up call, putting all other calls (if any) on hold, with redial
4	Set up call, disconnecting all other calls (if any)

5	Set up call, disconnecting all other calls (if any), with redial
6...255	Reserved Values

`<confirmationText>`(str)

String for user confirmation stage

`<calledNumber>`(num)

String containing called number

`<callSetupText>`(str)

String for call set up stage

`<confirmationIconQualifier>`(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

`<confirmationIconId>`(num)

0...255

0	No Icon

`<callSetupIconQualifier>`(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

`<callSetupIconId>`(num)

0...255

0	No Icon

Note

- If the Fixed Dialling Number service is enabled, the number included in the SET UP CALL proactive command shall not be checked against those of the FDN list.

8.10 AT^SSTGI SAT Get Information - Send SS (17)

This command shall be used after receiving the URC ^SSTN: 17
The module is sending a supplementary service request to the network, and is alerting the user of this. Text and an icon identifier shall be passed to the TE to display to the user.

Syntax

Write Command

`AT^SSTGI=17`

Response(s)

`^SSTGI: <cmdType>[, <commandDetails>][, <text>], <iconQualifier>, <iconId>`
`OK`
`ERROR`
`+CME ERROR: <err>`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<cmdType>(num)

17	Proactive command ID, see Table 8.6, Command Type Table.

<commandDetails>(num)

This byte is RFU.

<text>(str)

String to provide the user with information.
If the string is provided by the SIM, the TE shall use it to inform the user. This is also an indication that the TE should not give any other information to the user on the fact that the UE is sending an SS request.
If the alpha identifier is not provided by the SIM, the UE may give information to the user concerning what is happening.

<iconQualifier>(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

<iconId>(num)

0...255	
0	No Icon

8.11 AT^SSTGI SAT Get Information - Send USSD (18)

This command shall be used after receiving the URC ^SSTN: 18
The module is sending an unstructured supplementary service request to the network, and is alerting the user of this.
Text and an icon identifier shall be passed to the TE to display to the user.

Syntax

Write Command

`AT^SSTGI=18`

Response(s)

`^SSTGI: <cmdType>[, <commandDetails>][, <text>], <iconQualifier>, <iconId>`
`OK`
`ERROR`
`+CME ERROR: <err>`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<cmdType>(num)

18	Proactive command ID, see Table 8.6, Command Type Table.

<commandDetails>(num)

This byte is RFU.

<text>(str)

String to provide the user with information.
If the string is provided by the SIM, the TE shall use it to inform the user. This is also an indication that the TE should not give any other information to the user on the fact that the UE is sending a USSD request.
If the alpha identifier is not provided by the SIM, the UE may give information to the user concerning what is happening.

<iconQualifier>(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

<iconId>(num)

0...255	
0	No Icon

8.12 AT^SSTGI SAT Get Information - Send Short Message (19)

This command shall be used after receiving the URC ^SSTN: 19
The SIM Application is sending a Short Message and the TE is informed of this. The user can be passed a string containing information to display.

Syntax

Write Command

`AT^SSTGI=19`

Response(s)

`^SSTGI: <cmdType>, <commandDetails>, <textInfo>, <iconQualifier>, <iconId>`
`OK`
`ERROR`
`+CME ERROR: <err>`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

`<cmdType>`(num)

19	Proactive command ID, see Table 8.6, Command Type Table.

`<commandDetails>`(num)

This byte is RFU.

`<textInfo>`(str)

String to provide the user with information.
If the string is provided by the SIM, the TE shall use it to inform the user. This is also an indication that the TE should not give any other information to the user on the fact that the UE is sending a short message.
If the alpha identifier is not provided by the SIM, the UE may give information to the user concerning what is happening.

`<iconQualifier>`(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

`<iconId>`(num)

0...255	
0	No Icon
1	An icon is provided by the SIM, the icon indicated in the command may be used by the UE to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier.

8.13 AT^SSTGI SAT Get Information - Send DTMF (20)

This command shall be used after receiving the URC ^SSTN: 20
The SIM Application is sending DTMF tones to the network, and can provide the TE with some information about this.
Text and an icon identifier can be passed to the TE to display to the user.

Syntax

Write Command

```
AT^SSTGI=20
```

Response(s)

```
^SSTGI: <cmdType>,<commandDetails>,<text>,<iconQualifier>,<iconId>
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<cmdType>(num)

20	Proactive command ID, see Table 8.6, Command Type Table.

<commandDetails>(num)

This byte is RFU.

<text>(str)

String to provide the user with information.
If the string is provided by the SIM, the TE shall use it to inform the user. This is also an indication that the TE should not give any other information to the user on the fact that the UE is performing a SEND DTMF command. If the alpha identifier is not provided by the SIM, the UE may give information to the user concerning what is happening.

<iconQualifier>(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

<iconId>(num)

0...255	
0	No Icon

8.14 AT^SSTGI SAT Get Information - Launch Browser (21)

This command shall be used after receiving the URC ^SSTN: 21.
If the SIM Application attempts to start an Internet Browser, it uses this response to inform the TE of the launch parameters.

The sequence of events is as follows:
1. After the Remote-SAT notification 21 was issued the TE shall ask for the command parameters via AT^SSTGI=21.
2. The UE shall ask the user for confirmation using the Alpha Identifier/Icon Identifier (user confirmation phase) if present, when it receives a LAUNCH BROWSER command which requests to connect the existing browser session to a new URL or to terminate a browser session.
3. If the user confirms to start the browser, the response AT^SSTR=21,0 shall be sent.
4. If the user rejects to start the browser, the response AT^SSTR=21,34 shall be sent.
5. The SIM Application will end the proactive session.
6. The UE shall request content using the given URL. However, if no URL string is supplied a default URL shall be used.
7. If the response AT^SSTR=21,0 was issued, the browser session may still be active while a next proactive command is issued. Therefore the end of the browser session shall be reported to the UE via browser termination event command asynchronously if determined by the event list.
For details please refer to AT^SSTR.

Syntax

Write Command

AT^SSTGI=21

Response(s)

^SSTGI: <cmdType>, <commandDetails>, <confirmationText>, <confirmationIconQualifier>, <iconId>, <browserIdentity>, <url>, <bearerList>, <fileRefList>, <gatewayIdentity>
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<cmdType>(num)

21	Proactive command ID, see Remote-SAT Command Types

<commandDetails>(num)

This byte is RFU.

<confirmationText>(str)

String for user confirmation stage

<confirmationIconQualifier>(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text

	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

`<iconId>`(num)

0...255	
0	No Icon

`<browserIdentity>`(num)

0...255	Browser to be used
0	Default Browser shall be used.
1...255	RFU

`<url>`(str)

String containing URL to be used by the TE to request content. The way the UE requests content using the URL is out of the scope of the present document. This is specified in RFC 1738 Annex K for example.

`<bearerList>`(str)

“00“	SMS
“01“	CSD
“02“	USSD
“03“	GPRS
"04"..."FF"	RFU

`<fileRefList>`(str)

String containing full path to the provisioning file. The first byte contains the number of files. Every comma separated path is the concatenation of file identifiers starting from the Master File (e.g. 3F007F206FXY). The file contains a single unambiguous set of parameters required to make the connection. The content of the file is expected to be consistent with the format defined for provisioning information for the requested type of browser.

`<gatewayIdentity>`(str)

String containing the Gateway/Proxy Identity which gives to the mobile the name/identity of the Gateway/Proxy to be used for connecting to the URL. This Gateway/Proxy identity is required when the bearer data object is present.

8.15 AT^SSTGI SAT Get Information - Play Tone (32)

This command shall be used after receiving the URC ^SSTN: 32.
The UE has been instructed to generate an audible tone, and may pass to the TE some information to support this.

Syntax

Write Command

`AT^SSTGI=32`

Response(s)

`^SSTGI: <cmdType>, <commandDetails>, <infoText>, <tone>, <durationUnit>, <duration>, <iconQualifier>, <iconId>`
`OK`
`ERROR`
`+CME ERROR: <err>`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

`<cmdType>`(num)

32	Proactive command ID, see Remote-SAT Command Types

`<commandDetails>`(num)

This byte is RFU.

`<infoText>`(str)

String to accompany tone

`<tone>`(str)

Tone generated by the UE

"01"..."08"	Standard supervisory tones:
“01“	Dial tone
“02“	Called subscriber busy
“03“	Congestion
“04“	Radio path acknowledge
“05“	Radio path not available / Call dropped
“06“	Error / Special information
“07“	Call waiting tone
“08“	Ringing tone
"16"..."18"	UE proprietary tones:
“16“	General beep
“17“	Positive acknowledgement tone
“18“	Negative acknowledgement or error tone

<durationUnit>(num)	
0	Minutes
1	Seconds
2	Tenth of Seconds

<duration>(num)	
1...255	Duration of tone, expressed in units

<iconQualifier>(num)	
0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

<iconId>(num)	
0...255	
0	No Icon

8.16 AT^SSTGI SAT Get Information - Display Text (33)

This command shall be used after receiving the URC ^SSTN: 33. The TE gets a message to be displayed to the user. The message can have different display characteristics.

Syntax

Write Command

`AT^SSTGI=33`

Response(s)

`^SSTGI: <cmdType>, <commandDetails>, <text>, <immediateResponse>, <iconQualifier>, <iconId>`
`OK`
`ERROR`
`+CME ERROR: <err>`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

`<cmdType>`(num)

33	Proactive command ID, see Section 8.3, Remote-SAT Command Types and Table 8.6.

`<commandDetails>`(num)

0...255	Used as bit field
bit 1	0: Normal priority (see note).
	1: High priority (see note).
bit 2-7	RFU
bit 8	0: Clear message after a delay.
	1: Wait for user to clear message.

`<text>`(str)

String to be displayed

`<immediateResponse>`(num)

This parameter indicates whether the UE should sustain the display beyond sending the TERMINAL RESPONSE.

0	Send TERMINAL RESPONSE when text is cleared from screen.
1	Send TERMINAL RESPONSE immediately and continue to display the text until one of the following events occurs: • A subsequent proactive command is received, containing display data. • A short delay notified with `<commandDetails>` has expired. • User intervention.

	• A higher priority event occurs, e.g. a mobile terminated call. No further TERMINAL RESPONSE shall be sent when the UE removes the text from the display, regardless of the cause. If the <immediateResponse> parameter equals "1" the subsequent "^SSTN: 254" URC should not be used to clear the text from the screen - in this case the text should remain on the screen until one of the above events occurs.

<iconQualifier>(num)	
0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text. 1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

<iconId>(num)	
0...255	
0	No Icon

Notes

- The MMI shall reject normal priority text commands if the screen is currently used for more than its normal standby display, e.g. if the MMI is in sub-menu. If the command is rejected, the MMI sends the TERMINAL RESPONSE message to the SIM (UE currently unable to process command - screen busy).
- High priority text shall be displayed on the screen immediately, except if a priority conflict of the alerting events occurs, e.g. incoming call or a URC if the battery needs to be charged, see 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

8.17 AT^SSTGI SAT Get Information - Get Inkey (34)

This command shall be used after receiving the URC ^SSTN: 34.
The TE is asked to prompt the user for an input, which is a single character. Help can be requested by the user, if available.

Syntax

Write Command

```
AT^SSTGI=34
```

Response(s)

```
^SSTGI: <cmdType>,<commandDetails>,<text>,<iconQualifier>,<iconId>
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<cmdType>(num)	
34	Proactive command ID, see Remote-SAT Command Types

<commandDetails>(num)	
0...255	Used as bit field
bit 1	0: Digits only (0 9, *, # and +)
	1: Alphabet set
bit 2	0: SMS default alphabet (GSM character set)
	1: UCS2 alphabet
bit 3	0: Character sets defined by bit 1 and bit 2 are enabled
	1: Character sets defined by bit 1 and bit 2 are disabled and the "Yes/No" response is requested
bit 4-7	RFU
bit 8	0: No help information available
	1: Help information available

<text>(str)
String as prompt for text.

<iconQualifier>(num)	
0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

`<iconId>`(num)

0...255

0	No Icon

8.18 AT^SSTGI SAT Get Information - Get Input (35)

This command shall be used after receiving the URC ^SSTN: 35.
The TE is asked to prompt the user for an input, of a specified length and type, e.g. digits only. Help can be requested by the user, if available.

Syntax

Write Command

`AT^SSTGI=35`

Response(s)

`^SSTGI: <cmdType>, <commandDetails>, <text>, <responseMin>, <responseMax>[, <defaultText>], <iconQualifier>, <iconId>`
`OK`
`ERROR`
`+CME ERROR: <err>`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

`<cmdType>`(num)

35	Proactive command ID, see `Remote-SAT Command Types`

`<commandDetails>`(num)

0...255	Used as bit field
bit 1	0: Digits only (0 9, *, # and +)
	1: Alphabet set
bit 2	0: SMS default alphabet (GSM character set)
	1: UCS2 alphabet
bit 3	0: UE may echo user input on the display
	1: User input shall not be revealed in any way (see note)
bit 4	0: User input to be in unpacked format
	1: User input to be in SMS packed format
bit 5-7	RFU
bit 8	0: No help information available
	1: Help information available

`<text>`(str)

String as prompt for text

`<responseMin>`(num)

0...255	Minimum length of user input.

`<responseMax>`(num)

0...255	Maximum length of user input.

<defaultText>(str)

String supplied as default response text

<iconQualifier>(num)	
0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

<iconId>(num)	
0...255	
0	No Icon

Note

- Hidden entry mode (see 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20]) is only available when using digit input. In hidden entry mode only characters ('0', '9', '*' and '#') are allowed.

8.19 AT^SSTGI SAT Get Information - Select Item (36)

This command shall be used after receiving the URC ^SSTN: 36.
The TE is supplied with a list of items allowing the user to select one. Help can be requested by the user, if available and the presentation style is specified. In addition to text strings and icon identifiers, a next action indicator informs the user of the likely result of selecting a chosen item.

Syntax

Write Command

`AT^SSTGI=36`

Response(s)

The first line of output from the ME is:
`^SSTGI: <cmdType>, <commandDetails>, <numOfItems>, <titleText>, <defaultItemId>, <itemIconsPresent>, <itemIconsQualifier>, <titleIconQualifier>, <titleIconId>`
One line follows for every item, repeated for `<numOfItems>`:
`^SSTGI: <cmdType>, <itemId>, <itemText>, <nextActionId>, <iconId>`
`OK`
`ERROR`
`+CME ERROR: <err>`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

`<cmdType>`(num)	
36	Proactive command ID, see `Remote-SAT Command Types`

`<commandDetails>`(num)	
0...255	Used as bit field
bit 1	0: Presentation type is not specified
	1: Presentation type is specified in bit 2
bit 2	0: Presentation as a choice of data values, if bit 1 = '1'
	1: Presentation as a choice of navigation options if bit 1 is '1'
bit 3	0: No selection preference
	1: Selection using soft key preferred
bit 4-7	RFU
bit 8	0: No help information available
	1: Help information available

`<numOfItems>`(num)

Number of items in the list

`<titleText>`(str)

String giving menu title

<defaultItemId>(num)

ID of default item
The SIM may supply with the list an indication of the default item, e.g. the previously selected item

0	No default item issued by the SIM application
1...255	Id of the default Item

<itemIconsPresent>(num)

0	No icons
1	Icons present

<itemIconsQualifier>(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

<titleIconQualifier>(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

<titleIconId>(num)

0...255

0	No Icon

<itemId>(num)

Item identifier (1 - <numOfItems>)

<itemText>(str)

String giving menu title

<nextActionId>(num)

The next proactive command type to be issued upon execution of the menu item. See Remote-SAT Command Types

0	Next Action information available

<iconId>(num)

0...255

0	No Icon

8.20 AT^SSTGI SAT Get Information - Set up Menu (37)

This command shall be used after receiving the URC ^SSTN: 37. The response provides the main menu of the SIM Application to the TE. It needs to be stored by the TE so that it can be displayed without invoking a proactive session.

As with every proactive command the TE is expected to acknowledge the ^SSTGI response with AT^SSTR to confirm that the proactive command has been executed.
Terminal Response via AT^SSTR will not provide any user information in case of this proactive command. Refer to AT^SSTR.

AT^SSTGI can be issued during states IDLE, PAC and WAIT for this proactive command without previously receiving a URC ^SSTN:<cmdType>, see AT^SSTGI.

Syntax

Write Command

AT^SSTGI=37

Response(s)

The first line of output from the ME is:
^SSTGI: <cmdType>, <commandDetails>, <numOfItems>, <titleText>, <menuItemIconsPresent>, <menuItemIconsQualifier>, <titleIconQualifier>, <titleIconId>
One line follows for every item, repeated for <numOfItems>:
^SSTGI: <cmdType>, <itemId>, <itemText>, <nextActionId>, <iconId>
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<cmdType>(num)

37	Proactive command ID, see Remote-SAT Command Types

<commandDetails>(num)

0...255	Used as bit field
bit 1	0: No selection preference
	1: Selection using soft key preferred
bit 2-7	RFU
bit 8	0: No help information available
	1: Help information available

<numOfItems>(num)

Number of menu items in the list

<titleText>(str)

String displaying menu title

<menuItemIconsPresent>(num)

0	No icons
1	Icons present

<menuItemIconsQualifier>(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

<titleIconQualifier>(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

<titleIconId>(num)

0...255

0	No Icon

<itemId>(num)

Menu item identifier (1 - <numOfItems>)

<itemText>(str)

Title of menu item

<nextActionId>(num)

The next proactive command type to be issued upon execution of the menu item. See Remote-SAT Command Types

0	No next Action information available

<iconId>(num)

0...255

0	No Icon

8.21 AT^SSTGI SAT Get Information - Set up Idle Mode Text (40)

This command shall be used after receiving the URC ^SSTN: 40.
It provides text and optionally an icon to be displayed by the TE when the display is Idle.

Syntax

Write Command

`AT^SSTGI=40`

Response(s)

`^SSTGI: <cmdType>, <commandDetails>, <text>, <iconQualifier>, <iconId>`
`OK`
`ERROR`
`+CME ERROR: <err>`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<cmdType>(num)

40	Proactive command ID, see Remote-SAT Command Types

<commandDetails>(num)

This byte is RFU.

<text>(str)

Text to be displayed when TE in IDLE mode

<iconQualifier>(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

<iconId>(num)

0...255	
0	No Icon

Note

- AT^SSTGI can be issued during states IDLE, PAC and WAIT for this proactive command without previously receiving a URC ^SSTN:<cmdType>, see AT^SSTGI.

8.22 AT^SSTGI SAT Get Information - Language Notification (53)

This command shall be used after receiving the URC ^SSTN: 53.
It provides text to inform the TE about the language currently used for any text string within proactive commands or envelope command responses.
The notified language remains valid until the end of the card session or upon executing another LANGUAGE NOTIFICATION command.
If the Toolkit application is not aware of the currently selected language, no specific language or several languages will be used. The SIM may notify non-specific language. All LANGUAGE NOTIFICATION previously made will be cancelled.
Two types of language notification are defined:
• specific, where a two-character language notification is issued in <langText>,
• non-specific, where no language notification is issued, i.e. <langText> is an empty string.
The TE may use the language included in LANGUAGE NOTIFICATION as appropriate. For instance, this could be done to avoid a mix of languages in screen displays combining UE MMI and SIM Toolkit originating text strings.

Syntax

Write Command

AT^SSTGI=53

Response(s)

^SSTGI: <cmdType>, <commandDetails>, <langText>
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<cmdType>(num)

53	Proactive command ID, see Remote-SAT Command Types

<commandDetails>(num)

0...255	Used as bit field
bit 1	0: non-specific language notification
	1: specific language notification
bit 2-8	RFU

<langText>(str)

Language code string provided as a pair of alpha-numeric characters, defined in ISO 639. Each alphanumeric character is coded on one byte using the SMS default 7-bit coded alphabet as defined in 3GPP TS 23.038[33].

Note

- AT^SSTGI can be issued during states IDLE, PAC and WAIT for this proactive command without previously receiving a URC ^SSTN:<cmdType>, see AT^SSTGI.

8.23 AT^SSTGI SAT Get Information - Open Channel (64)

The SIM Application is opening a data session for the Bearer Independent Protocol, and can provide the TE with some information about this.
Text and an icon identifier can be passed to the TE for display to the user.

Syntax

Write Command

`AT^SSTGI=64`

Response(s)

`^SSTGI: <cmdType>, <commandDetails>, <text>, <iconQualifier>, <iconId>`
`OK`
`ERROR`
`+CME ERROR: <err>`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

`<cmdType>`(num)

64	Proactive command ID, see Table 8.6, Command Type Table.

`<commandDetails>`(num)

This byte is RFU.

`<text>`(str)

String to provide the user with information.
If the string is provided by the SIM, the TE shall use it to inform the user. This is also an indication that the TE should not give any other information to the user on the fact that the UE is performing an Open Channel command.
If the alpha identifier is not provided by the SIM, the UE may give information to the user concerning what is happening.

`<iconQualifier>`(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

`<iconId>`(num)

0...255	
0	No Icon

8.24 AT^SSTGI SAT Get Information - Close Channel (65)

The SIM Application is closing a data session for the Bearer Independent Protocol, and can provide the TE with some information about this.
Text and an icon identifier can be passed to the TE for display to the user.

Syntax

Write Command

`AT^SSTGI=65`

Response(s)

`^SSTGI: <cmdType>, <commandDetails>, <text>, <iconQualifier>, <iconId>`
`OK`
`ERROR`
`+CME ERROR: <err>`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

`<cmdType>`(num)

65	Proactive command ID, see Table 8.6, Command Type Table.

`<commandDetails>`(num)

This byte is RFU.

`<text>`(str)

String to provide the user with information.
If the string is provided by the SIM, the TE shall use it to inform the user. This is also an indication that the TE should not give any other information to the user on the fact that the UE is performing a Close Channel command.
If the alpha identifier is not provided by the SIM, the UE may give information to the user concerning what is happening.

`<iconQualifier>`(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

`<iconId>`(num)

0...255	
0	No Icon

8.25 AT^SSTGI SAT Get Information - Receive Data (66)

The SIM Application receives data in an open session for the Bearer Independent Protocol, and can provide the TE with some information about this.
Text and an icon identifier can be passed to the TE for display to the user.

Syntax

Write Command

`AT^SSTGI=66`

Response(s)

`^SSTGI: <cmdType>, <commandDetails>, <text>, <iconQualifier>, <iconId>`
`OK`
`ERROR`
`+CME ERROR: <err>`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

`<cmdType>`(num)

66	Proactive command ID, see Table 8.6, Command Type Table.

`<commandDetails>`(num)

This byte is RFU.

`<text>`(str)

String to provide the user with information.
If the string is provided by the SIM, the TE shall use it to inform the user. This is also an indication that the TE should not give any other information to the user on the fact that the UE is performing an Open Channel command.
If the alpha identifier is not provided by the SIM, the UE may give information to the user concerning what is happening.

`<iconQualifier>`(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

`<iconId>`(num)

0...255	
0	No Icon

8.26 AT^SSTGI SAT Get Information - Send Data (67)

The SIM Application sends data in an open session for the Bearer Independent Protocol, and can provide the TE with some information about this.
Text and an icon identifier can be passed to the TE for display to the user.

Syntax

Write Command

`AT^SSTGI=67`

Response(s)

`^SSTGI: <cmdType>, <commandDetails>, <text>, <iconQualifier>, <iconId>`
`OK`
`ERROR`
`+CME ERROR: <err>`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

`<cmdType>`(num)

67	Proactive command ID, see Table 8.6, Command Type Table.

`<commandDetails>`(num)

This byte is RFU.

`<text>`(str)

String to provide the user with information.
If the string is provided by the SIM, the TE shall use it to inform the user. This is also an indication that the TE should not give any other information to the user on the fact that the UE is performing an Open Channel command.
If the alpha identifier is not provided by the SIM, the UE may give information to the user concerning what is happening.

`<iconQualifier>`(num)

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text
	1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

`<iconId>`(num)

0...255	
0	No Icon

8.27 AT^SSTR SAT Response

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed. AT^SSTR will also provide any user information, e.g. a selected menu item.

Syntax

Test Command

AT^SSTR=?

Response(s)

^SSTR: (list of supported <state>s), (list of supported <cmdType>s)
OK

Read Command

AT^SSTR?

Response(s)

^SSTR: <state>, <cmdType>
OK

Write Command

AT^SSTR=<cmdType>, <status>[, <inputNumber>][, <inputString>][, <statAddInfo>]

Response(s)

^SSTR: <cmdType>[, <TerminationQualifier>, <TerminationCauseText>]
OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<state>(num)

PLAS9-W Remote-SAT interface states

0	RESET
1	OFF
2	IDLE
3	PAC
4	WAIT

<cmdType>(num)

Number related to Proactive Command or event type according to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

<TerminationQualifier>(num)

0	The proactive command has been successfully finished.
1...255	The proactive command did not perform successfully.

<TerminationCauseText>(str)

This text has to be shown to the user for an appropriate time, e.g. 2 seconds. The text contains information regarding the termination cause, e.g. in case of a failed dialing process call barring through Call Control by SIM mechanism may be indicated.
If <TerminationCauseText> is an empty string and <TerminationQualifier> is not equal to 0, the TE may give an own indication to the user.

<status>(num)

Command status return regarding the type of action that has taken place, e.g. action performed by the user. Values are in accordance with 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

<inputNumber>(num)

Response number entered by user

<inputString>(str)

Response string entered by user

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

8.28 AT^SSTR SAT Response - Refresh (1)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=1, <status>, , [, <statAddInfo>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

Note

- The refresh action (SIM data cache update) will be performed in any case, i.e. <status> values other than 0 will be ignored.

8.29 AT^SSTR SAT Response - Set Up Event List (5)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed. The TE acknowledges that the event list has been set up correctly.

Syntax

Write Command

AT^SSTR=5, <status>, , [, <statAddInfo>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully
32	UE currently unable to process command
48	Command beyond UE's capabilities
132	UE currently unable to process command because screen is busy

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

8.30 AT^SSTR SAT Response - Set Up Call (16)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=16, <status>, , [, <statAddInfo>]

Response(s)

^SSTR: 16, <TerminationQualifier>, <TerminationCauseText>
OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicate that the user has accepted the call request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
20	USSD/SS Transact terminated by user
32	UE currently unable to process command
34	User did not accept the proactive command. Indicate that the user has denied the call request
35	User cleared down call before connection or network release
48	Command beyond UE's capabilities
132	UE currently unable to process command because screen is busy

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

Note

- After confirmation phase the TE may show a dialling animation on the screen until a mandatory response parameter is issued.
  ^SSTR: <cmdType>, <TerminationQualifier>, <TerminationCauseText>

8.31 AT^SSTR SAT Response - Send SS (17)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=17, <status>

Response(s)

^SSTR: 17, <TerminationQualifier>, <TerminationCauseText>
OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)	
0...4	
0	Command performed successfully. Indicate that the user has accepted the SS request.
4	Command performed successfully, but requested icon could not be displayed.

8.32 AT^SSTR SAT Response - Send USSD (18)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=18, <status>

Response(s)

^SSTR: 18, <TerminationQualifier>, <TerminationCauseText>
OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)	
0...4	
0	Command performed successfully. Indicate that the user has accepted the USSD request.
4	Command performed successfully, but requested icon could not be displayed.

8.33 AT^SSTR SAT Response - Send Short Message (19)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=19, <status>

Response(s)

^SSTR: 19, <TerminationQualifier>, <TerminationCauseText>
OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)	
0...4	
0	Command performed successfully. Indicate that the user has accepted the SMS request.
4	Command performed successfully, but requested icon could not be displayed.

8.34 AT^SSTR SAT Response - Send DTMF (20)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=20, <status>, , [, <statAddInfo>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicate that the user has accepted the Send DTMF request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
32	UE currently unable to process command
48	Command beyond UE's capabilities
132	UE currently unable to process command because screen is busy

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

8.35 AT^SSTR SAT Response - Launch Browser (21)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=21, <status>, , [, <statAddInfo>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicates that the user has accepted the Launch Browser request.
4	Command performed successfully, but requested icon could not be displayed.
32	UE currently unable to process command
34	User did not accept the proactive command. Indicates that the user has denied the Launch Browser request
38	Launch Browser generic error with additional information "No specific cause can be given".
48	Command beyond UE's capabilities
132	UE currently unable to process command because screen is busy
138	Launch Browser generic error with additional information "Bearer unavailable".
238	Launch Browser generic error with additional information "Browser unavailable".
239	Launch Browser generic error with additional information "UE unable to read the provisioning data".

<statAddInfo>(num)

For the general result "Launch Browser generic error code", it is mandatory for the UE to provide additional information.

0...255

0	"No specific cause can be given"
1	"Bearer unavailable"
2	"Browser unavailable"
3	"UE unable to read the provisioning data"

8.36 AT^SSTR SAT Response - Play Tone (32)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=32, <status>, , [, <statAddInfo>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicates that the user has accepted the Play Tone request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session was terminated by user.
32	UE or TE currently unable to process command.
48	Command beyond UE's (respectively TE's) capabilities.
132	TE currently unable to process command because screen is busy.

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

Note

- This command starts playing the tone by the UE. It is possible for the TE to stop playing the tone via user break, i.e. issue any character whilst the command is running.

8.37 AT^SSTR SAT Response - Display Text (33)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=33, <status>, , [, <statAddInfo>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicates that the user has accepted the Display Text request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
17	Backward move in the proactive SIM session requested by the user
18	No response from user
32	UE currently unable to process command
48	Command beyond UE's capabilities
132	UE currently unable to process command because screen is busy

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

8.38 AT^SSTR SAT Response - Get Inkey (34)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=34, <status>, , <inputString>[, <statAddInfo>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicates that the user has accepted the Get Inkey request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
17	Backward move in the proactive SIM session requested by the user
18	No response from user
19	Help information required by the user
32	UE currently unable to process command
48	Command beyond UE's capabilities
132	UE currently unable to process command because screen is busy

<inputString>(str)

User response entered as a string parameter

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

Notes

- Coding of any input character is related to the selected alphabet:
  - Input of a character in case of GSM character set requests one byte, e.g. "Y".
  - Input of any characters in UCS2 alphabet requests a 4 byte set, e.g. "0059" is coding the same character "Y".
  - If, as a user response, a binary choice (Yes/No) is requested by the SIM application using bit 3 of the <commandDetails> parameter the valid content of the <inputString> is:
    a) GSM alphabet: "Y" or "y" (positive answer) and "N" or "n" (negative answer).
    b) UCS2 alphabet "0079" or "0059" (positive answer) and "006E" or "004E" (negative answer). For more detailed information refer to AT^SSTGI.
  - Coding of an empty string is done as a "\1b" string with every alphabet.

- The <Alphabet> parameter of AT^SSTA determines the alphabet used on the AT command interface, while the value reported by the <commandDetails> bit 2 of the AT^SSTGI=34 command determines the set of characters allowed. If these alphabet settings are different, the following applies:
  Example: If UCS2 alphabet is selected with AT^SSTA and the <commandDetails> bit 2 of the AT^SSTGI=34 command is reported as "SMS default alphabet (GSM character set)" any input has to be done in UCS2 alphabet. However, take care to enter only UCS2 characters for which equivalent characters are defined in the SMS (GSM) default alphabet. In this case, the ME will correctly translate the given UCS2 data into a TERMINAL RESPONSE coded in SMS (GSM) default alphabet. See also Section 1.7.2, UCS2 and GSM character coding and conversion.

8.39 AT^SSTR SAT Response - Get Input (35)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=35, <status>, , <inputString>[, <statAddInfo>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicates that the user has accepted the Get Input request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
17	Backward move in the proactive SIM session requested by the user
18	No response from user
19	Help information required by the user
32	UE currently unable to process command
48	Command beyond UE's capabilities
132	UE currently unable to process command because screen is busy

<inputString>(str)

User response entered as a string, length depends on the <responseMin> and <responseMax> values returned by the related AT^SSTGI=35 command.

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

Notes

- Coding of any input character is related to the selected alphabet:
  - Input of a character in case of GSM character set requests one byte, e.g. "Y".
  - Input of any characters in UCS2 alphabet requests a 4 byte set, e.g. "0059" is coding the same character "Y".
  - Coding of an empty string is done as a "\1b" string with every alphabet.

- The <Alphabet> parameter of AT^SSTA determines the alphabet used on the AT command interface, while the value reported by the <commandDetails> bit 2 of the AT^SSTGI=35 command determines the set of characters allowed. If these alphabet settings are different, the following applies:
  Example: If UCS2 alphabet is selected with AT^SSTA and the <commandDetails> bit 2 of the AT^SSTGI=35 command is reported as "SMS default alphabet (GSM character set)" any input has to be done in UCS2 alphabet. However, take care to enter only UCS2 characters for which equivalent characters are defined in the SMS (GSM) default alphabet. In this case, the UE will correctly translate the given UCS2 data into a TERMINAL RESPONSE coded in SMS (GSM) default alphabet. See also Section 1.7.2, UCS2 and GSM character coding and conversion.

8.40 AT^SSTR SAT Response - Select Item (36)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed. The TE sends a response that can indicate the user's intentions, e.g. when the user is requesting help or selecting a menu item.

For compatibility reasons <itemId> is optional in case of <status>=19 ("Help information required by the user"). In this case <itemId>=0 is sent to the USIM.

Syntax

Write Command

AT^SSTR=36, <status>, <itemId>[, <statAddInfo>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicates that the user has accepted the Select Item request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
17	Backward move in the proactive SIM session requested by the user
18	No response from user
19	Help information required by the user
32	UE currently unable to process command
48	Command beyond UE's capabilities
132	UE currently unable to process command because screen is busy

<itemId>(num)

Item IDs are supplied by the SIM Application

1...255	ID of selected item can be issued if a <status> value of 0 is returned

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

8.41 AT^SSTR SAT Response - Set Up Menu (37)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command
AT^SSTR=37, <status>, , [, <statAddInfo>]
Response(s)
OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicates that the user has accepted the Set Up Menu request.
4	Command performed successfully, but requested icon could not be displayed.
32	UE currently unable to process command
48	Command beyond UE's capabilities
132	UE currently unable to process command because screen is busy

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

Note

- The response simply conveys, to the SAT, the information that the main menu was received and set up on the user interface. It does not transmit any information about a selected item, like in the case of AT^SSTR.

  Once this command was executed the user can proceed as described in the AT^SSTR SAT Response - Setup Menu (37).

8.42 AT^SSTR SAT Response - Set Up Idle Mode Text (40)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command
AT^SSTR=40, <status>, , [, <statAddInfo>]
Response(s)
OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicates that the user has accepted the Set Up Idle Mode Text request.
4	Command performed successfully, but requested icon could not be displayed.
32	UE currently unable to process command
48	Command beyond UE's capabilities
132	UE currently unable to process command because screen is busy

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

8.43 AT^SSTR SAT Response - Language Notification (53)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed. The TE indicates whether the Language Notification command was correctly executed.

Syntax

Write Command

AT^SSTR=53, <status>, , [, <statAddInfo>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicates that the user has accepted the Language Notification request.

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

8.44 AT^SSTR SAT Response - Open Channel (64)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=64, <status>, , [, <statAddInfo>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicates that the user has accepted the Open Channel request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
32	UE currently unable to process command
48	Command beyond UE's capabilities
132	UE currently unable to process command because screen is busy

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

8.45 AT^SSTR SAT Response - Close Channel (65)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=65, <status>, , [, <statAddInfo>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicates that the user has accepted the Close Channel request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
32	UE currently unable to process command
48	Command beyond UE's capabilities
132	UE currently unable to process command because screen is busy

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

8.46 AT^SSTR SAT Response - Receive Data (66)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=66, <status>, , [, <statAddInfo>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicates that the user has accepted the Receive Data request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
32	UE currently unable to process command
48	Command beyond UE's capabilities
132	UE currently unable to process command because screen is busy

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

8.47 AT^SSTR SAT Response - Send Data (67)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

Syntax

Write Command

AT^SSTR=67, <status>, , [, <statAddInfo>]

Response(s)

OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully. Indicates that the user has accepted the Send Data request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
32	UE currently unable to process command
48	Command beyond UE's capabilities
132	UE currently unable to process command because screen is busy

<statAddInfo>(num)

Optional additional command status; for possible values refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].

0...255

8.48 AT^SSTR SAT Event - Menu Selection (211)

The TE specifies the user's selection of an item from the main menu, which was set up using SETUP MENU command. Alternatively help can be requested.

Syntax

Write Command
AT^SSTR=211, <status>, <itemId>
Response(s)
OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<status>(num)

0...255

0	Command performed successfully.
19	Help information required by the user, no other value can be returned.

<itemId>(num)

ID of selected item

0...255

8.49 AT^SSTR SAT Event - User Activity (232)

Sent by the customer application to indicate that a key has been pressed.

Syntax

Write Command
AT^SSTR=232
Response(s)
OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

8.50 AT^SSTR SAT Event - Idle Screen Available (233)

Sent by the customer application to indicate that the screen has become idle.

Syntax

Write Command
AT^SSTR=233
Response(s)
OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

8.51 AT^SSTR SAT Event - Language Selection (235)

Sent by the customer application to indicate that the customer application has changed the language.
The last value given via this command is also provided to the SIM as response to the proactive command "Provide Local Information (Language Setting)".

Syntax

Write Command

`AT^SSTR=`235, , , `<inputString>`

Response(s)

`OK`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

`<inputString>`(str)

Two character language tag, e.g. "en" for English or "de" for German. Default value is "en".

8.52 AT^SSTR SAT Event - Browser Termination (236)

Sent by the customer application to indicate that the internet browser application has been terminated.

Syntax

Write Command

`AT^SSTR=236, , , <TermCause>`

Response(s)

`OK`

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

`<TermCause>`(num)

Browser Termination Cause

0...255

0	User termination
1	Error termination

8.53 AT^SSTR SAT Event - Terminate Command (254)

This command allows the TE to finish an ongoing proactive command session. As a result, the UE will attempt to return to IDLE mode. This is done by sending repeatedly a Terminal Response ("ME currently unable to process command") to the SIM (see 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20]), if issued in states PAC or WAIT. No action is performed if the interface is already in IDLE state, however, the command returns "OK".
The reaction to the Terminal Response depends on the SIM application: The UE may either be kept in IDLE state or requested to perform another action.

Syntax

Write Command
AT^SSTR=254
Response(s)
OK

PIN	MDM	APP	✈	Last
-	+	+	+	-

8.54 Examples for Using Remote-SAT

To give you an idea of how to start and use Remote-SAT, you may follow the steps described below:

// Start after switch on the module
at
OK

// Switch on verbose error messages
at+cmee=2
OK

// Enter the PIN code (if necessary due to SIM configuration)
at+cpin=1234
OK

// Query the Remote-SAT activation status
at^ssta?
^SSTA: 1,0,1,"FFFFFFFF7F1F00DFFF00001FE20000000360",300,1 for USIM (3G)
or
^SSTA: 1,0,1,"7FFFFFFF7F0F00DFFF00001FE200000003",300,1 for SIM (2G).
OK
// First '1' indicates that the interface is in OFF state, i.e. the Automatic Response (AR) mode is enabled. During this mode all SAT Proactive Commands are handled internally by the UE.

// Tell the module that the TE is interested in handling SAT, i.e. switch to Explicit Response (ER) mode.
at^ssta=1,0
OK

// This setting takes effect after next start of the UE only, so switch off first
AT^SMSO
OK

// Switch on UE again

// Switch on verbose error messages
at+cmee=2
OK

// Enter the PIN code (if necessary due to SIM configuration)
at+cpin=1234
OK

// Receiving the first proactive command (if the mounted SIM carries a SIM Application)
^SSTN:37

// Requesting parameter details
at^sstgi=37

// These are the details:
^SSTGI: 37,0,3,"SAT Special Menu",0,1,1,0
^SSTGI: 37,1,"News",0,0
^SSTGI: 37,2,"EMail",0,0
^SSTGI: 37,3,"Banking",0,0

OK

// To query the status of the proactive command
at^sstr=37,0

OK

// SAT indicates that the proactive session has ended and enters its main menu (which should then be opened on the screen by an MMI): ^SSTN:254

// Selecting item number 1 of the menu sent before:
at^sstr=211,0,1

OK

// Receiving the next proactive command:
^SSTN:36

// Requesting more information...
at^sstgi=36

// ... and get it:
^SSTGI: 36,0,12,"Rubriken >",0,0,1,1,0
^SSTGI: 36,1,"News >",0,0
^SSTGI: 36,2,"Stock Infos>",0,0
^SSTGI: 36,3,"Aktien D >",0,0
^SSTGI: 36,4,"Aktien INT >",0,0
^SSTGI: 36,5,"Sports >",0,0
^SSTGI: 36,6,"1.BL-Clubs >",0,0
^SSTGI: 36,7,"Unterhaltung>",0,0
^SSTGI: 36,8,"Horoskop >",0,0
^SSTGI: 36,9,"Wetter D >",0,0
^SSTGI: 36,10,"Wetter INT >",0,0
^SSTGI: 36,11,"Wetter spez>",0,0
^SSTGI: 36,63,"Extras >",0,0

OK

// Remember to acknowledge:
at^sstr=36,0,63

OK

// And again: Receiving the next proactive command:
^SSTN:36
// ...

Examples

EXAMPLE 1

```
// Switch on verbose error messages
at+cmee=2
OK
```

EXAMPLE 2

```
// Enter the PIN code
at+cpin=1234
OK
```

EXAMPLE 3

```
// Start Remote-SAT
at^ssta=1,0
OK
```

EXAMPLE 4

```
// Proactive command "GET INKEY" is issued by the SIM
^SSTN: 34
```

EXAMPLE 5

```
// Get complete data
at^sstgi=34
^SSTGI: 34,0,"<COLOUR-ICON>",1,2
OK
```

EXAMPLE 6

```
// Use GET RESPONSE command (192) to analyze SIM file EF-IMG (hex. 4F20)
at+crsm=192,20256,0,0,15
+CRSM: 144,0,000000644F20040014F04401020114
OK
```

EXAMPLE 7

```
// Use READ RECORD command (178) to get its content
at+crsm=178,20256,2,4,20
+CRSM: 144,0,010808214F0200000016FFFFFFFFFFFFFFFFFFFF
OK
```

EXAMPLE 8

```
// Use READ BINARY command (176) to get content of image instance data file (e.g. hex 4F02)
at+crsm=176,20226,0,0,22
+CRSM: 144,0,080802030016AAAA800285428142814281528002AAAA
OK

at+crsm=176,20226,0,22,9
+CRSM: 144,0,FF000000FF000000FF
OK
```

EXAMPLE 9

```
// Finalize Proactive Command session
at^sstr=34,0,,"+"
OK
```

EXAMPLE 10

```
// Session end indication, i.e. display SAT main menu
^SSTN: 254
```

9. Short Message Service (SMS) Commands

The AT Commands described in this chapter allow an external application to use the Short Message Service with the PLAS9-W.

9.1 SMS parameters

This section provides an overview of parameters included in SMS related AT commands and lists references to 3GPP TS specifications.

Parameter Description

`<ackpdu>`(num)

Format is same for `<pdu>` in case of SMS, but without 3GPP TS 24.011 [37] SC address field and parameter shall be bounded by double quote characters like a normal string type parameter.

`<ct>`(num)

Command Type

3GPP TS 23.040 [34] TP-Command-Type in integer format

[0]...255

`<da>`(str)(+CSCS)

Destination Address

3GPP TS 23.040 [34] TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters; type of address given by `<toda>`

`<data>`(num)(+CSCS)

User Data (in text mode)

In case of SMS: 3GPP TS 23.040 [34] TP-User-Data in text mode responses; format:

- If `<dcs>` indicates that 3GPP TS 23.038 [33] default alphabet is used and `<fo>` indicates that 3GPP TS 23.040 [34] TP-User-Data-Header-Indication is not set: UE converts GSM alphabet into current TE character set according to rules covered in Annex A.
- If `<dcs>` indicates that 8-bit or UCS2 data coding scheme is used, or `<fo>` indicates that 3GPP TS 23.040 [34] TP-User-Data-Header-Indication is set: UE converts each 8-bit octet into hexadecimal numbers con-taining two IRA characters (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65).

In case of CBS: 3GPP TS 23.041 [35] CBM Content of Message in text mode responses; format:

- If `<dcs>` indicates that 3GPP TS 23.038 [33] default alphabet is used: UE converts GSM alphabet into current TE character set according to rules covered in Annex A.
- If `<dcs>` indicates that 8-bit or UCS2 data coding scheme is used: UE converts each 8-bit octet into hexa-decimal numbers containing two IRA characters.

`<dt>`(num)

Discharge Time

Parameter for Status Reports: 3GPP TS 23.040 [34] TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss+zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. For example, 6th of May 1994, 22:10:00 GMT+2 hours equals "94/05/06,22:10:00+08"

<ieia>(num)

IEIa (Information Element Identifier octet) of the concatenated SMS.

8	Concatenated short messages, 8-bit reference number
16	Concatenated short messages, 16-bit reference number

<index>(num)

Integer type; value in the range of location numbers supported by the associated memory.

<length>(num)

Message Length

For PDU mode (<mode>=0):
Integer type value indicating in PDU mode (AT+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length).

For Text mode (<mode>=1):
In Text mode the value of the <length> parameter depends on the <dcs>parameter in following way:

- If <dcs> indicates that GSM 7 bit default alphabet is used: every character counts as 1, i.e. for "ABC" <length>= 3.
- If <dcs> indicates that 8-bit data coding scheme is used: every coded character (2 IRA characters) counts as 1, i.e. for "414243" (= "ABC") <length>= 3.
- If <dcs> indicates that UCS2 data coding scheme is used: every coded character (4 IRA characters) counts as 1, i.e. for "004100420043" (= "ABC") <length>= 3.

For concatenated SMS messages the maximum length will be reduced by the length of the user data header with respect to <ieia> (6 bytes for <ieia>=8 and 7 bytes for <ieia>=16). In the case of 8-bit data, the maximum length of the short message field is: 140 octets - (6 or 7) = 134 or 133. In the case of GSM 7 bit default alphabet data, the maximum length of the short message is (140 - (6 or 7))*8/7 = 153 or 152 characters. In the case of 16 bit UCS2 data, the maximum length of the short message is: (140 - (6 or 7))/2)= 67 or 66 characters.

<max>(num)

Maximum number of all segments to be concatenated into one SMS, beginning with 1.
<max>=0 means: ignore the value. This will result in a non-concatenated SMS.

0...255

<mem1>(str)(NV)

Memory to be used when listing, reading and deleting messages:

“SM“	SIM message storage
“ME“	UE message storage
“MT“	Same as "ME" storage
“SR“	Status report storage Received status reports are not stored by the module. Therefore, AT+CMGR, AT+CMGL, AT^SMGR, AT^SMGL commands will show only status reports previously stored to the "SR" memory.

<mem2>(str)(NV)

Memory to be used when writing and sending messages:

“SM“	SIM message storage
“ME“	UE message storage

“MT“	Same as "ME" storage
“SR“	Status report storage

`<mem3>`(str)(NV)

Received messages will be placed in this memory storage if routing to TE is not set. See command `AT+CNMI` with parameter `<mt>`=2.

“SM“	SIM message storage
“ME“	UE message storage
“MT“	Same as "ME" storage
“SR“	Status report storage

`<mid>`(num)

Message Identifier

3GPP TS 23.041 [35] CBM Message Identifier in integer format

`<mn>`(num)

Message Number

3GPP TS 23.040 [34] TP-Message-Number in integer format

`<mr>`(num)

Message Reference

3GPP TS 23.040 [34] TP-Message-Reference in integer format

`<oa>`(str)(+CSCS)

Originating Address

3GPP TS 23.040 [34] TP-Originating-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters; type of address given by `<tooa>`

`<page>`(num)

Page Parameter

3GPP TS 23.041 [35] CBM Page Parameter bits 4-7 in integer format

`<pages>`(num)

Page Parameter

3GPP TS 23.041 [35] CBM Page Parameter bits 0-3 in integer format

`<pdu>`(num)

In the case of SMS: 3GPP TS 24.011 [37] SC address followed by 3GPP TS 23.040 [34] TPDU in hexadecimal format: UE converts each octet of TP data unit into hexadecimal numbers containing two IRA characters (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)). In the case of CBS: `<ra>` 3GPP TS 23.040 [34] TP-Recipient-Address Ad-dress-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted into characters; type of address given by `<tora>`

`<ra>`(str)(+CSCS)

Recipient Address

3GPP TS 23.040 [34] TP-Recipient-Address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (refer to command `AT+CSCS`.); type of address given by `<tora>`

<ref>(num)

Reference number to identify all segments of the concatenated SMS (i.e. the number needs to be the same for each segment).

0...255	8 bit reference number <ieia>=8
0...65535	16 bit reference number <ieia>=16

<sca>(str)(+CSCS)(NV)

Service Center Address

3GPP TS 24.011 [37] RP SC address Address-Value field in string format; BCD numbers (or GSM default alphabet characters) are converted to characters of the currently selected TE character set (refer to command AT+CSCS); type of address given by <tosca>

<scts>(num)

Service Centre Time Stamp

3GPP TS 23.040 [34] TP-Service-Centre-Time-Stamp in time-string format (refer <dt>)

<seq>(num)

Sequence number of the concatenated SMS beginning with 1. The number must be incremented by one for each segment of the concatenated short message.
<seq>=0 means: ignore the value. This will result in a non-concatenated SMS.

0...255

<sn>(num)

Serial Number

3GPP TS 23.041 [35] CBM Serial Number in integer format

<st>(num)

Status

3GPP TS 23.040 [34] TP-Status in integer format for Status Report

0...255

<stat>(str)

Message status

3GPP 27.005 Interface of SMS and CB. Indicates the status of message in memory.

Description	text mode (<mode>=1)	PDU mode (<mode>=0)	Default
Received unread messages	"REC UNREAD"	0	for SMS reading commands
Received read messages	"REC READ"	1	
Stored unsent messages	"STO UNSENT"	2	for SMS writing commands
Stored sent messages	"STO SENT"	3	
All messages	"ALL"	4	

<toda>(num)

Type of Destination Address

3GPP TS 24.011 [37] TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129)

0...255

<tooa>(num)

Type of Originating Address

3GPP TS 24.011 [37] TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>)

<tora>(num)

Type of Recipient Address

3GPP TS 24.011 [37] TP-Recipient-Address Type-of-Address octet in integer format (default refer <toda>)

<tosca>(num)

Type of Service Center Address

3GPP TS 24.011 [37] RP SC address Type-of-Address octet in integer format (default refer <toda>)

9.2 AT+CMGC Send an SMS command

Syntax

Test Command

AT+CMGC=?

Response(s)

OK

Write Command

If text mode (see AT+CMGF=1)

AT+CMGC=<fo>, <ct>[, <pid>[, <mn>[, <da>[, <toda>]]]]<CR> Text can be entered <CTRL-Z>/<ESC>

Response(s)

+CMGC: <mr>[, <scts>]
If sending fails
ERROR
+CMS ERROR: <err>

Write Command

If PDU mode (see AT+CMGF=0)

AT+CMGC=<length><CR> PDU can be entered <CTRL-Z>/<ESC>

Response(s)

+CMGC: <mr>[, <ackpdu>]
OK
ERROR
+CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	-	-

Reference(s)

3GPP TS 27.005 [44]

Note

- After invoking the commands AT+CMGW, AT+CMGS or AT+CMGC it is necessary to wait for the prompt ">" before entering text or PDU.

9.3 AT+CMGD Delete short message

The AT+CMGD write command deletes a short message from the preferred message storage <mem1> location <index>.

Syntax

Test Command

AT+CMGD=?

Response(s)

+CMGD: (list of used <index>s)
OK

Write Command

AT+CMGD=<index>

Response(s)

OK
ERROR
+CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.005 [44]

Notes

- To delete multiple SMS please use concatenated AT+CMGD=<index> commands, for example AT+CMGD=1;+CMGD=17;+CMGD=55. Note that a single concatenated command line supports max. 1000 characters.
- If there is no short message stored at the selected index, the response is OK too.
- Users should be aware that error will occur when using this AT command quickly after SIM PIN authentication due to the fact the SIM data may not yet be accessible.

9.4 AT+CMGF Select SMS message format

The AT+CMGF command specifies the input and output format of the short messages.

Syntax

Test Command

```
AT+CMGF=?
```

Response(s)

```
+CMGF: (list of supported<mode>s)
OK
```

Read Command

```
AT+CMGF?
```

Response(s)

```
+CMGF: <mode>
OK
```

Write Command

```
AT+CMGF=<mode>
```

Response(s)

```
OK
```

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.005 [44]

Parameter Description

<mode>(num)(&V)(&W)	
[0](&F)	PDU mode
1	Text mode

9.5 AT+CMGL List SMS messages from preferred store

The write command returns messages with status value <stat> from message storage <mem1> to the TE. If the status of the message is 'received unread', the status in the storage changes to 'received read'.
The execute command is the same as the write command with the given default for <stat>.

Syntax

Test Command

AT+CMGL=?

Response(s)

+CMGL: (list of supported <stat>s)
OK

Exec Command

AT+CMGL

Response(s)

+CMGL: (see write command for default of <stat>)
OK

Write Command

AT+CMGL=<stat>

Response(s)

Output if text mode (AT+CMGF=1) and command successful:
For SMS- SUBMITs and/or SMS-DELIVERs
+CMGL: <index>, <stat>, <oa>/<da>, , [<scts>][, <tooa>/<toda>, <length>]
<data>
[...]
OK

For SMS-Commands
+CMGL: <index>, <stat>, <fo>, <ct>
[...]
OK

Output if PDU mode AT+CMGF=0 and command successful:
For SMS-SUBMITs and/or SMS-DELIVERs
+CMGL: <index>, <stat>, , <length>
<pdu>
[...]
OK

If error is related to ME functionality
ERROR
+CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.005 [44]

Notes

- The selected <mem1> can contain different types of SMs (e.g. SMS-DELIVERs, SMS-SUBMITs and SMS-COMMANDs), the response may be a mix of the responses of different SM types. TE application can recognize the response format by examining the third response parameter.
- Users should be aware that error will occur when using this AT command quickly after SIM PIN authentication due to the fact the SIM data may not yet be accessible.
- Status reports are not stored by the module and therefore are not displayed by AT+CMGR and AT+CMGL commands.

9.6 AT+CMGR Read SMS messages

The write command returns SMS message with location value <index> from message storage <mem1> to the TE. If status of the message is 'received unread', status in the storage changes to 'received read'.

Syntax

Test Command

AT+CMGR=?

Response(s)

OK

Write Command

AT+CMGR=<index>

Response(s)

Output if text mode (AT+CMGF=1) and command successful:
For SMS-DELIVER

+CMGR: <stat>, <oa>, , <scts>[, <tooa>, <fo>, <pid>, <dcs>, <sca>, <tosca>, <length>]
<data>
[...]
OK

For SMS-SUBMIT

+CMGR: <stat>, <da>, [, <toda>, <fo>, <pid>, <dcs>, [<vp>], <sca>, <tosca>, <length>]
<data>
[...]
OK

For SMS-Commands

+CMGR: <stat>, <fo>, <ct>[, <pid>[<mn>], [<da>], [<toda>], <length>
<data>]
[...]
OK

Output if PDU mode (AT+CMGF=0) and command successful:
For SMS-SUBMITs and/or SMS-DELIVERs

+CMGR: <stat>, , <length>
<pdu>
[...]
OK
ERROR
+CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.005 [44]

Notes

- If AT+CMGR is used to read an empty record the response is: OK.
- If AT+CMGR is used to read a non-existent record index the response is: "+CMS ERROR: 321" (invalid memory index).
- Users should be aware that error will occur when using this AT command quickly after SIM PIN authentication due to the fact the SIM data may not yet be accessible.
- Status reports are not stored by the module and therefore are not displayed by AT+CMGR and AT+CMGL commands.

9.7 AT+CMGS Send Short Message

The write command transmits a short message from TE to network (SMS-SUBMIT).
After invoking the write command wait for the prompt ">" and then start to write the message. To send the message simply enter <CTRL-Z>.
To abort sending use <ESC>. Abortion is acknowledged with "OK", though the message will not be sent.
The message reference <mr> is returned to the TE on successful message delivery. The value can be used to identify the message in a delivery status report provided as an unsolicited result code.

Syntax

Test Command

AT+CMGS=?

Response(s)

OK

Write Command

If text mode (see AT+CMGF=1)

AT+CMGS=<da>[, <toda>]<CR> Text can be entered. <CTRL-Z>/<ESC>

Response(s)

+CMGS: <mr>[, <scts>]
OK
ERROR
+CMS ERROR: <err>

Write Command

If PDU mode (see AT+CMGF=0)

AT+CMGS=<length><CR> PDU can be entered. <CTRL-Z>/<ESC>

Response(s)

+CMGS: <mr>[, <ackpdu>]
OK
ERROR
+CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	-	-

Reference(s)

3GPP TS 27.005 [44]

Notes

- Note that some providers do not recognize an @ symbol used in a short message. A widely used alternative is typing "*" as defined in 3GPP TS 23.040 [34].
- Message Length in Text Mode:
  The maximum length of a short message depends on the used coding scheme: It is 160 characters if the 7 bit GSM coding scheme is used, and 140 characters according to the 8 bit GSM coding scheme.

9.8 AT+CMGW Write Short Messages to Memory

The execute and write commands transmit a short message (either SMS-DELIVER or SMS-SUBMIT) from TE to memory storage <mem2>. Memory location <index> of the stored message is returned. Message status will be set to 'stored unsent' unless otherwise given in parameter <stat>.
After invoking the execute or write command wait for the prompt ">" and then start to write the message. To save the message simply enter <CTRL-Z>.
To abort writing use <ESC>. Abortion is acknowledged with "OK", though the message will not be saved.

Syntax

Test Command

AT+CMGW=?

Response(s)

OK

Exec Command

If text mode (see AT+CMGF=1):

AT+CMGW

Response(s)

<CR> Text can be entered. <CTRL-Z>/<ESC>
+CMGW: <index>
OK
ERROR
+CMS ERROR: <err>

Write Command

If text mode (see AT+CMGF=1):

AT+CMGW=<oa>/<da>[, [<tooa>/<toda>][, <stat>]]<CR> Text can be entered. <CTRL-Z>/<ESC>

Response(s)

+CMGW: <index>
OK
ERROR
+CMS ERROR: <err>

Write Command

If PDU mode (see AT+CMGF=0):

AT+CMGW=<length>[, <stat>]<CR> PDU can be entered. <CTRL-Z>/<ESC>

Response(s)

+CMGW: <index>
OK
If writing fails see notes below.

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.005 [44]

Notes

- Note that some providers do not recognize an @ symbol used in a short message. A widely used alternative is typing "*" as defined in 3GPP TS 23.040 [34].
- Message Length in Text Mode:
  The maximum length of a short message depends on the used coding scheme: It is 160 characters if the 7 bit GSM coding scheme is used, and 140 characters according to the 8 bit GSM coding scheme.

9.9 AT+CMSS Send short messages from storage

The write command sends message with location value <index> from message storage <mem2> to the network (SMS-SUBMIT or SMS-COMMAND).
If new recipient address <da> is given for SMS-SUBMIT, it shall be used instead of the one stored with the message. Reference value <mr> is returned to the TE on successful message delivery. Value can be used to identify message upon unsolicited delivery status report result code.
If the optional parameter <da> is given, the old status of the short message at <index> remains unchanged (see <stat>).

Syntax

Test Command

AT+CMSS=?

Response(s)

OK

Write Command

If text mode (AT+CMGF=1):

AT+CMSS=<index>[, <da>[, <toda>]]

Response(s)

+CMSS: <mr>[, <scts>]
OK
If sending fails
ERROR
+CMS ERROR: <err>

Write Command

If PDU mode (AT+CMGF=0):

AT+CMSS=<index>[, <da>[, <toda>]]

Response(s)

+CMSS: <mr>[, <ackpdu>]
OK
ERROR
+CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	-	-

Reference(s)

3GPP TS 27.005 [44]

9.10 AT+CNMA New Message Acknowledgement to UE/TE

The AT+CNMA write and execute commands confirm successful receipt of a new message (SMS-DELIVER or SMS-STATUS-REPORT) routed directly to the TE. If the PLAS9-W does not receive acknowledgement within required time (network timeout), it sends an "RP-ERROR" message to the network. The UE will automatically disable routing to the TE by setting both <mt> and <ds> values of AT+CNMI to zero.

Please see AT^SCFG subcommand "Sms/AutoAck", parameter <SmsAcknl>, for options of automatically acknowledging incoming short messages rather than using AT+CNMA.

Syntax

Test Command
AT+CNMA=?
Response(s)
+CNMA: (list of supported <n>s) OK

Exec Command
AT+CNMA
Response(s)
OK ERROR +CMS ERROR: <err>

Write Command
AT+CNMA=<n>
Response(s)
OK ERROR +CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	-	-

Reference(s)
3GPP TS 27.005 [44]

Parameter Description

<n>(num)

Parameter required only for PDU mode.

0	Command operates similarly as in text mode.
1	Send positive (RP-ACK) acknowledgement to the network. Accepted only in PDU mode.
2	Send negative (RP-ERROR) acknowledgement to the network. Accepted only in PDU mode.

Note

- Execute and write command shall only be used when AT+CSMS parameter <service> equals 1 (= phase 2+) and an appropriate URC has been issued by the module, i.e.:
  "+CMT" for <mt>=2 incoming message classes 0,1,3 and none;
  "+CMT" for <mt>=3 incoming message classes 0 and 3;
  "+CDS" for <ds>=1.

9.11 AT+CNMI SMS Event Reporting Configuration

AT+CNMI controls details of the SMS related URC presentation. It selects the procedure how the receipt of a new SMS from the network is indicated to the TE when TE is active.
The rules <mt>=2 and <mt>=3 for storing received messages are possible only if phase 2+ compatibility is activated with AT+CSMS=1. The parameter <ds>=1 is also only available in phase 2+.

Syntax

Test Command

AT+CNMI=?

Response(s)

+CNMI: (list of supported<mode>s), (list of supported <mt>s), (list of supported <bm>s), (list of supported <ds>s), (list of supported <bfr>s)
OK

Read Command

AT+CNMI?

Response(s)

+CNMI: <mode>, <mt>, <bm>, <ds>, <bfr>
OK

Write Command

AT+CNMI=[[<mode>][[, <mt>][[, <bm>][[, <ds>][[, <bfr>]]]]]]

Response(s)

OK
ERROR
+CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.005 [44]

Unsolicited Result Codes

URC 1

<mt>=1,2 or 3 - indication only (text and PDU mode):

+CMTI: <mem3>, <index>

Indicates that new message has been received

URC 2

<mt>=1,2 or 3 - directly routed message (PDU mode enabled):

+CMT: <length><CR><LF><pdu>

Indicates that new message has been received

URC 3

<mt>=1,2 or 3 - directly routed message (text mode enabled):

+CMT: <oa>, , <scts>[, <tooa>, <fo>, <pid>, <dcs>, <sca>, <tosca>, <length>]<CR><LF><data>

Indicates that new message has been received

URC 4

<bm>=2 (PDU mode enabled):

+CBM: <length><CR><LF><pdu>

Indicates that new cell broadcast message has been received

URC 5

<bm>=2 (text mode enabled):

+CBM: <sn>, <mid>, <dcs>, <page>, <pages><CR><LF><data>

Indicates that new cell broadcast message has been received

URC 6

<ds>=1 (PDU mode enabled):

+CDS: <length><CR><LF><pdu>

Indicates that new SMS status report has been received

URC 7

<ds>=1 (text mode enabled):

+CDS: <fo>, <mr>[, <ra>][, <tora>], <scts>, <dt>, <st>

Indicates that new SMS status report has been received

Parameter Description

<mode>(num)(&V)(&W)	
0(&F)(D)	SMS related URCs are always buffered in the UE. If the buffer is full, the oldest indications are discarded and replaced with newly received indications.
1	SMS related URCs are forwarded directly to the TE. However, if this is not possible because UE-TE link is reserved, e.g. during a data call, these URCs are discarded.
2	SMS related URCs are forwarded directly to the TE. However, if this is not possible because UE-TE link is reserved these URCs are buffered and flushed to the TE afterwards. Additionally, while UE-TE link is reserved, buffered URCs can be signaled to the TE by activating the RING line, according to parameters AT^SCFG "URC/Ringline" <urcRinglineCfg> and AT^SCFG "URC/Ringline/ActiveTime" <urcRinglineDuration>.

<mt>(num)(&V)(&W)	
Rules for storing received short messages depend on the relevant data coding method (refer to 3GPP TS 23.038 [33]), preferred memory storage setting (AT+CPMS) and this value.	
0(&F)(D)	No SMS-DELIVER indications are routed to the TE.
1	Class 0 SMS-DELIVERs are routed directly to the TE via URC. For all other messages the following applies: If SMS-DELIVER is stored in UE, indication of the memory location is routed to the TE via URC.
2	SMS-DELIVERs, except class 2 messages and messages in the message waiting indication group (store message) are routed directly to the TE via URC. Class 2 messages and messages in the message waiting indication group (store message) result in indication as defined for <mt>=1
3	Class 0 and 3 SMS-DELIVERs are routed directly to the TE via URCs defined in <mt>=2. Messages of other data coding schemes result in indication as defined in <mt>=1.

<bm>(num)(&V)(&W)

Rules for storing received CBMs depend on the relevant data coding method (refer to 3GPP TS 23.038 [33]), the setting of Select CBM Types (AT+CSCB) and this value:

0(&F)(D)	No CBM indications are routed to the TE.
2	New CBMs are routed directly to the TE via URC.

<ds>(num)(&V)(&W)

0(&F)(D)	No SMS-STATUS-REPORTs are routed to the TE. Also see notes.
1	SMS-STATUS-REPORTs are routed to the TE via URC.

<bfr>(num)(&V)(&W)

1(&F)(D)	UE's buffer of SMS related URCs is cleared when <mode> changes from 0 to 1, 2.

<index>(num)

Integer type; value in the range of location numbers supported by the associated memory

Notes

- With <mt>=2,3 and <ds>=1 messages routed directly to the TE (either short messages or status reports) have to be acknowledged with AT+CNMA. To do this, GSM Phase 2+ has to be enabled (see AT+CSMS).
- If Phase 2+ is enabled and either a short message or a status report is not acknowledged within the required time, then <mt> and <ds> will be set to zero. See AT+CNMA for further detail.
- Received status reports are not stored by the module. Therefore, AT+CMGR, AT+CMGL, AT^SMGR, AT^SMGL commands will show only status reports previously stored to the "SR" memory.

9.12 AT+CPMS Preferred SMS message storage

The AT+CPMS write command selects memory storages <mem1>,<mem2>, <mem3> to be used for reading, writing, etc.
The AT+CPMS test command lists the supported memory storages.
The AT+CPMS read command indicates the currently selected memory storages incl. the numbers of used and total entries.

Syntax

Test Command

AT+CPMS=?

Response(s)

+CPMS: (list of supported <mem1>s), (list of supported <mem2>s), (list of supported <mem3>s)
OK

Read Command

AT+CPMS?

Response(s)

+CPMS: <mem1>, <used1>, <total1>, <mem2>, <used2>, <total2>, <mem3>, <used3>, <total3>
OK
ERROR
+CMS ERROR: <err>

Write Command

AT+CPMS=<mem1>[, <mem2>[, <mem3>]]

Response(s)

+CPMS: <used1>, <total1>, <used2>, <total2>, <used3>, <total3>
OK
ERROR
+CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.005 [44]

Parameter Description

<used1>(num)

Number of messages currently in <mem1>

<used2>(num)

Number of messages currently in <mem2>

<used3>(num)

Number of messages currently in <mem3>

<total1>(num)

Number of messages storable in <mem1>

<total2>(num)

Number of messages storable in <mem2>

<total3>(num)

Number of messages storable in <mem3>

Notes

- The Mobile Equipment storage "ME" offers space for 255 short messages, see <mem1>.
- Incoming Class 1 short messages (ME specific) will be preferably stored to "ME" and may be transferred to the "SM" storage if "ME" is used up.
  Incoming Class 2 messages (SIM specific) will be stored to the SIM card only, no matter whether or not there is free "ME" space. For more information regarding SIM and ME specific message classes refer to parameter <dcs> and the following specification: 3GPP TS 23.038 [33].
- While <mem3> equals "SM" and <mem1> equals "ME" it is possible that, after deleting short messages from "ME", the freed space on "ME" is reclaimed for new incoming short messages, when there is no space left on the "SM" storage. As it is often the clients concern to have received short messages stored only to the SIM card, inconsistent settings should be generally avoided. This can be achieved simply by using the same memory for all parameters.
- Users should be aware that error will occur when using this AT command quickly after SIM PIN authentication due to the fact the SIM data may not yet be accessible.

9.13 AT+CSCA SMS Service Center Address

Write command updates the SMSC address, through which mobile originated SMs are transmitted. In text mode, setting is used by send and write commands. In PDU mode, setting is used by the same commands, but only when the length of the SMSC address coded into the <pdu> parameter equals zero.

Syntax

Test Command

```
AT+CSCA=?
```

Response(s)

```
OK
```

Read Command

```
AT+CSCA?
```

Response(s)

```
+CSCA: <sca>, <tosca>
OK
```

Write Command

```
AT+CSCA=<sca>[, <tosca>]
```

Response(s)

```
OK
```

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.005 [44]

Notes

- The SMS service center address should be entered as specified by the service provider.
- An empty string ("") for <sca> is not accepted and denied with error.

9.14 AT+CSCB Select Cell Broadcast Message Indication

The test command returns the supported <operation>s as a compound value.
The read command displays the accepted message types.
Depending on the <operation> parameter, the write command adds or deletes the message types accepted by the ME.

Syntax

Test Command

AT+CSCB=?

Response(s)

+CSCB: (list of supported <operation>s)
OK
ERROR
+CMS ERROR: <err>

Read Command

AT+CSCB?

Response(s)

+CSCB: <operation>, <mids>, <dcss>
OK
ERROR
+CMS ERROR: <err>

Write Command

AT+CSCB=[<operation>[, <mids>[, <dcss>]]]

Response(s)

OK
ERROR
+CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.005 [44]

Parameter Description

<operation>(num)

Add/delete operation

0(&F)(P)	Add new message types defined in <mids> to the list of accepted message types by ME and replace types defined in <dcss>. In case of using this operation code without parameters default (0-65535) range will be added to the list of <mids>.
1	Delete message types defined in <mids> from the list of accepted message types by ME and replace types defined in <dcss>. In case of using this operation code without parameters all <mids>s will be deleted. (for more see notes)

<mids>(str)(NV)

Cell Broadcast Message ID specification

All different possible combinations of CBM message identifiers; e.g. "0,1,5,320-478,922". Maximum length of the input string in the AT+CSCB write command is 50 characters (including ',' as separator and '-' in ranges).

""(D)

<dcss>(str)

CBM data coding scheme specification

All different possible combinations of CBM data coding schemes (e.g. "0-3,5"). Maximum length of the string is 50 characters (including ',' as separator and '-' in ranges). A given <dcss> replaces any former value and is used for consecutive requests.

""(&F)(P)

Default is empty string and if it is used all CBMs are received independent of their dcss.

Note

- The <operation> parameter shown in the AT+CSCB read command response retains the value last used in the write command. This way, the read command response always reflects the last action done: 0 means that the last action was adding new channel(s), 1 means that the last action was deleting channel(s).

9.15 AT+CSDH Show SMS text mode parameters

The write command sets whether or not detailed header information is shown in text mode result codes.

Syntax

Test Command

AT+CSDH=?

Response(s)

+CSDH: (list of supported <show>s)
OK

Read Command

AT+CSDH?

Response(s)

+CSDH:<show>
OK

Write Command

AT+CSDH=<show>

Response(s)

OK

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.005 [44]

Parameter Description

<show>(num)(&V)(&W)

0(&F)(D)	Do not show header values defined in commands AT+CSCA and AT+CSMP (<sca>, <tosca>,<fo>,<vp>, <pid> and <dcs>) nor <length>, <toda> or <tooa> in "+CMT", AT+CMGL, AT+CMGR result codes for SMS-DELIVERs and SMS-SUBMITs in text mode; for SMS-COMMANDs in +CMGR result code, do not show <pid>,<mn>,<da>, <toda>, <length>
1	Show the values in result codes

9.16 AT+CSMP Set SMS Text Mode Parameters

AT+CSMP controls additional parameters needed when an SMS is sent to the network or placed in a storage if text format message mode is selected.
It is possible to set the validity period starting from the time when the short message is received by the SMSC (<vp> is in the range 0... 255) or define an absolute time for validity period termination (<vp> is a string). The format of <vp> is given by <fo>. The enhanced validity period format is given as hexadecimal coded string (e.g. <pdu>) with quotes.

Syntax

Test Command

```
AT+CSMP=?
```

Response(s)

```
OK
```

Read Command

```
AT+CSMP?
```

Response(s)

```
+CSMP:<fo>, <vp>/ <scts>, <pid>, <dcs>
OK
```

Write Command

```
AT+CSMP=[<fo>[, <vp>/<scts>[, <pid>[, <dcs>]]]]
```

Response(s)

```
OK
ERROR
+CMS ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.005 [44]

Parameter Description

<fo>(num)

First Octet

Depending on the command or result code: First octet of 3GPP TS 23.040 [34] SMS-DELIVER, SMS-SUBMIT, SMS-STATUS-REPORT, or SMS-COMMAND in integer format. If a valid value has been entered once, parameter can be omitted.

0...17(&F)(P)...255

<vp>(num)

Validity Period

Depending on SMS-SUBMIT <fo> setting: 3GPP TS 23.040 [34] TP-Validity-Period either in integer format or in time-string format (refer <dt>).

0...167(&F)(P)...255

<pid>(num)(NV)

Protocol Identifier

3GPP TS 23.040 [34] TP-Protocol-Identifier in integer format.

0(&F)...255

<dcs>(num)(NV)

Data Coding Scheme

3GPP TS 23.038 [33] SMS Data Coding Scheme, or Cell Broadcast Data Coding Scheme in integer format.

0(&F)...247 Compressed SMS are network dependent and may not be supported properly.

Note

- When storing a SMS DELIVER from the TE to the preferred memory storage in text mode (using the AT+CMGW write command), <vp> field can be used for <scts>.

9.17 AT+CSMS Select Message Service

Syntax

Test Command

AT+CSMS=?

Response(s)

+CSMS: (list of supported<service>s)
OK

Read Command

AT+CSMS?

Response(s)

+CSMS: <service>, <mt>, <mo>, <bm>
OK

Write Command

AT+CSMS=<service>

Response(s)

+CSMS: <mt>, <mo>, <bm>
OK
ERROR
+CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.005 [44]

Parameter Description

<service>(num)(&V)(&W)

0(&F)	3GPP TS 23.040 [34] and 3GPP TS 23.041 [35] (the syntax of SMS AT commands is compatible with 3GPP TS 27.005 [44] Phase 2 version 4.7.0; Phase 2+ features which do not require new command syntax may be supported, e.g. correct routing of messages with new Phase 2+ data coding schemes)
1	3GPP TS 23.040 [34] and 3GPP TS 23.041 [35] (the syntax of SMS AT commands is compatible with 3GPP TS 27.005 [44] Phase 2+ version; the requirement of <service> setting 1 is mentioned under corresponding command descriptions).

<mt>(num)(&V)

Mobile Terminated Messages:

0	Type not supported
1	Type supported

<mo>(num)(&V)

Mobile Originated Messages:

0	Type not supported
1	Type supported

<bm>(num)(&V)

Broadcast Type Messages:

0	Type not supported
1	Type supported

Note

- Phase 2+ (<service>=1) must be set before acknowledging incoming short messages with AT+CNMA is possible. Acknowledgements are required for directly routed messages delivered using "+CMT" and "+CDS" URCs. Direct routing is used for certain message classes when <mt>=2, <mt>=3 or <ds>=1.

9.18 AT^SMGL List Short Messages from preferred store without setting status to REC READ

The write command allows to select a status type and lists, from the message storage <mem1>, all messages that currently have the specified <stat>. The major difference over the standard command AT+CMGL is that the status of the listed messages remains u n c h a n g e d (unread remains unread).
The execute command is the same as the write command, but uses the given default of <stat>.

Syntax

Test Command

AT^SMGL=?

Response(s)

same as AT+CMGL

Exec Command

AT^SMGL

Response(s)

^SMGL: (For default values of <stat>, see "Section 9.1, SMS parameters.)
OK

Write Command

AT^SMGL=<stat>

Response(s)

same as AT+CMGL

PIN	MDM	APP	✈	Last
+	+	+	+	-

Notes

- The selected <mem1> can contain different types of SMs (e.g. SMS-DELIVERs, SMS-SUBMITs and SMS-COMMANDs), the response may be a mix of the responses of different SM types. TE application can recognize the response format by examining the third response parameter.
- Users should be aware that when using this AT command quickly after SIM PIN authentication the SIM data may not yet be accessible, resulting in an error or a short delay before the requested AT command response is returned.

9.19 AT^SMGR Read short message without setting status to REC READ

The AT^SMGR command is a proprietary command which has the same syntax as AT+CMGR. The only functional difference is that the status "REC UNREAD" of a short message is not overwritten to "REC READ".

Syntax

Test Command
AT^SMGR=?
Response(s)
OK

Write Command
AT^SMGR=<index>
Response(s)
see AT+CMGR

PIN	MDM	APP	✈	Last
+	+	+	+	-

Note

- Users should be aware that when using this AT command quickly after SIM PIN authentication the SIM data may not yet be accessible, resulting in a short delay before the requested AT command response is returned.

9.20 AT^SSDA Set SMS Display Availability

AT^SSDA determines whether to display an incoming Class 0 short message directly to the user or to store it automatically in the SMS memory. This means, for Class 0 short messages, AT^SSDA overrides the AT+CNMI <mt> settings.
For all other short message classes AT^SSDA is not effective, i.e. they will be indicated as specified with AT+CNMI.

In case of Class 0 SMS, the <da> setting modifies the AT+CNMI functionality for <mt> as follows:

- If AT^SSDA=0:
  The UE handles Class 0 short messages as though there was no message class: SMS-DELIVER is stored in the UE and indication of the memory location is routed to the TE via URC. This approach is compliant with 3GPP TS 23.038 [33].
- If AT^SSDA=1:
  Class 0 SMS-DELIVERs are routed directly to the TE via URC.

Syntax

Test Command

```
AT^SSDA=?
```

Response(s)

```
^SSDA:(list of supported <da>s)
OK
```

Read Command

```
AT^SSDA?
```

Response(s)

```
^SSDA:<da>
OK
```

Write Command

```
AT^SSDA=<da>
```

Response(s)

```
OK
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<da>(num)(NV)

Display Availability

0	Application is not able to display incoming short message
1(&F)(D)	Application is able to display incoming short message

9.21 AT^SCML List Concatenated Short Messages from preferred store

The write command returns messages with status value <stat> from message storage <mem1> to the TE. If the status of the message is 'received unread', the status in the storage changes to 'received read'. The execute command is the same as the write command with the given default for <stat>. See notes of AT+CMGL.

Syntax

Test Command

AT^SCML=?

Response(s)

^SCML: (list of supported <stat>s)
OK

Exec Command

AT^SCML

Response(s)

^SCML: (see write command for default of <stat>)
OK

Write Command

AT^SCML=<stat>

Response(s)

Output if text mode (AT+CMGF=1) and command successful:
For SMS-SUBMITs and/or SMS-DELIVERs
^SCML: <index>, <stat>, <oa>/<da>, , [<scts>][, <tooa>/<toda>, <length>][, <seq>, <max>, <ieia>, <ref>]
<data>
[...]
OK

For SMS-STATUS-REPORTs
^SCML: <index>, <stat>, <fo>, <mr>, [<ra>], [<tora>], <scts>, <dt>, <st>
[...]
OK

For SMS-Commands
^SCML: <index>, <stat>, <fo>, <ct>
[...]
OK

Output if PDU mode (AT+CMGF=0) and command successful:
For SMS- SUBMITs and/or SMS-DELIVERs
^SCML: <index>, <stat>, , <length>
<pdu>
[...]
OK

If error is related to ME functionality
ERROR
+CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

9.22 AT^SCMR Read Concatenated Short Messages

The write command returns the message with location value <index> from message storage <mem1> to the TE. If the status of the message is 'received unread', the status in the storage changes to 'received read'. See notes of AT+CMGR.

Syntax

Test Command

AT^SCMR=?

Response(s)

OK

Write Command

AT^SCMR=<index>

Response(s)

Output if text mode (AT+CMGF=1) and command successful:
For SMS-DELIVER
^SCMR: <stat>, <oa>, , <scts>[, <tooa>, <fo>, <pid>, <dcs>, <sca>, <tosca>, <length>][, <seq>, <max>, <ieia>, <ref>]
<data>
[...]
OK

For SMS-SUBMIT
^SCMR: <stat>, <da>, [, <toda>, <fo>, <pid>, <dcs>, [<vp>], <sca>, <tosca>, <length>][, <seq>, <max>, <ieia>, <ref>]
<data>
[...]
OK

For SMS-STATUS-REPORT
^SCMR: <stat>, <fo>, <mr>, [<ra>], [<tora>], <scts>, <dt>, <st>
<data>
[...]
OK

For SMS-Commands
^SCMR: <stat>, <fo>, <ct>[, <pid>, [<mn>], [<da>], [<toda>], <length>]
<data>
[...]
OK

Output if PDU mode (AT+CMGF=0) and command successful:
For SMS-SUBMITs and/or SMS-DELIVERs
^SCMR: <stat>, , <length>
<pdu>
[...]
OK

ERROR
+CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

9.23 AT^SCMS Send Concatenated Short Messages

Sending a concatenated message is similar to sending a "normal" message, except that each segment of the concatenated message must be identified by the additional parameters <seq>, <ieia> and <ref>. To send all segments of the message one by one, the AT^SCMS write command must be executed for each segment.
The write command transmits one segment of a concatenated short message from TE to network (SMS-SUBMIT).
After invoking the write command wait for the prompt ">" and then start to write the message. To send the message simply enter <CTRL-Z>. After the prompt a timer will be started to observe the input.
To abort sending use <ESC>. Abortion is acknowledged with "OK", though the message will not be sent.
The message reference <mr> is returned to the TE on successful message delivery. The value can be used to identify the message in a delivery status report provided as an unsolicited result code.

Syntax

Test Command

AT^SCMS=?

Response(s)

OK

Write Command

Command syntax for text mode (see AT+CMGF=1):

AT^SCMS=<da>, [<toda>], <seq>, <max>, <ieia>, <ref><CR> Text can be entered <CTRL-Z>/<ESC>

Response(s)

^SCMS: <mr>[, <scts>]
OK
If sending fails
ERROR
+CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	-	-

Notes

- See notes provided for AT+CMGS.
- Command is only available if AT+CMGF=1.

9.24 AT^SCMW Write Concatenated Short Messages to Memory

Writing a concatenated message to the memory is similar to writing a "normal" message, except that each segment of the concatenated message must be identified by the additional parameters <seq>, <ieia> and <ref>. To store all segments of the message one by one, the AT^SCMW write command must be executed for each segment.
The write commands transmits one segment of a concatenated SMS (either SMS-DELIVER or SMS-SUBMIT) from TE to memory storage <mem2>. Memory location <index> of the stored message is returned. Message status will be set to 'stored unsent' unless otherwise given in parameter <stat>.

Syntax

Test Command

AT^SCMW=?

Response(s)

OK

Write Command

If text mode (see AT+CMGF=1)

AT^SCMW=<oa>/<da>, [<tooa>/<toda>][, <stat>], <seq>, <max>, <ieia>, <ref><CR> Text can be entered. <CTRL-Z>/<ESC>

Response(s)

^SCMW: <index>
OK
If writing fails
ERROR
+CMS ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

Notes

- Command is only available if AT+CMGF=1.
- To send or delete a concatenated short message please use the known SMS commands, see AT+CMSS for sending and AT+CMGD for deleting.
- See notes provided for AT+CMGW.

10. Packet Domain Related Commands

The AT commands described in this chapter allow the Customer Application to control packet switched services in GSM/UMTS/LTE networks.

10.1 AT+CGDCONT Define PDP Context

AT+CGDCONT specifies the parameters for a PDP context identified by the context identifier <cid>. The number of contexts that may be in a defined state at the same time is given by the range returned by the AT+CGDCONT test command. A special form of the write command (AT+CGDCONT=<cid>) causes the values for context <cid> to become undefined. If context 1 is undefined on startup, it will be recreated automatically with <PDP_type> "IPV4V6" and all other parameters set to their defaults.
It is not allowed to undefine an already activated context.
The AT+CGDCONT read command returns the current settings for each defined PDP context.

The default settings of AT+CGDCONT as well as AT^SGAPN depend on the loaded network provider profile. For details see AT^SCFG "MEopMode/Prov/Cfg" parameter <provCfg> and AT^SCFG "MEopMode/Prov/AutoSelect" parameter <provAutoSelect>.

PDP contexts can be associated with APN Classes configurable with AT^SGAPN. Please note that changing the PDP context definitions with AT^SGAPN will also affect the settings of AT+CGDCONT.

Syntax

Test Command

```
AT+CGDCONT=?
```

Response(s)

```
+CGDCONT: (range of supported <cid>s), "IP", , , (list of supported <d_comp>s), (list of supported <h_comp>s), (list of supported <IPv4AddrAlloc>s), (list of supported <emergency_indication>s), (list of supported <P-CSCF_discovery>s), (list of supported <IM_CN_Signalling_Flag_Ind>s)
+CGDCONT: (range of supported <cid>s), "PPP", , , (list of supported <d_comp>s), (list of supported <h_comp>s), (list of supported <IPv4AddrAlloc>s), (list of supported <emergency_indication>s), (list of supported <P-CSCF_discovery>s), (list of supported <IM_CN_Signalling_Flag_Ind>s)
+CGDCONT: (range of supported <cid>s), "IPV6", , , (list of supported <d_comp>s), (list of supported <h_comp>s), (list of supported <IPv4AddrAlloc>s), (list of supported <emergency_indication>s), (list of supported <P-CSCF_discovery>s), (list of supported <IM_CN_Signalling_Flag_Ind>s)
+CGDCONT: (range of supported <cid>s), "IPV4V6", , , (list of supported <d_comp>s), (list of supported <h_comp>s), (list of supported <IPv4AddrAlloc>s), (list of supported <emergency_indication>s), (list of supported <P-CSCF_discovery>s), (list of supported <IM_CN_Signalling_Flag_Ind>s)
OK
ERROR
+CME ERROR: <err>
```

Read Command

```
AT+CGDCONT?
```

Response(s)

```
[+CGDCONT: <cid>, <PDP_type>, <APN>, <PDP_addr>, <d_comp>, <h_comp>, <IPv4AddrAlloc>, <emergency_indication>, <P-CSCF_discovery>, <IM_CN_Signalling_Flag_Ind>]
[+CGDCONT: <cid>, <PDP_type>, <APN>, <PDP_addr>, <d_comp>, <h_comp>, <IPv4AddrAlloc>, <emergency_indication>, <P-CSCF_discovery>, <IM_CN_Signalling_Flag_Ind>]
[+CGDCONT: ...]
OK
ERROR
+CME ERROR: <err>
```

Write Command

AT+CGDCONT=<cid>[, <PDP_type>[, <APN>[, <PDP_addr>[, <d_comp>[, <h_comp>[, <IPv4AddrAlloc>[, <emergency_indication>[, <P-CSCF_discovery>[, <IM_CN_Signalling_Flag_Ind>]]]]]]]]

Response(s)

OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007,
3GPP TS 23.003,
3GPP TS 24.301,
3GPP TS 25.323,
3GPP TS 44.065

Parameter Description

<cid>(num)(NV)

PDP Context Identifier

Parameter specifies a particular PDP context definition. This parameter is used in other PDP context-related commands.

1...16

<PDP_type>(str)(NV)

Packet Data Protocol type

Specifies the type of the packet data protocol.
Changing the PDP type with AT+CGDCONT will also change the AT^SGAPN value.

“IP“	Internet Protocol (IETF STD 5)
“PPP“	Point to Point Protocol (IETF STD 51)
“IPV6“	Internet Protocol, version 6 (see RFC 2460)
“IPV4V6“	Virtual <PDP_type> introduced to handle dual IP stack UE capability. (See 3GPP TS 24.301). Not applicable to PPP (dialup) connections).

<APN>(str)(NV)

Access Point Name

Logical name used to select the GGSN or the external packet data network. Maximum length: 100 characters.
An Access Point Name has to follow the syntax rules specified in 3GPP TS 23.003 in section 9.1.
If the value is null or omitted, then the subscription value will be requested.
Changing the APN with AT+CGDCONT will also change the AT^SGAPN value.

<PDP_addr>(str)(NV)

Packet Data Protocol address

Identifies the MT in the address space applicable to PDP (e.g. IPv4 address for PDP type IP). If the value is null or omitted, then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The read command will continue to return the null string even if an address has been allocated during the PDP startup procedure. A string consisting of the values 0.0.0.0 for IPV4 or 0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0 for IPV6 has the same meaning as a null string. The allocated address may be read using AT+CGPADDR.

`<d_comp>`(num)(NV)

Data Compression

Controls the PDP data compression (applicable for Subnetwork Dependent Convergence Protocol (SNDCP) only); see 3GPP TS 44.065 and GPP TS 23.003 for details.

[0]	off
1	on
2	V.42bis

`<h_comp>`(num)(NV)

Header Compression

Controls the PDP header compression; see 3GPP TS 44.065 and 3GPP TS 25.323 for details.

[0]	off
1	on
2	RFC1144
3	RFC2507
4	RFC3095

`<IPv4AddrAlloc>`(num)(NV)

Numeric parameter that controls how the MT/TA requests to get the IPv4 address information.

[0]	IPv4 Address Allocation through NAS Signalling

`<emergency_indication>`(num)(NV)

Numeric parameter used to indicate whether the PDP context is for emergency bearer services or not.

[0]	PDP context is not for emergency bearer services
1	PDP context is for emergency bearer services

`<P-CSCF_discovery>`(num)(NV)

Numeric parameter influences how the MT/TA requests to get the P-CSCF address, see 3GPP TS 24.229 [89] annex B and annex L.

[0]	Preference of P-CSCF address discovery not influenced by +CGDCONT
1	Preference of P-CSCF address discovery through NAS Signalling
2	Preference of P-CSCF address discovery through DHCP

`<IM_CN_Signalling_Flag_Ind>`(num)(NV)

Numeric parameter used to indicate to the network whether the PDP context is for IM CN subsystem-related signalling only or not.

[0]	UE indicates that the PDP context is not for IM CN subsystem-related signaling only
1	UE indicates that the PDP context is for IM CN subsystem-related signaling only

10.1.1 Attaching to LTE Networks and Registering to IMS

To allow access to the PDN (Packet Data Network) and to the IMS (IP-based Multimedia Subsystem), the UE has to perform attach and context activation procedures. The initial PDN attach is prerequisite for LTE services.

The correct APNs shall be specified *before* the UE tries to attach. For ease of use, the UE comes with preconfigured provider profiles. Depending on the selected provider configuration the UE either loads
- a standard profile intended for a great variety of operators (referred to as Fallback profile),
- or a dedicated profile preconfigured for a specific network operator.
For details on provider configurations see ATI61 and the AT^SCFG subcommands "MEopMode/Prov/Cfg" and "MEopMode/Prov/AutoSelect". To check the currently defined PDP contexts use the AT+CGDCONT read command.

If provider profile autoselection is on, provider profile settings are non-volatile as long as the same SIM or a SIM of the same provider is inserted. Otherwise, if a different provider configuration is selected, or a SIM of a different provider is inserted the existing profile will be cleared before the new profile can be loaded. This applies to all PDP contexts defined with AT+CGDCONT, no matter whether loaded as part of a preconfigured provider profile, or set by the TE.
If the Fallback profile is enabled, provider profile settings are non-volatile only as long as exactly the same SIM is inserted. Changing the SIM, even though a SIM of the same issuer, always clears all profile settings.

In contrast to 2G (GSM) and 3G (UMTS) where PDN attach and context activation are performed separately, a successful LTE attach and registration procedure always includes the automatic activation of a PDN PDP context. If IMS (IP-based Multimedia Subsystem) is enabled and supported by the network, the IMS PDP context will also be activated when the UE attaches to LTE.

Many network operators allow to assign the 1st PDP context to the PDN APN, and the 2nd to the IMS APN. This way, the 1st PDP context serves both for LTE attach and Internet access. For PLAS9-W this means that the AT^SWWAN command can simply reuse the 1st PDP context to establish data connections to the Internet. PDP contexts defined for IMS or IMS Emergency signalling cannot be used for AT^SWWAN.
NOTE: Only few operators require separate APNs for LTE attach and for Internet access, for example German Telecom and China Mobile. Therefore, the profile preconfigured for the German Telecom inside the UE defines the 1st PDP context only for Internet access without usage for LTE attach, while the 2nd PDP context is assigned to IMS and used for LTE attach. The benefit is that German Telecom subscribers may also set up AT^SWWAN connections at the 1st PDP context. For China Mobile the 5th PDP context is preconfigured for LTE attach.

How to trigger the attach procedure:
To ensure that the UE properly attaches to LTE it is necessary to retain the auto attach ability, by default enabled with AT^SCFG="GPRS/AutoAttach". This way, the UE automatically tries to attach to LTE and IMS after SIM PIN1 authentication has completed. Manual attach / detach procedures by AT+CGATT are not recommended for LTE and IMS, and should be used only for GSM and UMTS.

To verify whether LTE attach and IMS registration were successful use the following AT commands:
- AT+CGACT? read command shows the automatically activated PDP contexts for PDN and IMS.
- AT+CGPADDR shows the IP addresses dynamically assigned to each PDP context.
- AT+CGCONTRDP shows the APNs, EPS bearer IDs, IP addresses.
Please remember that AT+CGACT? does not indicate active WWAN connections set up with AT^SWWAN.

As long as the UE is attached and registered to LTE any attempt to deactivate the active PDP context (e.g AT+CGACT=0,1) will be denied with "+CME ERROR: operation not allowed". The detach command AT+CGATT=0 is accepted but will cause the UE to deregister from LTE.
Likewise, an active PDP context assigned to IMS can neither be deactivated.

LTE attach with no APN
If no PDN APN is specified (for most operators at <cid> 1) when the UE attaches to LTE, the network will automatically select the so called default APN, specified in the HSS, to establish the initial context (PDN connection/ default bearer). Although the LTE attach procedure will be successful in that case, the context for the default APN might be configured with restrictions concerning the transmission of data, depending on operator settings.

LTE attach with wrong APN
If a wrong PDN APN is configured during the LTE attach procedure, e.g. if an application allows the user to change SIM cards and the APN was not set correctly after the SIM change, the LTE attach will be rejected by the network. As result, the RAT type LTE will be disabled by the UE for a limited amount of time and the UE will only use 2G and 3G RAT types for PS access. The duration while RAT type LTE is disabled depends on network configuration (timer T3402, default 12 minutes). To get notifications on the T3402 timer you can take advantage of the AT^SIND "ltebot" indicator.

Recommendations for LTE attach
When using LTE auto attach, the application shall ensure that the correct PDN APN is specified *before* the UE attaches to LTE. To do so, use the command AT+CGDCONT=<cid>,<PDP_type>,<APN>.
If the application cannot ensure that the correct PDN APN is configured *before* the UE attempts to attach to LTE, the application shall employ one of the following command sequences:

- AT+COPS=2 to deregister from the network, AT+CGDCONT to set the APN, then AT+COPS=0 to force a new network registration, thus enabling a new LTE auto attach attempt. If running, the T3402 timer will be stopped by AT+COPS=0.
- AT+COPS=2 to deregister from the network, AT+CGDCONT to set the APN, then AT+CFUN=1,1 to restart the UE (since the AT+CGDCONT setting is non-volatile).

10.2 AT+CGDSCONT Define Secondary PDP Context

The AT+CGDSCONT write command specifies PDP context parameter values for a Secondary PDP context identified by the context identification parameter <cid>. The number of PDP contexts that may be in a defined state at the same time is given by the range returned by the test command.
A special form of the write command, AT+CGDSCONT=<cid> causes the values for context number <cid> to become undefined. The AT+CGDSCONT read command returns the current settings for each defined context.
The AT+CGDSCONT test command returns values supported as a compound value.

Syntax

Test Command

```
AT+CGDSCONT=?
```

Response(s)

```
+CGDSCONT: (range of supported <cid>s), (list of <pcid>s for defined primary contexts), (list of supported <d_comp>s), (list of supported <h_comp>s)
OK
ERROR
+CME ERROR: <err>
```

Read Command

```
AT+CGDSCONT?
```

Response(s)

```
+CGDSCONT: [<cid>, <pcid>, <d_comp>, <h_comp>]
[+CGDSCONT: <cid>, <pcid>, <d_comp>, <h_comp>]
[+CGDSCONT: ...]
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CGDSCONT=<cid>[, <pcid>[, <d_comp>[, <h_comp>]]]
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<cid>(num)(NV)

PDP Context Identifier

Parameter specifies a particular PDP context definition and is used in other PDP context-related commands.

1...16

<pcid>(num)(NV)

Primary PDP Context Identifier

Parameter specifies a particular PDP context definition which has been specified by use of the AT+CGDCONT command. The list of permitted values is returned by the test form of the command.

1...16

<d_comp>(num)(NV)

Data Compression

Controls the PDP data compression (applicable for Subnetwork Dependent Convergence Protocol (SNDCP) only) 3GPP TS 44.065

[0]	off
1	on
2	V.42bis

<h_comp>(num)(NV)

Header Compression

Controls the PDP header compression 3GPP TS 44.065, 3GPP TS 25.323

[0]	off
1	on
2	RFC1144
3	RFC2507
4	RFC3095

10.3 AT+CGTFT Traffic Flow Template

Syntax

Test Command

AT+CGTFT=?

Response(s)

+CGTFT: <pdptype>, (list of supported <filterid>s), (list of supported <precedence>s), , (list of supported <protocolno>s), (list of supported <destportrange>s), (list of supported <srcportrange>s), (list of supported <ipsecidx>s), (list of supported <tos>s), (list of supported <flowlabel>s)
OK

Read Command

AT+CGTFT?

Response(s)

[+CGTFT: <cid>, <filterid>, <precedence>, <rem_addr_subnet_mask>, <protocolno>, <destportrange>, <srcportrange>, <ipsecidx>, <tos>, <flowlabel>]
[+CGTFT: ...]

Write Command

AT+CGTFT=[<cid>[, <filterid>, <precedence>[, <rem_addr_subnet_mask>[, <protocolno>[, <destportrange>[, <srcportrange>[, <ipsecidx>[, <tos>[, <flowlabel>]]]]]]]]]

Response(s)

OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Command Description

The test command returns values supported as a compound value. If the MT supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line. TFTs shall be used for PDP-type IP and PPP only. For PDP-type PPP a TFT is applicable only when IP traffic is carried over PPP. If PPP carries header-compressed IP packets, then a TFT cannot be used.

The read command returns the current settings for all Packet Filters for each defined context.

The write command allows the TE to specify a Packet Filter - PF for a Traffic Flow Template - TFT that is used in the GGSN for routing of down-link packets onto different QoS flows towards the TE. The concept is further described in the 3GPP TS 23.060. A TFT consists of from one and up to two Packet Filters, each identified by a unique <filterid>. A Packet Filter also has an <precedence> that is unique within all TFTs associated with all PDP contexts that are associated with the same PDP address.
The write command specifies a Packet Filter that is to be added to the TFT stored in the MT and used for the context identified by the context identification parameter, <cid>. The specified TFT will be stored in the GGSN only at activation or MS-initiated modification of the related context. Since this is the same parameter that is used in the +CGDCONT and +CGDSCONT commands, the +CGTFT command is effectively an extension to these commands. The Packet Filters consist of a number of parameters, each of which may be set to a separate value.
A special form of the write command, +CGTFT= <cid> causes all of the Packet Filters in the TFT for context number <cid> to become undefined. At any time there may exist only one PDP context with no associated TFT amongst all PDP contexts associated to one PDP address. At an attempt to delete a TFT, which would violate this rule, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the AT+CMEE command.

Parameter Description

`<cid>`(num)

Parameter specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands.

1...16

`<filterid>`(num)

Packet filter identifier

Parameter specifies a packet filter identifier.

1...16

`<precedence>`(num)

Evaluation Precedence Index

Parameter specifies a evaluation precedence index.

0...255

`<rem_addr_subnet_mask>`(str)

Remote address and subnet mask

The string is given as dot-separated numeric (0-255) parameters on the form: "a1.a2.a3.a4.m1.m2.m3.m4" for IPv4 or "a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16" for IPv6.
The settings of AT+CGPIAF can influence the format of this parameter.

`<protocolno>`(num)

Protocol number

Parameter specifies the protocol number (ipv4) / next header (ipv6).

0...255

`<destportrange>`(str)

Destination port range

Parameter specifies the destination port range.

"0.0"..."65535.65535"

`<srcportrange>`(str)

Source port range

Parameter specifies the source port range.

"0.0"..."65535.65535"

`<ipsecidx>`(num)

IPsec security parameter index

Parameter specifies the IPsec security parameter index (spi).

0...FFFFFFFF

<tos>(str)

Type of service and mask/traffic class

Parameter specifies the type of service (tos)(ipv4) and mask/traffic class (ipv6).

"0.0"..."255.255"

<flowlabel>(num)

Flow label

Parameter specifies the flow label (ipv6).

0...FFFFF

<pdptype>(str)

PDP type

Parameter specifies the PDP type.

“IP“	Internet Protocol (IETF STD 5)
“PPP“	Point to Point Protocol (IETF STD 51)
“IPV6“	Internet Protocol, version 6 (see RFC 2460)
“IPV4V6“	Virtual <pdptype> introduced to handle dual IP stack UE capability. (See 3GPP TS 24.301)

Note

- Some of the above listed attributes may coexist in a Packet Filter while others mutually exclude each other, the possible combinations are shown in 3GPP TS 23.060.

10.4 AT+CGATT PS Attach or Detach

The AT+CGATT write command is used to attach the MT to, or detach the MT from, the Packet Domain service. After the command has completed, the MT remains in V.25ter command state. If the MT is already in the requested state, the command is ignored and the OK response is returned. If the requested state cannot be achieved, an ERROR or +CME ERROR response is returned.
Any active PDP contexts will be automatically deactivated when the attachment state changes to detached.
The AT+CGATT read command returns the current Packet Domain service state.
The AT+CGATT test command is used for requesting information on the supported Packet Domain service states.

Syntax

Test Command

```
AT+CGATT=?
```

Response(s)

```
+CGATT: (list of supported <state>s)
OK
```

Read Command

```
AT+CGATT?
```

Response(s)

```
+CGATT: <state>
OK
```

Write Command

```
AT+CGATT=[<state>]
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	-	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<state>(num)

Indicates the state of PS attachment.

0(P)	Detached
[1]	Attached

10.5 AT+CGACT PDP Context Activate or Deactivate

AT+CGACT write command is used to activate or deactivate the specified PDP context(s). After command has completed, the MT remains in V.250 command state. If any PDP context is already in the requested state, the state for that context remains unchanged. If MT is not PS attached when the activation form of the command is executed, MT firstly performs a PS attach and then attempts to activate the specified contexts. If no <cid>s are specified the activation/deactivation form of the command activates/deactivates all defined contexts.

AT+CGACT read command returns the current activation states for all defined PDP contexts.

AT+CGACT test command is used for requesting information on supported PDP context activation states.

Syntax

Test Command

AT+CGACT=?

Response(s)

+CGACT: (list of supported <state>s)
OK
ERROR
+CME ERROR: <err>

Read Command

AT+CGACT?

Response(s)

+CGACT: [<cid>, <state>]
[+CGACT: <cid>, <state>]
...
OK
ERROR
+CME ERROR: <err>

Write Command

AT+CGACT=<state>[,<cid>[,<cid>[, ...]]]

Response(s)

OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	-	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<state>(num)

Indicates the state of PDP context activation.

0	Deactivated
1	Activated

<cid>(num)

Parameter specifies a particular PDP context definition (see AT+CGDCONT parameter <cid>).

Notes

- More than one PDP context can be active if each PDP context ID has a specific setting, e.g. the APN.
  Keep in mind that PDP contexts are activated automatically when the UE attaches to the PDN (Packet Data Network) and to the IMS (IP-based Multimedia Subsystem). If the UE is registered to LTE and IMS AT+CGACT shows the active state of both PDP contexts, but any attempt to deactivate them with AT+CGACT will be denied. See more information in Section 10.1.1, Attaching to LTE Networks and Registering to IMS.
  For IP sessions, the user may activate further PDP contexts. To avoid conflicts those PDP contexts should be different from PDP contexts automatically activated along with preconfigured provider settings. Also, the user is responsible to make sure whether parallel usage of these PDP contexts is allowed by the mobile operator and by the USIM.
  Remember that contexts may also be activated implicitly by using other commands, e.g. AT+CGDATA or ATD*99#.
  Contexts activated by AT^SWWAN are not indicated by AT+CGACT.
- Contexts activated by , e.g. AT+CGDATA or ATD*99# cannot be handled by the AT+CGACT write command but their activation state is still visible via AT+CGACT read command. A write command without specifying any <cid> will always fail as long as some contexts are still in use by AT+CGDATA or ATD*99#.
- If activation or deactivation of a context fails, then AT+CEER may provide further informations about the reason.
- Please see AT&D for information on disconnecting data call.

10.6 AT+CGDATA Enter Data State

AT+CGDATA write command causes the MT to perform all actions which are necessary to establish communication between the TE and the network using one or more Packet Domain PDP types. This may include performing a PS attach and one or more PDP context activations. Commands following the AT+CGDATA command in the AT command line will not be processed by the MT.
If the write command is successful, the MT issues the intermediate result code CONNECT and enters V.250 online data state.
The application that initiates the PPP mode must be designed to start all LCP configure requests in accordance with TS 27.060 par 9.1. Otherwise the MT remains, after the CONNECT, infinitely in a waiting state.
After data transfer is complete, and layer 2 protocol termination procedure has completed successfully, command state is reentered and MT returns the final result code OK.
If <L2P> parameter value is unacceptable to the MT it returns ERROR or +CME ERROR.
In the event of erroneous termination or a failure to start up, command state is reentered and MT returns NO CARRIER, or if enabled +CME ERROR.

AT+CGDATA test command is used for requesting information on the supported layer 2 protocols to be used between TE and MT.

Syntax

Test Command

```
AT+CGDATA=?
```

Response(s)

```
+CGDATA: (list of supported <L2P>s)
OK
```

Write Command

```
AT+CGDATA=[<L2P>[, <cid>]]
```

Response(s)

```
CONNECT
NO CARRIER
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	-	-	+

Reference(s)

3GPP 27.007

Parameter Description

<L2P>(str)

Layer 2 protocol to be used between TE and MT.

[“PPP“]	Layer 2 protocol PPP

<cid>(num)

Parameter specifies a particular PDP context definition (see AT+CGDCONT parameter <cid>).
Secondary PDP contexts are not supported.
If parameter is not specified, then the first defined primary context is used.

10.6.1 Automatic deactivation of PDP context during dial-up PPP

From using AT+CGDATA write command or ATD*99# follows that MT issues intermediate result code CONNECT and enters V.250ter online data state. In V.250 online data state, first some LCP protocol exchange between MT and TE is performed to set up the PPP link. After successfully establishing the PPP link, the MT performs PDP context activation procedure if the context is not already activated. As a result, MT is in a "PDP context activated" state within the PLMN, the PPP link is established on the mobile side and the mobile is ready for IP data transfer.
If the TE wants to close the LCP link the MT may perform an LCP termination request procedure on PPP level. After this LCP termination procedure the MT deactivates the PDP context automatically and the MT returns to V.250 command mode and issues the final result code NO CARRIER.
If DTR is configured to disconnect data connections (AT&D2), the application should not toggle DTR during implicit PDP context deactivation and before "NO CARRIER" is received.

10.7 AT+CGPADDR Show PDP Address

The AT+CGPADDR exec command returns a list of PDP addresses for all defined contexts.

The AT+CGPADDR write command returns a list of PDP addresses for the specified context identifiers. If a context is not defined, then no output line is generated for it. If no <cid> is specified, the addresses for all defined contexts are returned.

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

Syntax

Test Command

AT+CGPADDR=?

Response(s)

[+CGPADDR: (list of defined <cid>s)]
OK

Exec Command

AT+CGPADDR

Response(s)

[+CGPADDR: <cid>[, <PDP_address_1>[, <PDP_address_2>]]]
[+CGPADDR: ...]
OK
ERROR
+CME ERROR: <err>

Write Command

AT+CGPADDR=[<cid>[,<cid>[, ...]]]

Response(s)

[+CGPADDR: <cid>[, <PDP_address_1>[, <PDP_address_2>]]]
[+CGPADDR: ...]
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP 27.007

Parameter Description

<cid>(num)

Parameter specifies a particular PDP context definition (see AT+CGDCONT parameter <cid>).

<PDP_address_1>(str)

A string that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. If address is not available parameter is omitted.
Parameter specifies the assigned address as a dot-separated numeric (0-255) parameter of the form "a1.a2.a3.a4" for IPv4 and "a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16" for IPv6.
The settings of AT+CGPIAF can influence the format of the IPv6 address.

<PDP_address_2>(str)

A string that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. Parameter is displayed only when both IPv4 and IPv6 addresses are assigned, with <PDP_address_1> containing the IPv4 address and this parameter the IPv6 address.
Parameter specifies the assigned IPv6 address as a dot-separated numeric (0-255) parameter of the form "a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16".
The settings of AT+CGPIAF can influence the format of this parameter.

10.8 AT+CGPIAF Select Printing IP address format

AT+CGPIAF specifies the format to print IPV6 address parameters of other AT commands. See RFC 4291 for details of the IPv6 address format. The +CGPIAF parameters <format>, <subnet>, <lzeros> and <czeros> affect the following commands and parameters:

- in AT+CGTFT and AT+CGTFTRDP, the <rem_addr_subnet_mask>;
- in AT+CGDCONT, the <PDP_addr>;
- in AT+CGPADDR, the <PDP_address_1> and <PDP_address_2>;
- in AT+CGCONTRDP, the <LocalAddr and SubNetMask>, <GwAddr>, <DNS_prim_addr> and <DNS_sec_addr>.

The read command returns the current command parameter settings.
The test command returns supported parameter values.

Syntax

Test Command

AT+CGPIAF=?

Response(s)

+CGPIAF: (list of supported <format>s), (list of supported <subnet>s), (list of supported <lzeros>s), (list of supported <czeros>s)
OK

Read Command

AT+CGPIAF?

Response(s)

+CGPIAF: <format>, <subnet>, <lzeros>, <czeros>
OK

Write Command

AT+CGPIAF=[<format>[, <subnet>[, <lzeros>[, <czeros>]]]]

Response(s)

OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP 27.007

Parameter Description

<format>(num)

A numeric parameter which decides the IPv6 address format. Relevant for all AT command parameters that can hold an IPv6 address.

0(&F)(P) Use IPv4-like dot-notation. IP address, and subnetwork mask if applicable, are dot-separated, e.g.
"32.1.13.184.0.0.205.48.0.0.0.0.0.0.0.0.255.255.255.255.255.255.255.240.0.0.0.0.0.0.0.0"
for parameters holding address and subnet mask and
"32.1.13.184.0.0.205.48.0.0.0.0.0.0.0.0"
for other IP address parameters.

1	Use IPv6-like colon-notation. IP address, and subnetwork mask if applicable and when given explicitly, are separated by a space, e.g. "2001:0DB8:0000:CD30:0000:0000:0000:0000 FFFF:FFFF:FFFF:FFF0:0000:0000:0000:0000" for parameters holding address and subnet mask and "2001:0DB8:0000:CD30:0000:0000:0000:0000" for other IP address parameters.

`<subnet>`(num)

A numeric parameter which decides the subnet-notation for parameters that hold remote address and subnet mask, e.g. `<rem_addr_subnet_mask>`. Setting does not apply if `<format>`= 0.

0(&F)(P)	Both IP Address and subnet mask are stated explicitly, separated by a space, e.g. "2001:0DB8:0000:CD30:0000:0000:0000:0000 FFFF:FFFF:FFFF:FFF0:0000:0000:0000:0000".
1	The printout format is applying / (forward slash) subnet-prefix Classless Inter-Domain Routing (CIDR) notation, e.g. ":0DB8:0000:CD30:0000:0000:0000:0000/60"

`<lzeros>`(num)

A numeric parameter which decides whether leading zeros are omitted or not. Setting does not apply if `<format>`= 0.

0(&F)(P)	Leading zeros are omitted, e.g. "2001:DB8:0:CD30:0:0:0:0".
1	Leading zeros are included, e.g. "2001:0DB8:0000:CD30:0000:0000:0000:0000".

`<czeros>`(num)

A numeric parameter which decides whether 1-n instances of 16-bit zero-values are replaced by only '::'. This applies only once. Setting does not apply if `<format>`= 0.

0(&F)(P)	No zero compression, e.g. "2001:DB8:0:CD30:0:0:0:0".
1	Use zero compression, e.g. "2001:DB8:0:CD30::".

10.9 AT+CGEREP Packet Domain Event Reporting

The AT+CGEREP write command enables or disables sending of unsolicited result codes, +CGEV URCs from MT to TE in the case of certain events occurring in the Packet Domain MT or the network.
Parameter <mode> controls the processing of unsolicited result codes specified within this command. <bfr> controls the effect on buffered codes when <mode> 1 or 2 is entered. If a setting is not supported by the MT, ERROR or +CME ERROR: is returned.

The AT+CGEREP read command returns the current <mode> and buffer settings.

The AT+CGEREP test command returns the modes and buffer settings supported by the MT as compound values.

Syntax

Test Command

```
AT+CGEREP=?
```

Response(s)

```
+CGEREP: (list of supported <mode>s), (list of supported <bfr>s)
OK
```

Read Command

```
AT+CGEREP?
```

Response(s)

```
+CGEREP: <mode>, <bfr>
OK
```

Write Command

```
AT+CGEREP=<mode>[, <bfr>]
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Unsolicited Result Codes

URC 1

```
+CGEV: REJECT <PDP_type>, <PDP_addr>
```

A network request for PDP context activation occurred when the MT was unable to report it to the TE with a +CRING unsolicited result code and was automatically rejected.

URC 2

```
+CGEV: NW REACT <PDP_type>, <PDP_addr>[, <cid>]
```

The network has requested a context reactivation. The <cid> that was used to reactivate the context is provided if known to the MT.

URC 3

```
+CGEV: NW DEACT <PDP_type>, <PDP_addr>[, <cid>]
```

The network has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the MT.

URC 4

+CGEV: ME DEACT <PDP_type>, <PDP_addr>[, <cid>]

The UE has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the MT.

URC 5

+CGEV: NW DETACH

The network has forced a PS detach.

URC 6

+CGEV: ME DETACH

The UE has forced a PS detach.

URC 7

+CGEV: NW CLASS <class>

The network has forced a change of MS class. The highest available class is reported.

URC 8

+CGEV: ME CLASS <class>

The UE has forced a change of MS class. The highest available class is reported.

URC 9

+CGEV: PDN ACT <cid>

A context activation has been forced. The <cid> that was used to activate the context is provided if known to the MT. The context represents a PDN connection in LTE or a Primary PDP context in GSM/UMTS.

URC 10

+CGEV: PDN DEACT <cid>

A context deactivation has been forced. The <cid> that was used to activate the context is provided if known to the MT. The context represents a PDN connection in LTE or a Primary PDP context in GSM/UMTS.

URC 11

+CGEV: ME ACT <pcid>, <cid>, <event-type>

The network has responded to an ME initiated context activation. The <cid> for this context is provided to the TE in addition to the associated primary <pcid>.

URC 12

+CGEV: NW MODIFY <cid>,<change-reason>,<event-type>

The network has modified a context. The associated <cid> is provided to the TE in addition to the <change-reason> and <event-type>. The format of the parameter <cid> is found in command AT+CGDCONT or AT+CGDSCONT.

URC 13

+CGEV: ME MODIFY <cid>, <change-reason>, <event-type>

The UE has modified a context. The associated <cid> is provided to the TE in addition to the <change-reason> and <event-type>.

URC 14

+CGEV: ME PDN ACT <cid>[, <reason>]

The UE has activated a context. The context represents a Primary PDP context in GSM/UMTS/LTE. The <cid> for this context is provided to the TE. This event is sent either in result of explicit context activation request (AT+CGACT), or in result of implicit context activation request associated to attach request (AT+CGATT=1).

Parameter Description

<mode>(num)	
0(P)	Buffer unsolicited result codes in the MT. Currently 3 +CGEV URCs can be buffered. If MT result code buffer is full, the oldest ones will be discarded. No codes are forwarded to the TE.
1	Discard unsolicited result codes when MT TE link is reserved (e.g. AT command port is in use, e.g. in online mode or in waiting state due to AT command processing); otherwise forward them directly to the TE.
2	Buffer unsolicited result codes in the MT when MT TE link is reserved (AT command port is in use, e.g. in online mode or in waiting state due to AT command processing) and flush them to the TE when MT TE link becomes available; otherwise forward them directly to the TE. Currently 3 +CGEV URCs can be buffered. If MT result code buffer is full, the oldest URCs will be discarded.

<bfr>(num)	
0(P)	MT buffer of unsolicited result codes defined within this command is cleared when <mode> 1 or 2 is entered
1	MT buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1 or 2 is entered (OK response will be given before flushing the codes). Buffer is empty afterwards.

<class>(str)	
Parameter indicates the GPRS mobile class.	
“A“	Class A (highest)
“B“	Class B
“CG“	Class C in GPRS mode
“CC“	Class C in circuit switched mode

<reason>(num)	
Indicates the reason why the context activation request for PDP type IPv4v6 was not granted. This parameter is only included if the requested PDP type associated with <cid> is IPv4v6, and the PDP type assigned by the network for <cid> is either IPv4 or IPv6.	
0	IPV4 only allowed
1	IPV6 only allowed
2	Single address bearers only allowed
3	Single address bearers only allowed and MT initiated context activation for a second address type bearer was not successful.

<change-reason>(num)	
Integer type parameter indicates what kind of change occurred.	
0	Not available
1	TFT only changed
2	Qos only changed
3	Both TFT and QoS changed

<event-type>(num)	
Integer type parameter indicates whether this is an informational event or whether the TE has to acknowledge it.	
0	Informational event

10.10 AT+CGREG Packet Domain Network Registration Status

The AT+CGREG write command enables the presentation of the URC "+CGREG: <stat>" when <n>=1 and ME's Packet Domain network registration status in GSM or UMTS changes, or URC "+CGREG: <stat>[, <lac>][, <ci>][, <AcT>]" when <n>=2 and the current network cell in GSM or UMTS changes.

AT+CGREG read command queries the current URC presentation status <n> and an integer <stat> which shows whether the network has currently indicated the registration of the ME.
Location information elements <lac>, <ci> and <AcT> are sent only if available, if <n>=2 and if ME is registered to the network.

Syntax

Test Command

```
AT+CGREG=?
```

Response(s)

```
+CGREG: (list of supported <n>s)
OK
```

Read Command

```
AT+CGREG?
```

Response(s)

```
+CGREG: <n>, <stat>[, [<lac>], [<ci>], [<AcT>]]
OK
```

Write Command

```
AT+CGREG=<n>
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP 27.007

Unsolicited Result Codes

URC 1

```
+CGREG: <stat>
```

Indicates a change in the ME's Packet Domain network registration status.

URC 2

```
+CGREG: <stat>[, <lac>][, <ci>][, <AcT>]
```

Indicates a change in the ME's Packet Domain network registration status or a change of the network cell including location information.

Parameter Description

<n>(num)	
0(&F)(P)	Disable Packet Domain network registration URC
1	Enable Packet Domain network registration URC "+CGREG: <stat>"
2	Enable Packet Domain network registration URC "+CGREG: <stat>[, <lac>][, <ci>][, <AcT>]"

<stat>(num)	
0	Not registered, ME is not currently searching an operator to register to.
1	Registered, home network.
2	Not registered, but ME is currently trying to attach or searching an operator to register to.
3	Registration denied.
4	Unknown
5	Registered, roaming.

<lac>(str)

Two byte location area code in hexadecimal format.

<ci>(str)

Cell ID in hexadecimal format:
- 16 bit for 2G
- 28 bit for 3G

<AcT>(num)

Radio access technology

0	GSM
2	UTRAN
3	GSM w/EGPRS
4	UTRAN w/HSDPA
5	UTRAN w/HSUPA
6	UTRAN w/HSDPA and w/HSUPA
7	E-UTRAN

10.11 AT+CEREG EPS Network Registration Status

The AT+CEREG write command enables presentation of URC "+CEREG: <stat>" when <n>=1 and UE's EPS network registration status in LTE changes, or URC "+CEREG: <stat>[, [<tac>], [<ci>], [<AcT>]]" when <n>=2 and the current network cell in LTE changes.
The AT+CEREG execute command restores default value "0" for parameter <n>.
The AT+CEREG read command queries the current URC presentation status and <stat> which shows whether the network has currently indicated the registration of the ME. Location information elements <tac> and <ci> are returned only if <n>=2 and ME is registered to the network.

Syntax

Test Command

```
AT+CEREG=?
```

Response(s)

```
+CEREG: (list of supported <n>s)
OK
```

Read Command

```
AT+CEREG?
```

Response(s)

```
+CEREG: <n>, <stat>[, [<tac>], [<ci>], [<AcT>]]
OK
```

Exec Command

```
AT+CEREG
```

Response(s)

```
OK
```

Write Command

```
AT+CEREG=<n>
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Unsolicited Result Codes

URC 1

```
+CEREG: <stat>
```

Indicates a change in the UE's EPS network registration status.

URC 2

```
+CEREG: <stat>[, [<tac>], [<ci>], [<AcT>]]
```

Indicates a change in the UE's EPS network registration status or a change of the network cell including location information.

Parameter Description

<n>(num)	
0(&F)(P)	Disable network registration unsolicited result code

1	Enable network registration URC "+CEREG: <stat>"
2	Enable network registration URC "+CEREG: <stat>[, [<tac>], [<ci>], [<AcT>]]"

<stat>(num)

0	Not registered, ME is not currently searching an operator to register to.
1	Registered, home network.
2	Not registered, but ME is currently trying to attach or searching an operator to register to.
3	Registration denied.
4	Unknown, e.g. out of LTE coverage
5	Registered, roaming.

<tac>(str)

Two byte tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)

<ci>(str)

Four byte LTE cell ID in hexadecimal format.

<AcT>(num)

Radio access technology

0	GSM (not applicable)
2	UTRAN (not applicable)
3	GSM w/EGPRS (not applicable)
4	UTRAN w/HSDPA (not applicable)
5	UTRAN w/HSUPA (not applicable)
6	UTRAN w/HSDPA and w/HSUPA (not applicable)
7	E-UTRAN

10.12 AT+CGCONTRDP PDP context read dynamic parameters

The AT+CGCONTRDP write command returns dynamic parameters for the active non-secondary PDP context specified with <cid>.
The AT+CGCONTRDP execute command returns dynamic parameters for all active non-secondary PDP contexts. For contexts of <PDP_type> "IPV4V6" the response of exec and write command will have two lines per <cid>. First line describes the IPV4 dynamic parameters followed by another line with the IPV6 dynamic parameters.

Syntax

Test Command

```
AT+CGCONTRDP=?
```

Response(s)

```
+CGCONTRDP: (list of supported <cid>s) associated with active contexts
OK
```

Exec Command

```
AT+CGCONTRDP
```

Response(s)

```
+CGCONTRDP: <cid>, <Bearer_ID>, <APN>[, <LocalAddr and SubNetMask>[, <GwAddr>[,
<DNS_prim_addr>[, <DNS_sec_addr>]]]]
+CGCONTRDP: <cid>, <Bearer_ID>, <APN>[, <LocalAddr and SubNetMask>[, <GwAddr>[,
<DNS_prim_addr>[, <DNS_sec_addr>]]]]
[+CGCONTRDP: ...]
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CGCONTRDP=<cid>
```

Response(s)

```
+CGCONTRDP: <cid>, <Bearer_ID>, <APN>[, <LocalAddr and SubNetMask>[, <GwAddr>[,
<DNS_prim_addr>[, <DNS_sec_addr>]]]]
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	-	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<cid>(num)

Specifies a particular non-secondary PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. See AT+CGDCONT.

<Bearer_ID>(num)

Identifies the bearer, EPS Bearer in EPS and NSAPI in UMTS/GPRS.

<APN>(str)

Access Point Name

Logical name used to select the GGSN or the external packet data network.

<LocalAddr and SubNetMask>(str)

Shows the IP address and subnet mask of the UE in the format specified by AT+CGPIAF.

<GwAddr>(str)

Shows the Gateway Address of the UE in the format specified by AT+CGPIAF.

<DNS_prim_addr>(str)

Shows the IP address of the primary DNS server.
The settings of AT+CGPIAF influences the format of this parameter.

<DNS_sec_addr>(str)

Shows the IP address of the secondary DNS server.
The settings of AT+CGPIAF influences the format of this parameter.

10.13 AT+CGSCONTRDP Secondary PDP Context Read Dynamic Parameters

The write command returns <p_cid> and <bearer_ID> for an active secondary PDP context with the context identifier <cid>.
If the parameter <cid> is omitted, the <cid>, <p_cid> and <bearer_ID> are returned for all active secondary PDP contexts. In EPS, the Traffic Flow parameters are returned.
The test command returns a list of <cid>s associated with active secondary PDP contexts.

Syntax

Test Command

```
AT+CGSCONTRDP=?
```

Response(s)

```
+CGSCONTRDP: (list of <cid>s associated with active contexts)
OK
```

Exec Command

```
AT+CGSCONTRDP
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CGSCONTRDP=<cid>
```

Response(s)

```
[+CGSCONTRDP: <cid>, <p_cid>, <bearer_ID>]
[+CGSCONTRDP: <cid>, <p_cid>, <bearer_ID>]
[+CGSCONTRDP: ...]
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	-	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<cid>(num)

Specifies a particular active secondary PDP context or Traffic Flows definition. The parameter is used in other PDP context-related commands (see the AT+CGDCONT and AT+CGDSCONT).

<p_cid>(num)

Specifies a particular PDP context definition or default EPS context Identifier which has been specified by use of the AT+CGDSCONT command (see the AT+CGDSCONT command).

<bearer_ID>(num)

Identifies the bearer, EPS Bearer in EPS and NSAPI in UMTS/GPRS.

Note

- The <cid> for network-initiated PDP contexts will have values outside the ranges (including values of 100 and above) indicated for the <cid> in the test form of the commands AT+CGDCONT and AT+CGDSCONT.

10.14 AT+CGTFTRDP Traffic Flow Template Read Dynamic Parameters

The write command returns the relevant information about Traffic Flow Template for an active secondary or non-secondary PDP context specified by <cid> together with the additional network assigned values when established by the network.
The exec command returns the relevant information about the Traffic Flow Templates for all active secondary and non-secondary PDP contexts.
Parameters of both network and MT/TA initiated PDP contexts will be returned.

The test command returns a list of <cid>s associated with active secondary and non-secondary contexts.

Syntax

Test Command

```
AT+CGTFTRDP=?
```

Response(s)

```
+CGTFTRDP: (list of <cid>s associated with active contexts)
OK
```

Exec Command

```
AT+CGTFTRDP
```

Response(s)

```
[+CGTFTRDP: <cid>, <filterid>, <precedence>, <rem_addr_subnet_mask>, <protocolno>,
<local-portrange>, <remote-portrange>, <ipsecidx>, <tos>, <flowlabel>, <direction>,
<NW-filterID>]
[+CGTFTRDP: ...]
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CGTFTRDP=<cid>
```

Response(s)

```
[+CGTFTRDP: <cid>, <filterid>, <precedence>, <rem_addr_subnet_mask>, <protocolno>,
<local-portrange>, <remote-portrange>, <ipsecidx>, <tos>, <flowlabel>, <direction>,
<NW-filterID>]
[+CGTFTRDP: ...]
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	-	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<cid>(num)

Specifies a particular secondary or non secondary PDP context definition or Traffic Flows definition (see AT+CGDCONT and AT+CGDSCONT commands). (see notes for network initiated PDP context)

1...16

`<filterid>`(num)

Packet filter identifier

Specifies a packet filter identifier. (see notes for network initiated PDP context)

1...16

`<precedence>`(num)

Evaluation Precedence Index

Specifies a evaluation precedence index.

0...255

`<rem_addr_subnet_mask>`(str)

Remote address and subnet mask

The string is given as dot-separated numeric (0-255) parameters on the form:
"a1.a2.a3.a4.m1.m2.m3.m4" for IPv4 or
"a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16" for IPv6.
The settings of AT+CGPIAF can influence the format of this parameter.

`<protocolno>`(num)

Protocol number

Specifies the protocol number (ipv4) / next header (ipv6).

0...255

`<local-portrange>`(str)

Local port range

The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".

`<remote-portrange>`(str)

Remote port range

The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".

`<ipsecidx>`(num)

IPsec security parameter index

Specifies the IPsec security parameter index (spi) in hexadecimal format.

00000000...FFFFFFFF

`<tos>`(str)

Type of service and mask/traffic class

Specifies the type of service (tos)(ipv4) and mask/traffic class (ipv6) and mask. The string is given as dot-separated numeric (0-255) parameters on the form "f.t".

`<flowlabel>`(num)

Flow label

Parameter specifies the flow label in hexadecimal format (valid for ipv6 only).

00000...FFFFF

<direction>(num)

Specifies the transmission direction in which the Packet Filter will be applied.

0	Pre Release 7 TFT Filter
1	Uplink
2	Downlink
3	Bidirectional (Used for Uplink and Downlink)

<NW-filterID>(num)

NW Packet filter identifier

Parameter specifies a packet filter identifier. In EPS the value is assigned by the network when established.

1...16

Notes

- Some of the listed attributes can coexist in a Packet Filter while others mutually exclude each other. The possible combinations are shown in 3GPP TS 23.060 [26].
- The <cid> for network-initiated PDP contexts will have values outside the ranges (including values of 100 and above) indicated for the <cid> in the test form of the commands AT+CGDCONT and AT+CGDSCONT.
- <filterid> values for network initiated PDP contexts can have values outside the ranges indicated.

10.15 AT+CGEQOS Define EPS Quality of Service

AT+CGEQOS write command allows the UE to specify the EPS Quality of Service parameters for a PDP context or Traffic Flows. When in UMTS/GPRS the MT applies a mapping function to UTMS/GPRS Quality of Service. A special form of the write command, AT+CGEQOS=<cid> causes the values for context number <cid> to become undefined.

Syntax

Test Command

AT+CGEQOS=?

Response(s)

+CGEQOS: (range of supported <cid>s), (range of supported <QCI>s), (range of supported <DL_GBR>s), (range of supported <UL_GBR>s), (range of supported <DL_MBR>s), (range of supported <UL_MBR>s)
OK

Read Command

AT+CGEQOS?

Response(s)

[+CGEQOS: <cid>, <QCI>, [<DL_GBR>, <UL_GBR>], [<DL_MBR>, <UL_MBR>]]
[+CGEQOS: ...]
OK

Write Command

AT+CGEQOS=<cid>[, <QCI>[, <DL_GBR>, <UL_GBR>[, <DL_MBR>, <UL_MBR>]]]

Response(s)

OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<cid>(num)

Specifies a particular EPS Traffic Flows definition in EPS and a PDP Context definition in UMTS/GPRS (see AT+CGDCONT and AT+CGDSCONT).

1...16

<QCI>(num)

Specifies a class of EPS QoS.

0	QCI is selected by network
1...4	Value range for guaranteed bit rate Traffic Flows
5...9	Value range for non-guaranteed bit rate Traffic Flows

<DL_GBR>(num)

Indicates DL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [40]).

<UL_GBR>(num)

Indicates UL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [40]).

<DL_MBR>(num)

Indicates DL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [40]).

<UL_MBR>(num)

Indicates UL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI (see 3GPP TS 24.301 [40]).

10.16 AT+CGEQOSRDP EPS Quality of Service Read Dynamic Parameters

The write command returns Quality of Service parameters of the active PDP context associated to the provided context identifier <cid>.
If the parameter <cid> is omitted, the Quality of Service parameters for all secondary and non-secondary active PDP contexts are returned.
The test command returns a list of <cid>s associated with active PDP contexts.
Parameters of both network and MT/TA initiated PDP contexts will be returned.

Syntax

Test Command

AT+CGEQOSRDP=?

Response(s)

+CGEQOSRDP: (list of <cid>s associated with active contexts)
OK

Exec Command

AT+CGEQOSRDP

Response(s)

[+CGEQOSRDP: <cid>, <QCI>, [<DL_GBR>, <UL_GBR>], [<DL_MBR>, <UL_MBR>][, <DL_AMBR>, <UL_AMBR>]]
[+CGEQOSRDP: ...]
OK
ERROR
+CME ERROR: <err>

Write Command

AT+CGEQOSRDP=<cid>

Response(s)

[+CGEQOSRDP: <cid>, <QCI>[, <DL_GBR>, <UL_GBR>][, <DL_MBR>, <UL_MBR>][, <DL_AMBR>, <UL_AMBR>]]
[+CGEQOSRDP: ...]
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	-	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<cid>(str)

Specifies a particular EPS Traffic Flows definition in EPS and a PDP Context definition in UMTS/GPRS (see AT+CGDCONT and AT+CGDSCONT).

<QCI>(num)

Specifies a class of EPS QoS.

0	QCI is selected by network
1...4	Value range for guaranteed bit rate Traffic Flows
5...9	Value range for non-guaranteed bit rate Traffic Flows
128...254	Value range for for Operator-specific QCIs

<DL_GBR>(num)

Indicates DL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI.

<UL_GBR>(num)

Indicates UL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI.

<DL_MBR>(num)

Indicates DL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI.

<UL_MBR>(num)

Indicates UL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI.

<DL_AMBR>(num)

Indicates DL APN aggregate MBR. The value is in kbit/s.

<UL_AMBR>(num)

Indicates UL APN aggregate MBR. The value is in kbit/s.

Notes

- If multiple lines in a response belong to the same PDN connection they contain the same <DL_AMBR> <UL_AMBR> values.
- The <cid> for network-initiated PDP contexts will have values outside the ranges (including values of 100 and above) indicated for the <cid> in the test form of the commands AT+CGDCONT and AT+CGDSCONT.

10.17 AT+CGSMS Select Service for MO Short Messages

AT+CGSMS specifies the service or service preference that the MT will use to send MO (mobile originated) short messages.

Syntax

Test Command

```
AT+CGSMS=?
```

Response(s)

```
+CGSMS: (list of supported <service>s)
OK
```

Read Command

```
AT+CGSMS?
```

Response(s)

```
+CGSMS: <service>
OK
```

Write Command

```
AT+CGSMS=<service>
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP 27.007

Parameter Description

<service>(num)(&V)(NV)

A numeric parameter which indicates the service or service preference to be used.

0	Packet Domain
1(D)	Circuit switched
2	Packet Domain preferred (use circuit switched SMS transfer if mobile is not PS attached)
3	Circuit switched preferred (use Packet Domain if circuit switched is not available)

10.18 AT+CNMPSD No more PS data

The AT+CNMPSD command indicates that no application on the MT is expected to exchange data. Upon receiving this command, the final result code OK is returned. When in UTRAN, if further conditions defined in 3GPP TS 25.331 [43] are met, this can cause transmission of a SIGNALLING CONNECTION RELEASE INDICATION message with the cause "UE Requested PS Data session end".

Syntax

Test Command

```
AT+CNMPSD=?
```

Response(s)

```
OK
```

Exec Command

```
AT+CNMPSD
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	-	+

Reference(s)

3GPP 27.007

10.19 ATD*99# Request Packet Domain service

This command causes the MT to perform whatever actions are necessary to establish a communication between the TE and the external PDN.
The V.250 'D' (Dial) command causes the MT to enter the V.250 online data state and, with the TE, to start the specified layer 2 protocol. No further commands may follow on the AT command line. PS attachment and PDP context activation procedures may take place prior to or during the PDP startup if they have not already been performed using the AT+CGATT and AT+CGACT commands.
To confirm acceptance of the command before entering the V.250 online data state command will respond with CONNECT.
The application that initiates the PPP mode must be designed to start all LCP configure requests in accordance with TS 27.060 par 9.1. Otherwise the MT remains, after the CONNECT, infinitely in a waiting state.
When the layer 2 protocol has terminated, either as a result of an orderly shut down of the PDP or an error, the MT enters V.250 command state and returns NO CARRIER (for details refer to Section 10.6.1, Automatic deactivation of PDP context during dial-up PPP).
ATD*99# is blocked when the Fixed Dialing lock is enabled and the number "*99#" is not present in the "FD" phonebook (see AT+CLCK SIM Fixed Dialing lock). In this case "+CME ERROR: call barred" is returned.

Syntax

Exec Command

```
ATD*99[* [<called_address>][* [<L2P>][* [<cid>]]]]#
```

Response(s)

```
CONNECT
NO CARRIER
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	-	-	+

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<called_address>(str)

IP V4 address in the form w.x.y.z, which identifies the called party; if it is provided, the MT will automatically set up a virtual call to the specified address after the context has been activated.

<L2P>(num)

Layer 2 protocol to be used between the TE and MT.

[1] layer 2 protocol PPP

<cid>(num)

Parameter specifies a particular PDP context definition (see AT+CGDCONT parameter <cid>).
Secondary PDP contexts are not supported.
If parameter is not specified, then the first defined primary context is used.

10.20 AT^SGAPN Configure APN class settings

Command allows to query or set APN class parameters for PDP contexts.
The AT^SGAPN test command returns the supported ranges of the APN class parameters.
The read command returns the current values for the APN class parameters for all defined PDP contexts.
The write command can be used to set the APN class parameters for a PDP context already defined by AT+CGDCONT and identified by the context identifier <cid>. If a context is newly defined by using AT+CGDCONT, then its APN class is 0, the APN bearer is "ANY", it is enabled and its inactivity timer is disabled.
When parameter settings are changed for an active context, it is necessary to close and reestablish the connection to make the changes take effect.

The default settings of AT^SGAPN as well AT+CGDCONT depend on the loaded network provider profile. For details see AT^SCFG "MEopMode/Prov/Cfg" parameter <provCfg> and AT^SCFG "MEopMode/Prov/AutoSelect" parameter <provAutoSelect>.

Syntax

Test Command

AT^SGAPN=?

Response(s)

^SGAPN: (list of supported <cid>s), (list of supported <apnClass>s), (list of supported <apnType>s), , (list of supported <bearer>s), (list of supported <enabledFlag>s), (range of supported <inactivityTimeout>s)
OK
ERROR
+CME ERROR: <err>

Read Command

AT^SGAPN?

Response(s)

[^SGAPN: <cid>, <apnClass>, <apnType>, <APN>, <bearer>, <enabledFlag>, <inactivityTimeout>]
[^SGAPN: ...]
OK
ERROR
+CME ERROR: <err>

Write Command

AT^SGAPN=<cid>, <apnClass>[, <apnType>[, <APN>[, <bearer>[, <enabledFlag>[, <inactivityTimeout>]]]]]

Response(s)

OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<cid>(num)(NV)

Parameter specifies a particular PDP context definition (see AT+CGDCONT parameter <cid>).

1...16

<apnClass>(num)(NV)

Parameter specifies an APN class.

0...16

<APN>(str)(NV)

Access Point Name

Parameter specifies the logical name used to select the GGSN or the external packet data network. It is the same parameter as the AT+CGDCONT parameter <APN>.
Changing this parameter using AT^SGAPN will also change the AT+CGDCONT value.

<apnType>(str)(NV)

Parameter specifies the type of the APN. It is the same parameter as the AT+CGDCONT parameter <PDP_type>.
Changing this parameter using AT^SGAPN will also change the AT+CGDCONT value.

“IP“

“PPP“

“IPV6“

“IPV4V6“

<bearer>(str)(NV)

Parameter specifies the APN bearer.

“GSM“

“WCDMA“

“LTE“

“ANY“

<enabledFlag>(str)(NV)

Parameter specifies whether an APN is enabled or not. A disabled APN can not be used to establish a connection.

“Enabled“

“Disabled“

<inactivityTimeout>(num)(NV)

For each APN exists an inactivity timer. If enabled, then for connections without data transfer the connection will be terminated after the timer expires.

0	Inactivity timer disabled
1...122820	Inactivity timeout value in s

10.21 AT^SGAUTH Set Type of Authentication for PDP-IP Connections

AT^SGAUTH specifies the authentication protocol, password and user name to be given if a Packet Domain network requires authentication and the subscriber uses AT+CGACT for PDP context activation.

See also parameter <gauth> provided by the configuration command AT^SCFG. This parameter specifies the authentication protocol applied by AT+CGDATA or ATD*99# during the PPP startup phase if no PDP context is activated yet.

Syntax

Test Command

```
AT^SGAUTH=?
```

Response(s)

```
^SGAUTH:(range of supported<cid>s), (list of supported <auth_type>s), ,
OK
ERROR
+CME ERROR: <err>
```

Read Command

```
AT^SGAUTH?
```

Response(s)

```
^SGAUTH:<cid>, <auth_type>[, <user>]
^SGAUTH:<cid>, <auth_type>[, <user>]
...
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT^SGAUTH=<cid>[, <auth_type>[, <passwd>, <user>]]
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<cid>(num)(NV)

Parameter specifies a particular PDP context definition (see AT+CGDCONT parameter <cid>).

<auth_type>(num)(NV)

Indicates the types of authentication to be used for the specified context. If CHAP or PAP is selected two additional parameters <passwd> and <user> need to be specified.

[0]	none
1	PAP
2	CHAP

<passwd>(str)(NV)

Parameter specifies the password used for authentication. It is required for the authentication types PAP and CHAP.
Maximum length: 127 characters.

<user>(str)(NV)

Parameter specifies the user name used for authentication. It is required for the authentication types PAP and CHAP.
Maximum length: 127 characters.

10.22 AT^SWWAN PDP Context Activate or Deactivate

AT^SWWAN write command can be used to activate or deactivate a WWAN connection for a PDP context defined with AT+CGDCONT.

UE supports two WWAN adapters (also referred to as Wireless Adapters or RmNet interfaces). The benefit is that different APNs can be assigned to each WWAN adapter. Both WWAN adapters can be activated a the same time.

AT^SWWAN read command shows whether a WWAN connection is active and which PDP context is used for it. If no WWAN connection is active, then read command just returns OK. To track activation errors AT^SIND indicator "ceer" can be used.

Syntax

Test Command

AT^SWWAN=?

Response(s)

^SWWAN: (list of supported <state>s), (list of supported <cid>s), (list of supported <WWAN adapter>s)
OK
ERROR
+CME ERROR: <err>

Read Command

AT^SWWAN?

Response(s)

[^SWWAN: <cid>, <state>[, <WWAN adapter>]]
[^SWWAN: ...]
OK
ERROR
+CME ERROR: <err>

Write Command

Activate/Deactivate WWAN connection

AT^SWWAN=<action>, <cid>[, <WWAN adapter>]

Response(s)

OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	-	-

Parameter Description

<action>(num)	
0	Deactivate
1	Activate

<state>(num)	
0(P)	Deactivated
1	Activated

<cid>(num)

Parameter specifies a particular PDP context definition (see AT+CGDCONT parameter <cid>).

<WWAN adapter>(num)	
1	First WWAN adapter If parameter <WWAN adapter> is omitted in the AT^SWWAN write command, the first WWAN adapter will be used.
2	Second WWAN adapter

Notes

- PDP contexts already activated by other commands as for example AT+CGACT cannot be reused for WWAN, except in LTE mode where the PDP context activated for LTE attach can also be used to start a WWAN connection. However, please note that some providers do not allow reusing this PDP context for data connectivity via Internet (e.g. German Telecom, China Mobile). For more information please refer to Section 10.1.1, Attaching to LTE Networks and Registering to IMS.
- PDP contexts defined for IMS and Emergency APNs cannot be used for WWAN connections.
  To check the currently defined PDP contexts use the AT+CGDCONT read command. The preconfigured APNs largely depend on the provider configuration, some APNs refer to IMS or SOS, others do not. Therefore, it is recommended to check especially the AT+CGDCONT parameter <P-CSCF_discovery> that is enabled (value 1) only in PDP contexts for IMS or IMS Emergency signalling.
- If activation or deactivation of a WWAN connection fails, then AT+CEER may provide further informations about the reason.

11. USIM related Commands

AT commands described in this chapter are related to the Universal Subscriber Identity Module (USIM) connected to the PLAS9-W.

Note:
If using data from the USIM please bear in mind that the content of all Elementary Files is *subject to change* at any moment!
This is because the network can change the USIM's data in the background via USIM Application Toolkit (USAT) procedure "Data download to USIM". For a detailed description please refer to 3GPP TS 11.14 [18], 3GPP TS 31.111 [19], ETSI TS 102 223 [20].
To get informed that changing Elementary Files has taken place the Customer Application (TE) needs to hook up USAT Proactive Command "REFRESH". For more information please refer to Chapter 8., USIM Application Toolkit (USAT) Commands and Section 8.7, AT^SSTGI in particular.

11.1 AT+CCHC Close logical channel

AT+CCHC asks the UE to close a communication session with the USIM. The UE shall close the previously opened logical channel, and no more commands can be sent on this logical channel. The UICC will close the logical channel when receiving this command.

Syntax

Test Command

```
AT+CCHC=?
```

Response(s)

```
OK
```

Write Command

```
AT+CCHC=<sessionid>
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45], 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16]

Parameter Description

<sessionid>(num)

Session Id to be used in order to target a specific application on the USIM using the logical channels mechanism. The number is the <sessionid> returned by the channel open command AT+CCHO.

11.2 AT+CCHO Open logical channel

AT+CCHO asks the UE to open a communication session with USIM. The UICC will open a new logical channel for the selected application identified by <dfname> and the UE shall return <sessionid> as response. The UE shall restrict the communication between the TE and the UICC to this logical channel.
The <sessionid> shall be used when sending commands with the Generic Logical Channel access AT+CGLA command. It will also be used with AT+CCHC to close the channel.

Syntax

Test Command

```
AT+CCHO=?
```

Response(s)

```
OK
```

Write Command

```
AT+CCHO=<dfname>
```

Response(s)

```
+CCHO: <sessionid>
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45], 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16]

Parameter Description

<dfname>(str)

All selectable applications in USIM are referenced by DF name coded on 1 to 16 bytes.

<sessionid>(num)

A session Id to be used in order to target a specific application on USIM using logical channels mechanism.

11.3 AT+CGLA Generic logical channel access

AT+CGLA allows direct control of the USIM by a remote application on the TE. The UE manages the channel relevant bits of the class byte depending on the <sessionid> and then sends the <command> as it is to the USIM. The UE takes care of processing USIM information within the frame specified by GSM/UMTS.
For parameter and USIM result coding please refer to 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16].

Syntax

Test Command

```
AT+CGLA=?
```

Response(s)

```
OK
```

Write Command

```
AT+CGLA=<sessionid>, <length>, <command>
```

Response(s)

```
+CGLA: <length>,<response>
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45], 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16]

Parameter Description

<sessionid>(num)

Identifier of the session to be used in order to send the APDU commands to the USIM.
The number is the <sessionid> returned by the channel open command AT+CCHO.

<length>(num)

Number of characters of <command> or <response> string.

<command>(str)

Command passed on by the UE to the USIM.

<response>(str)

Response data of the command returned by the USIM.

11.4 AT+CRSM Restricted USIM Access

AT+CRSM offers easy access of the Elementary Files on the USIM. Access to the USIM database is restricted to the commands listed with parameter <command>.
All parameters of AT+CRSM are used as defined by the specifications listed below. PLAS9-W handles internally all required USIM interface locking and file selection routines.
As response to the command, the PLAS9-W sends the actual USIM information parameters and response data. "+CME ERROR" may be returned if the command cannot be passed to the USIM, e.g. if the USIM is not inserted. Failures to execute the command on the USIM will be reported by the <sw1> and <sw2> parameters.

Please beware of *possible changes to Elementary Files* by the network at any time, refer Chapter 11., USIM related Commands.

Syntax

Test Command

```
AT+CRSM=?
```

Response(s)

```
OK
```

Write Command

```
AT+CRSM=<command>[, <fileID>[, <P1>, <P2>, <P3>[, <data>]]]
```

Response(s)

```
+CRSM: <sw1>,<sw2>[,<response>]
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45], 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16] ETSI TS 102 221 [17]

Parameter Description

<command>(num)

USIM command number.

176	READ BINARY
178	READ RECORD
192	GET RESPONSE
214	UPDATE BINARY
220	UPDATE RECORD
242	STATUS

<fileID>(num)

Identifier for an elementary data file on USIM, if used by <command>.

<P1>(num)

Parameter to be passed on by the PLAS9-W to the USIM.

0...255

`<P2>`(num)

Parameter to be passed on by the PLAS9-W to the USIM.

0...255

`<P3>`(num)

Parameter to be passed on by the PLAS9-W to the USIM.

0...255

`<data>`(str)

Information which shall be written to the USIM (hexadecimal character format).

`<sw1>`(num)

Status information from the USIM about the execution of the actual command. It is returned in both cases, on successful or failed execution of the command.

0...255

`<sw2>`(num)

Status information from the USIM about the execution of the actual command. It is returned in both cases, on successful or failed execution of the command.

0...255

`<response>`(str)

Response data in case of a successful completion of the previously issued command.
"STATUS" and "GET RESPONSE" commands return data, which gives information about the currently selected elementary data field. This information includes the type of file and its size.
After "READ BINARY" or "READ RECORD" commands the requested data will be returned.
`<response>` is empty after "UPDATE BINARY" or "UPDATE RECORD" commands.

11.5 AT+CSIM Generic USIM Access

AT+CSIM allows direct control of the USIM.
Compared to the restricted USIM access command AT+CRSM, the definition of AT+CSIM allows to take more control over the USIM interface.
However, the USIM Application Toolkit functionality is not supported by AT+CSIM. Therefore the following USIM commands cannot be used: TERMINAL PROFILE, ENVELOPE, FETCH and TEMINAL RESPONSE.

Syntax

Test Command

```
AT+CSIM=?
```

Response(s)

```
OK
```

Write Command

```
AT+CSIM=<length>, <command>
```

Response(s)

```
+CSIM: <length>,<response>
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45], 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16] ETSI TS 102 221 [17]

Parameter Description

`<length>`(num)

Number of characters in `<command>` or `<response>` string.

`<command>`(str)

Command passed on by the PLAS9-W to the USIM.
Parameter length: maximum 260 Bytes.

`<response>`(str)

Response data of the command returned by the USIM.
Parameter length: maximum 258 Bytes.

Note

- Access to datafields via SELECT is only allowed to files according to 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16].

Examples

EXAMPLE 1

The following examples show SELECT and GET RESPONSE commands for a 2G SIM card.

`AT+CSIM=14,"A0A40000027F10"`	SELECT DF-Telecom.
`+CSIM: 4,"9F19"`	Command successful. Indicates that x19 bytes response data are available and can be requested by using GET RESPONSE.
`OK`	
`AT+CSIM=14,"A0A40000026F3A"`	SELECT EF-ADN (Abbreviated dialing numbers).
`+CSIM: 4,"9F0F"`	Command successful. Indicates that x0F bytes response data are available and can be requested by using GET RESPONSE.
`OK`	
`AT+CSIM=10,"A0C000000F"`	GET RESPONSE command requests x0F bytes EF-ADN data.
`+CSIM: 34,"000002306F3A040011F0220102011C9000"`	
`OK`	

EXAMPLE 2

The following examples show SELECT and GET RESPONSE commands for a 3G USIM card.

`AT+CSIM=14,"00A40004023F00"`	SELECT Master File (MF).
`+CSIM: 4,"6138"`	Command successful. Indicates that x38 bytes response data are available and can be requested by using GET RESPONSE.
`OK`	
`AT+CSIM=10,"00C0000038"`	GET RESPONSE command requests x38 bytes MF data.
`+CSIM: 116,"6236.......A9000"`	(Response truncated here.)
`OK`	

11.6 AT^SATR Query SIM's Answer to Reset Data

AT^SATR performs multiple USIM related commands. It serves to trigger a USIM restart and query of Answer to Reset (ATR) data. The ATR data string of up to 33 bytes sent from the USIM to the UE, contains information about the USIM and the supported data transfer protocols. For ATR coding refer to 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16].

Syntax

Test Command

```
AT^SATR=?
```

Response(s)

```
OK
```

Write Command

```
AT^SATR=<command>
```

Response(s)

In case of <command>="GetAtr"

```
^SATR: <response>
OK
ERROR
+CME ERROR: <err>
```

For all other Commands

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<command>(str)

List of possible subcommands provided by AT^SATR.

“RestartSim“	Restart the currently inserted USIM.
“GetAtr“	Retrieve the Answer to Reset (ATR) data of the currently inserted USIM.
“SimPowerDown“	Perform USIM power down.
“SimPowerUp“	Perform USIM power up.

<response>(str)

GetAtr Response

Answer to Reset (ATR) data of currently inserted USIM.

11.7 AT^SCID USIM Identification Number

AT^SCID serves to query the USIM identification number. This information is retrieved from USIM elementary file EF_{ICCID}; for details refer to 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16].

Syntax

Test Command

```
AT^SCID=?
```

Response(s)

```
OK
```

Exec Command

```
AT^SCID
```

Response(s)

```
^SCID: <cid>
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<cid>(text)

USIM identification number.

11.8 AT^SCKS Query USIM and Chip Card Holder Status

AT^SCKS write command enables or disables the presentation of URCs to report the connection status of the USIM.
AT^SCKS read command returns the URC presentation mode and the status of the USIM connection.
Also refer to AT^SIND, which supplies indicator "simstatus" to monitor the USIM status.

Syntax

Test Command

```
AT^SCKS=?
```

Response(s)

```
^SCKS:(list of supported <mode>s)
OK
```

Read Command

```
AT^SCKS?
```

Response(s)

```
^SCKS: <mode>,<SimStatus>
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT^SCKS=<mode>
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Unsolicited Result Code

```
^SCKS: <SimStatus>
```

If the USIM connection status has changed an unsolicited result code (URC) is issued.

Parameter Description

<mode>(num)(&V)(&W)	
0(&F)	Disable URC "^SCKS".
1	Enable URC "^SCKS".

<SimStatus>(num)(&V)	
0	USIM is not inserted.
1	USIM inserted.
2	Possible reasons: • The USIM interface hardware has been deactivated to prevent possible damage (e.g. if a USIM with invalid or unsupported electrical specifications has been detected). The USIM interface can be reactivated only by restarting the UE, e.g. with "AT+CFUN= n,1".

	• In case a 5V USIM is inserted it might be possible that the USIM is not functional at all. As a result, URC "^SCKS: 0" occurs.
3	If during power up the USIM returns status words 6F00h (Technical problem, no precise diagnosis) to three consecutive APDUs sent by PLAS9-W, the USIM interface hardware has been deactivated. The USIM interface can be reactivated only by restarting the UE, e.g. via "AT+CFUN= n,1".

Note

- If <mode>=1 ("^SCKS" URC enabled) is stored to the user profile with AT&W it may happen that the "^SCKS" URC shows up after the "^SYSSTART" URC although the (U)SIM connection status has not changed.

11.9 AT^SSET USIM Data Ready Indication

After power-up and personalization (PIN entry if required) PLAS9-W starts reading data from the USIM. AT^SSET controls the presentation of "^SSIM READY" URC which indicates that the UE has finished this initial reading. Afterwards all AT commands that depend on USIM data can be used, e.g. phonebook and SMS related AT commands.

Syntax

Test Command

```
AT^SSET=?
```

Response(s)

```
^SSET:(list of supported <n>s)
OK
```

Read Command

```
AT^SSET?
```

Response(s)

```
^SSET: <n>
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT^SSET=<n>
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Unsolicited Result Code

```
^SSIM READY
```

This URC indicates that the UE has finished its initial USIM access.
Any attempt to access phonebook, SMS or other USIM data before having received the "^SSIM READY" URC, may either result in a "+CME: SIM busy" message or, in some cases, a couple of seconds delay before the command is executed.

Parameter Description

<n>(num)(&V)(&W)

URC presentation mode

0(&F)	Disable "^SSIM READY" URC.
1	Enable "^SSIM READY" URC.

12. Phonebook Commands

The AT commands described in this chapter allow the external application to access the phonebooks located in the PLAS9-W's memory or on the attached Subscriber Identity Module (SIM).

12.1 AT+CPBS Select phonebook memory storage

AT+CPBS selects the active phonebook storage, i.e. the phonebook storage that all subsequent phonebook commands will be operating on.
The read command returns the currently selected <storage>, the number of <used> entries and the <total> number of entries available for this storage.
The test command returns all supported <storage>s as compound value.

Syntax

Test Command

AT+CPBS=?

Response(s)

+CPBS: (list of supported <storage>s)
OK
ERROR
+CME ERROR: <err>

Read Command

AT+CPBS?

Response(s)

+CPBS: <storage>, <used>, <total>
OK
ERROR
+CME ERROR: <err>

Write Command

AT+CPBS=<storage>

Response(s)

OK
ERROR
+CME ERROR: <err>

Write Command

For write access to FD phonebook

AT+CPBS=<storage>, <pin>

Response(s)

OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<storage>(str)	
“SM“(&F)(P)	USIM phonebook Capacity: depending on USIM Location: USIM
“FD“	Fixed dialing phonebook Capacity: depending on USIM Location: USIM
“ME“	Mobile equipment phonebook Capacity: max. 500 entries Location: ME
“EN“	Emergency number Capacity: depending on USIM or ME Location: USIM or ME Can be accessed without entering PIN. AT+CPBW command is not applicable to this storage.
“ON“	MSISDN list Availability and capacity: depending on USIM Location: USIM
“VM“	CPHS voice mailbox phonebook Capacity: depending on USIM Location: USIM
“SD“	Service dialing number phonebook. Read only. Capacity: depending on USIM Location: USIM

<used>(num)

Value indicating the number of used locations in selected memory storage.

<total>(num)

Value indicating the maximum number of locations allowed in the selected memory storage.

Notes

- Users should be aware that when using this AT command quickly after USIM PIN authentication the USIM data may not yet be accessible, resulting in a short delay before the requested AT command response is returned.
- To get write access to the "FD" phonebook the following input is required: AT+CPBS="FD","PIN2"
- When using "EN" phonebook the numbers 911 and 112 must always be output by using AT+CPBR write command.
- Emergency number ("EN") phonebook can be accessed (using AT+CPBS="EN") without entering PIN usually used by AT+CPIN="PIN1". Then AT+CPBS read command and AT+CPBR write command are also possible without entering PIN.

12.2 AT+CPBR Read from phonebook

AT+CPBR serves to read one or more entries from the phonebook selected with AT command AT+CPBS.

The AT+CPBR test command returns the location range supported by the current phonebook storage, the maximum length of <number> field and the maximum length of <text> field.
Note: Length information may not be available while SIM storage is selected. If storage does not offer format information, the format list contains empty parenthesizes.

The AT+CPBR write command determines the phonebook entry to be displayed with <location1> or a location range from <location1> to <location2>. Hence, if no <location2> is given only the entry at <location1> will be displayed.
If no entries are found at the selected location "+CME ERROR: not found" will be returned.

Syntax

Test Command

```
AT+CPBR=?
```

Response(s)

```
+CPBR: (1-<maxloc>), <nlength>, <tlength>
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CPBR=<location1>[, <location2>]
```

Response(s)

```
[+CPBR: <location1>, <number>, <type>, <text>]
[+CPBR: <location2>, <number>, <type>, <text>]
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
±	+	+	+	-

Reference(s)

3GPP TS 27.007 [45], 3GPP TS 24.008 [38], 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16]

Parameter Description

<location1>(num)

The first (lowest) location number within phonebook memory where to start reading. The maximum range supported by the current phonebook is given in the test command response.
If <location1> exceeds the upper bound <maxloc> (as indicated by the test command), command will respond with "+CME ERROR: invalid index".

<location2>(num)

The last (highest) location number within phonebook memory where to stop reading. The maximum range supported by the current phonebook is given in the test command response.
If both <location1> and <location2> are in the range indicated by the test command parameter <maxloc>, the list of entries will be output and terminated with "OK". If <location2> exceeds the range indicated by the test command parameter <maxloc>, the command returns only "+CME ERROR: invalid index".

<number>(str)

Phone number in format specified by <type>, it may be an empty string.

<type>(num)

Type of address octet, which defines the used type of number (ton) and the numbering plan identification (npi). Possible values are:

128	Restricted <number> includes unknown type and format.
145	Dialing string <number> includes international access code character '+'.
161	National number <number>. Network support of this type is optional.
209	Dialing string <number> has been saved as ASCII string and includes non-digit characters other than "*", "#", "+" or "P". Note that phonebook entries saved with this type cannot be dialed.
255	Dialing string <number> contains "*", "#" characters for Supplementary Service codes. Network support of this type is optional.
129	Otherwise.

<text>(str)(+CSCS)

Text assigned to a phone number. The maximum length for this parameter is given with test command response parameter <tlength>.
If using an ASCII terminal characters which are coded differently in ASCII and GSM have to be entered via escape sequences as described in Section 1.7, Supported character sets.

<maxloc>(num)

Maximum location number for the currently selected storage. For phonebooks located on SIM, this value varies depending on the SIM card. See AT+CPBS for typical values.

<nlength>(num)

Maximum length of phone number for "normal" locations. Depending on the storage a limited number of locations with extended memory is available per phonebook. These locations allow storing numbers with twice the standard length, which is 2*<nlength> digits for normal numbers, but only <nlength> digits for numbers saved with <type>=209.

<tlength>(num)

Maximum amount of memory of <text> assigned to the telephone number in bytes. The value is shown in the AT+CPBR test command response. For details please see AT+CPBW parameter <tlength>.

Notes

- Users should be aware that when using this AT command quickly after SIM PIN authentication the SIM data may not yet be accessible, resulting in a short delay before the requested AT command response is returned.
- When a supplementary service command was stored to the phonebook along with a "+" within the phone number please note that the UE will not display the "+" after restart, but correctly handles the phone number as international type.
- When emergency number ("EN") phonebook is selected by AT+CPBS write command the numbers 911 and 112 must always be output by using AT+CPBR write command.
- Emergency number ("EN") phonebook can be accessed (using AT+CPBS="EN") without entering PIN usually used by AT+CPIN="PIN1". Then AT+CPBS read command and AT+CPBR write command are also possible without entering PIN.
- There is no restriction reading unsupported values for <type>.

Example

`AT+CPBR=?`	First run the AT+CPBR test command to find out the maximum range of entries stored in the active phonebook.
`+CPBR: (1-100),20,17`	PLAS9-W returns the supported values, where 100 is the supported range of location numbers, 20 is the length of the phone number and 17 is the maximum length of the associated text.

`AT+CPBR=1,3`
`+CPBR: 1,"+999999",145,"Charlie"`
`+CPBR: 2,"+777777",145,"Bill"`
`+CPBR: 3,"+888888",145,"Arthur"`
	Then use the AT+CPBR write command to display the phonebook entries sorted by location numbers.

12.3 AT+CPBW Write into phonebook

The AT+CPBW write command can be used to create, edit and delete a phonebook entry at a <location> of the active storage selected with AT+CPBS.
If <storage>="FD" (SIM fixed dialing numbers) is selected, PIN2 authentication has to be performed prior to any write access.

The AT+CPBW test command returns the location range supported by the current storage, the maximum length of the <number> field, the range of supported <type> values and the maximum length of the <text> field. Note: The length may not be available while SIM storage is selected. If storage does not offer format information, the format list contains empty parenthesizes.

Syntax

Test Command

```
AT+CPBW=?
```

Response(s)

```
+CPBW: (1-<maxloc>), <nlength>, (list of supported <type>s), <tlength>
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CPBW=[<location>][, <number>[[, <type>][, <text>]]]
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.007 [45], 3GPP TS 24.008 [38], 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16]

Parameter Description

<location>(num)

Location number within phonebook memory. The maximum range supported by each storage type is indicated in the test command response. If <location> is not given, the first free entry will be used.
If <location> is given as the only parameter, the phonebook entry specified by <location> is deleted.

<number>(str)

Phone number in format specified by <type>. Parameter must be present, although it may be an empty string. Alphabetic characters are not permitted. The <number> may contain dialstring modifiers "*", "#", "+" or "P".
If other printable special characters are used the entry needs to be saved with <type>=209. A <number> saved with <type>=209 requires double memory. In order to fit into a standard location, the number needs to be reduced to a maximum length of <nlength>/2, including all digits and dial string modifiers. Extended locations may be used as stated below for <nlength>.

<type>(num)

Type of address octet, which defines the used type of number (ton) and the numbering plan identification (npi).
If <type> is not specified:
- if <number> starts with "+", <type> 145 is used
- otherwise, <type> 129 is used.
Supported values are:

128	Restricted <number> includes unknown type and format.
145	Dialing string <number> includes international access code character "+".
161	National number <number>. The network support for this type is optional.
209	Dialing string <number> will be saved as ASCII string. Note that phonebook entries saved with this type cannot be dialed.
255	Dialing string <number> contains "*", "#" characters for Supplementary Service codes. Network support of this type is optional.
129	Unknown number. If <number> contains a leading "+", the "+" sign will be removed.

<text>(str)(+CSCS)

Text assigned to the phone number. The maximum length of this parameter is given in the test command response <tlength>. When using an ASCII terminal, characters which are coded differently in ASCII and GSM have to be entered via escape sequences as described in Section 1.7, Supported character sets.

<maxloc>(num)

Maximum number of locations supported by the currently selected storage. For phonebooks located on SIM, this value varies depending on the SIM card. See AT+CPBS for typical values.

<nlength>(num)

Maximum length of phone number for "normal" locations. Depending on the storage, a limited number of locations with extended memory is available per phonebook. These locations allow storing numbers with twice the standard length, which is 2*<nlength> digits for normal numbers, but only <nlength> digits for numbers saved with parameter <type>= 209. If all extended locations of the selected phonebook are used up, then any attempt to write a number which requires extended memory will be denied with "+CME ERROR: memory full".

<tlength>(num)

Maximum amount of memory of <text> assigned to the telephone number in bytes. The value is shown in the AT+CPBW test command response.
An internal optimization mechanism enables the UE to choose the most efficient method of storing <text>: Depending on the entered <text> characters, the UE internally converts them either to GSM or UCS2 alphabet, no matter which character set the TE is using for input and output (configured with AT+CSCS). For example, if AT+CSCS="UCS2" and, therefore, the TE enters the letter "A" as "0041" (two bytes) it is possible that the UE converts it to GSM alphabet, thus requiring only one byte of memory.
Note that escape sequences used in GSM coding require two bytes. Example: The € symbol will be stored as escape sequence "\1Be" in GSM, and "20AC" in UCS2.
For strings in UCS2 there are three different coding schemes. For detailed descriptions please refer to 3GPP TS 11.11 [14], 3GPP TS 31.101 [15], 3GPP TS 31.102 [16], Annex B.

Notes

- Users should be aware that when using this AT command quickly after SIM PIN authentication the SIM data may not yet be accessible, resulting in a short delay before the requested AT command response is returned.
- See for more details AT+CPBS select command which phonebook <storage> is possible to write by the user.
- DTMF transmission:
  If a dial string contains the call modifier "P" the digits after this call modifier will be saved as DTMF tones. The DTMF tones 'A','B','C' and 'D' can not be saved due to BCD limitations.

Examples

EXAMPLE 1

Make a new phonebook entry at the first free location

```
AT+CPBW=,"+431234567",145,"international"
```

EXAMPLE 2

Delete entry at location 1

```
AT+CPBW=1
```

EXAMPLE 3

The following examples are provided to illustrate the effect of writing phonebook entries with different types of dial string modifiers in <number>

```
AT+CPBW=5,"12345678",,"Arthur"
AT+CPBW=6,"432!P-765()&54*654#",,"John"
AT+CPBW=7,"432!P-765()&54*654#",129,"Eve"
AT+CPBW=8,"432!P-765()&54*654#",145,"Tom"
AT+CPBW=9,"432!P-765()&54*654#",209,"Richard"
```

EXAMPLE 4

Read phonebook entries from locations 5 - 9 via AT+CPBR

```
+CPBR:5,"12345678",129,"Arthur"
+CPBR:6,"432P76554*654#",129,"John"
+CPBR:7,"432P76554*654#",129,"Eve"
+CPBR:8,"+432P76554*654#",145,"Tom"
+CPBR:9,"432!P-765()&54*654#",209,"Richard"
```

12.4 AT+CSVM Set voice mail number

The number to the voice mail server is set by AT+CSVM command.
The parameters <number> and <type> can be left out if the parameter <mode> is set to 0. The read command returns the status (enabled <mode>=1 or disabled <mode>=0), the currently selected voice mail <number> and the <type>.
The test command returns supported <mode>s and <type>s.

Syntax

Test Command

AT+CSVM=?

Response(s)

+CSVM: (list of supported <mode>s), (list of supported<type>s)
OK
ERROR
+CME ERROR: <err>

Read Command

AT+CSVM?

Response(s)

+CSVM: <mode>, <number>, <type>
OK
ERROR
+CME ERROR: <err>

Write Command

AT+CSVM=<mode>[, <number>[, <type>]]

Response(s)

OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<mode>(num)

0	Disable the voice mail number
1	Enable the voice mail number

<number>(str)

Phone number in format specified by <type>. Parameter must be present when setting (<mode>=1) the voice mail number. Alphabetic characters are not permitted. The <number> may contain dialstring modifiers "*", "#", "+" or "P".
If other printable non-alphabetic characters are used the entry needs to be saved with <type>=209. A <number> saved with <type>=209 requires double memory. In order to fit into a standard location, the number needs to be reduced to a maximum length of <nlength>/2, including all digits and dial string modifiers.

<type>(num)

Type of address octet, which defines the used type of number (ton) and the numbering plan identification (npi). If <type> is not specified the unknown <type>=129 is used. If <number> contains a leading "+" <type>=145 (international) is used.
Possible values are:

128	Restricted <number> includes unknown type and format.
145	Dialing string <number> includes international access code character "+".
161	National number <number>. The network support for this type is optional.
209	Dialing string <number> will be saved as ASCII string. This is the default value, if <type> is not specified explicitly and characters other than "*", "#", "+" or "P" are included in <number>. Note that phonebook entries saved with this type cannot be dialed.
255	Dialing string <number> is a command to control a Supplementary Service, i.e. "*", "#" codes are contained. Network support of this type is optional.
129	Unknown number. If <type> is unknown and the <number> contains a leading "+", then this sign is removed.

Notes

- Users should be aware that when using this AT command quickly after USIM PIN authentication the USIM data may not yet be accessible, resulting in a short delay before the requested AT command response is returned.
- "VM" phonebook is only supported when corresponding Elementary File is available on USIM. Elementary Files belonging to "VM" phonebook are optional on USIM.
- If "VM" phonebook is available on USIM and has no write access it is not possible to use AT+CSVM write command.

Examples

EXAMPLE 1

Make a new voice mail number entry

AT+CSVM=1,"1234567890"	The <type> is not specified therefore the unknown <type>=129 is used.
OK	The voice mail number is written to UE.

EXAMPLE 2

Delete the voice mail number entry

AT+CSVM=0	The parameters <number> and <type> are not necessary.
OK	The voice mail number is deleted on UE.

EXAMPLE 3

Read an empty voice mail number entry

```
AT+CSVM?
+CSVM: 0,"",128
OK
```

12.5 AT+CNUM Read own numbers

AT+CNUM returns the subscribers own number(s) from the SIM.

Syntax

Test Command
AT+CNUM=?
Response(s)
OK

Exec Command
AT+CNUM
Response(s)
[+CNUM: [<alpha>], <number>, <type>] [+CNUM: ...] OK ERROR +CME ERROR: <err>

PIN	MDM	APP	✈	Last
+	+	+	+	-

Reference(s)
3GPP TS 27.007 [45]

Parameter Description

<alpha>(str)

Optional alphanumeric string associated with <number>.

<number>(str)

Phone number in format specified by <type>.

<type>(num)

Type of address octet, see also: AT+CPBR <type>.

Notes

- Users should be aware that when using this AT command quickly after SIM PIN authentication the SIM data may not yet be accessible, resulting in a short delay before the requested AT command response is returned.
- The subscribers own number(s) are stored in the "ON" phonebook and can be set using the AT+CPBW command.
- For alphanumeric representation the number stored in the phonebook must be identical to the number transported over the network - then the associated name will be recognized.

13. Hardware related Commands

All AT commands described in this chapter are related to the hardware interface of the PLAS9-W. Further information regarding this interface is available in the "PLAS9-W Hardware Interface Description" [2].

13.1 AT+CCLK Real Time Clock

AT+CCLK controls the real time clock (RTC) of PLAS9-W.
If a network supports automatic time update the RTC is constantly updated with the network time. Any changes to the RTC using the command AT+CCLK will be wiped out by the network time. If a network does not support automatic time update the RTC can be set using AT+CCLK.
Each time the UE is restarted it may take up to two seconds to reinitialize the RTC and to update the current time. Therefore, it is recommended to delay the usage of AT+CCLK after restart.

Changing the RTC influences an active automatic shutdown timer (see AT^SCFG parameter <shutdownRemainingTime> for details).
The current setting of the clock is retained if the UE enters Power Down mode via AT^SMSO or restarts using AT+CFUN. However, it will be reset to its factory default value if the UE is totally disconnected from power.

Syntax

Test Command

```
AT+CCLK=?
```

Response(s)

```
OK
```

Read Command

```
AT+CCLK?
```

Response(s)

```
+CCLK: <time>
OK
```

Write Command

```
AT+CCLK=<time>
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)

3GPP TS 27.007 [45]

Parameter Description

<time>(str)(NV)

Real time clock setting

Format is "yy/mm/dd,hh:mm:ss", where the characters yy indicate the two last digits of the year, followed by month (mm), day (dd), hour (hh, 24 hour format), minutes (mm) and seconds (ss).
For the write command the year can only set between 2000 and the end of 2037. For example the 6th of July 2017 at ten past ten in the evening equates to "17/07/06,22:10:00".

The factory delivery value, which is also used if the UE was totally disconnected from power, is "18/01/01,00:00:00", where "18" here stands for "2018".
So <time> values as reponse of the read command are ambiguous if the year part is > "79". To be sure that in such cases the correct time is used, it should be set explicitly using the AT+CCLK write command.

Note

- If automatic time zone update is enabled and a time zone update occurs additional time zone information will be appended to parameter <time> in the format +CCLK: "yy/mm/dd,hh:mm:ss+zz" or +CCLK: "yy/mm/dd,hh:mm:ss-zz". Time zone is displayed only when enabled with AT+CTZU and provided by the network. See AT+CTZU for more information.
  Please note that the AT+CCLK command, the AT+CTZU URC and the AT^SIND "nitz" URC employ different formats of time and time zone indication. The formats are compliant with 3GPP TS 27.007 [45].
  The time zone parameter (zz of AT+CCLK, <nitzTZ> of AT+CTZU and <nitzTZ> of AT^SIND "nitz") is given as a positive (east) or negative (west) offset from the UTC in units of 15 minutes. Depending on the network the AT+CTZU URC and the AT^SIND "nitz" URC may additionally show the daylight daving time (DST)expressed in hours. This parameter is not appended to the AT+CCLK response.

  Example:
  The local time Berlin *17/09/21,11:37:24* is equivalent to following network triggered time indication:
  Response +CCLK: "yy/mm/dd,hh:mm:ss+zz"
  +CCLK: "17/09/21,09:37:24+08" (= UTC + 2 hours time zone offset)

  URC: +CTZU: <nitzUT>,<nitzTZ>[,<nitzDST>]
  +CTZU: "17/09/21,09:37:18",+08,1 (= UTC + 2 hours time zone offset and 1 hour DST)

  URC: +CIEV: "nitz",<nitzUT>,<nitzTZ>[,<nitzDST>]
  +CIEV: "nitz,"17/09/21,09:37:18",+08,1 (= UTC + 2 hours time zone offset and 1 hour DST)

13.2 AT^SAD Antenna Configuration

AT^SAD controls usage of the module's UMTS/LTE (RX) diversity/MIMO antenna.

For RX antenna diversity, the AT^SAD command enables verification of receive paths. RX antenna diversity means usage of two antennas and two receiver paths to provide significant gains in performance. The gains depend on how 'decoupled' the antennas are from each other. Transmitter (TX) signal is always transferred via primary antenna.

Syntax

Test Command

```
AT^SAD=?
```

Response(s)

```
^SAD: (list of supported <sadMode>s)
OK
```

Write Command

```
AT^SAD=<sadMode>
```

Response(s)

```
^SAD: <sadValue>
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<sadMode>(num)

This parameter controls usage of the RX diversity antenna.

<sadMode> RX antenna diversity related settings 10, 11, 13 are stored in the non-volatile memory, any change takes effect after next UE power-up. An error is returned if write access to non-volatile storage fails.

10	Testing mode: Disable RX diversity functionality. Activate only the first antenna for RX operation, i.e. use the primary (main) antenna for RX operation. The secondary (diversity) receiver path is switched off.
11(D)	Enable RX diversity functionality by activating both antennas for RX operation.
12	Query RX diversity functionality setting. <sadValue> returns the currently stored configuration.
13	Testing mode: The primary (main) antenna port is used as TX chain. However, the related receiver path is switched off. Only the secondary (diversity) antenna is activated for RX operation.

<sadValue>(num)

The meaning of this parameter depends on given <sadMode>.

For <sadMode>=[10, 11, 13] <sadValue> returns the currently stored configuration of the RX diversity functionality, which will be used after next restart of the UE.
For <sadMode>=12 <sadValue> returns the current non-volatile memory setting (range 10, 11, 13).

13.3 AT^SBV Battery/Supply Voltage

AT^SBV allows to monitor the supply (or battery) voltage of the module. The voltage is periodically measured. The displayed value is averaged.

The measurement is related to the reference points of BATT+ and GND. For details on the reference points please refer to the Hardware Interface Description [2]. If the measured average voltage drops below or rises above the given voltage thresholds the UE will report alert messages by sending the "^SBC" URCs listed in Section 1.8.1, Common URCs.

Syntax

Test Command

```
AT^SBV=?
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

Exec Command

```
AT^SBV
```

Response(s)

```
^SBV: <Voltage>
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<Voltage>(num)

Supply (or battery) voltage in mV

13.4 AT^SCTM Critical Operating Temperature Monitoring

AT^SCTM allows to monitor the operating temperature range of the PLAS9-W device. Refer to "PLAS9-W Hardware Interface Description" [2] for specifications on critical temperature ranges.
The AT^SCTM write command controls the presentation of URCs to report critical operating temperature limits. Use parameter <UrcMode> to enable (1) and disable (0) URC presentation.

Important: Even if setting is <UrcMode>= 1 URC presentation is disabled during a 2 minutes guard period after the module was switched on. After expiry of the 2 minutes guard period, the presentation will be enabled, i.e. URCs with alert levels "1" or "-1" will be generated. During this period PLAS9-W will not switch off, even if the critical temperature limit is exceeded. This allows the user to set up emergency calls before PLAS9-W switches off. For details refer to Section 13.4.1, Deferred shutdown.

URCs indicating levels "2" are always enabled (except during the 2 minutes guard period, but when the guard period is expired and temperature is still above/below critical limit, then the URC will be issued), i.e. they will be issued even though the factory setting AT^SCTM=0 was never changed. If level "2" URCs occur PLAS9-W will trigger shutdown within 5 seconds, unless the temperature returns to a valid operating level ("1", "0", "-1") and the guard period has not yet expired.

URCs indicating alert levels "1" or "-1" are intended to enable the user to take appropriate precautions, such as protect PLAS9-W from exposure to extreme conditions, or save or back up data etc. .

At the lowest temperature threshold PLAS9-W will neither send an URC, nor switch off automatically.
AT^SCTM read command returns:

- The URC presentation mode.
- Information about the current temperature range of the PLAS9-W device.
- The board temperature (in degree Celsius) if parameter <tempCtrl>=1.

Syntax

Test Command

```
AT^SCTM=?
```

Response(s)

```
^SCTM:(list of supported <UrcMode>s)[, (range of <temp>in Celsius)]
OK
```

Read Command

```
AT^SCTM?
```

Response(s)

```
^SCTM: <UrcMode>, <UrcCause>[, <temp>]
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT^SCTM=<UrcMode>[, <tempCtrl>]
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Unsolicited Result Code

URCs will be automatically sent to the TE when the temperature reaches or exceeds the critical level, or when it is back to normal.

^SCTM_B: <UrcCause>

URC for PLAS9-W device temperature warning.

Parameter Description

<UrcMode>(num)	
URC presentation mode. Setting will not be stored during power-down, i.e. after next restart default setting will be restored.	
0(&F)(P)	Disable URC presentation (except for <UrcCause> equal to +2).
1	Enable URC presentation.

<UrcCause>(num)	
-1	Below low temperature alert limit.
0	Normal operating temperature.
1	Above upper temperature alert limit.
2	Above uppermost temperature limit (causes switch-off after 5 s time).

<tempCtrl>(num)	
0(P)	Suppress output of <temp> in read command.
1	Output <temp> in test and read command.

<temp>(num)
Board temperature in Celsius. Is comprised between the lowest temperature warning level and the uppermost temperature warning level.

Examples

EXAMPLE 1

URCs issued when the operating temperature is out of range:

^SCTM_B: 1	Caution: Module close to overtemperature limit.
^SCTM_B: 2	Alert: Module is above overtemperature limit and switches off.
^SCTM_B: -1	Caution: Module close to undertemperature limit.

EXAMPLE 2

URC issued when the temperature is back to normal (URC is output once):

^SCTM_B: 0	Module back to normal temperature.

13.4.1 Deferred shutdown

In the following cases, automatic shutdown will be deferred if a critical temperature limit is exceeded:

- While an emergency call is in progress.
- During a 2 minutes guard period after powerup. This guard period has been introduced in order to allow for the user to make an emergency call. The start of any one of these calls extends the guard period until the end of the call. Any other network activity may be terminated by shutdown upon expiry of the guard time.

While in a "deferred shutdown" situation, the engine continues to measure the temperature and to deliver alert messages, but deactivates the shutdown functionality. Once the guard period is expired or the call is terminated, full temperature control will be resumed. If the temperature is still out of range, the UE switches off immediately (without another alert message).

CAUTION!
Automatic shutdown is a safety feature intended to prevent damage to the module. Extended usage of the deferred shutdown facilities provided may result in damage to the module, and possibly other severe consequences.

13.5 AT^SRADC Configure and Read A/D Converter

AT^SRADC controls the UE's Analog-to-Digital Converter (ADC). This allows to measure the voltage of external devices connected to the ADC input lines.
AT^SRADC write command configures the parameters required for ADC measurement and returns the measurement result(s). The value(s) can be delivered once on request by using the single measurement mode, or periodically by specifying a measurement interval.
For details refer to "PLAS9-W Hardware Interface Description, Version 01.005".

Syntax

Test Command

AT^SRADC=?

Response(s)

^SRADC: (list of supported <ch>s), (list of supported <op>s), (list of supported <it>s)
OK

Read Command

AT^SRADC?

Response(s)

^SRADC: <ch>, <op>, <it>
[^SRADC: <ch>, <op>, <it>]
[^SRADC: ...]
OK

Write Command

Single measurement (with automatic channel open and close):

AT^SRADC=<ch>

Response(s)

^SRADC: <ch>, <count>, <value>
OK
ERROR
+CME ERROR: <err>

Write Command

Periodic measurement:

AT^SRADC=<ch>, <op>[, <it>]

Response(s)

[^SRADC: <ch>, <count>, <value>]
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Unsolicited Result Code

ADC measurement URC (only used in periodic measurement mode).

^SRADC: <ch>, <count>, <value>[, <value>[, <value>[, <value>[, <value>[, <value>[, <value>[, <value>[, <value>[, <value>]]]]]]]]]

Parameter Description

<ch>(num)

ADC channel

0	First ADC channel (ADC1_IN)
1	Second ADC channel (ADC2_IN)
2	Not supported by the UE.

<op>(num)

Operation

Open or close ADC channel for measurement.
If parameter is not specified, then single measurement mode is initiated (with open and close of channel). Single measurement is not allowed if the channel is already open.

[0]	Close ADC channel (value of parameter <it> is ignored).
1	Open ADC channel

<it>(num)

Measurement interval

Parameter is used only if operation <op> is 1 (Open).

Single Measurement Mode:

[0]	Performs a single measurement (incl. close of channel).

Measurement interval in ms for Periodic Measurement Mode:

Measurement interval and URC output:
The URC output interval is miminum 1000 ms. This means if the measurement interval <it> is smaller than 1000 ms, then every second one URC will be output containing several measurement values. If <it> is equal 1000 ms or greater, each URC contains exactly one single measurement value. See examples below.

URC buffer mechanism:
If the interface is not free (e.g., during execution of an AT command) measurement values are buffered. Up to 5 URCs can be buffered, each containing up to 11 measurement values. After freeing the interface, all buffered URCs will be printed out. Loss of measured values, if any, is indicated by an additional 6th URC containing the value "32767". See example below.

Possible values in milliseconds (ms):

100...30000

<value>(num)

Measurement value

Measurement value in mV

<count>(num)

1...11	Number of measured samples In single measurement mode: <count> is always 1. In periodic measurement mode: <count> is the number of <value>s indicated by the URC "^SRADC". The higher the sample rate set with <it>, the more measured values are reported within the URC "^SRADC".

Examples

EXAMPLE 1

Single measurement

```
AT^SRADC=0                          Open the first ADC channel for single measurement.
^SRADC: 0,1,78
OK
```

EXAMPLE 2

Periodic measurement at low sample rate (5s):

```
AT^SRADC=0,1,5000                   Start periodic measurement mode on the first ADC
^SRADC: 0,1,76                      channel. Samples are taken every 5s. Every 5s the
^SRADC: 0,1,78                      URC "^SRADC" appears to report the measured volt-
^SRADC: 0,1,76                      ages. The second parameter represents the number
                                    of measured samples, in this case only one.
^SRADC: 0,1,76
AT^SRADC=0,0                        Stop the periodic measurement
OK
```

EXAMPLE 3

Periodic measurement at high sample rate (250ms):

```
AT^SRADC=0,1,250                    Start periodic measurement on the first ADC chan-
^SRADC: 0,4,76,76,77,76             nel. Samples are taken every 250ms. Every second
^SRADC: 0,4,76,76,75,76             a URC "^SRADC" appears to report the measured
^SRADC: 0,5,77,77,76,76,76          voltage. The number of samples is 4 or 5.
^SRADC: 0,4,76,76,75,76
AT^SRADC=0,0
OK                                  Stop the periodic measurement
```

EXAMPLE 4

Handling of "^SRADC" URCs and AT command execution on the same interface:

```
AT^SRADC=0,1,250                    Start periodic measurement mode on the first ADC
^SRADC: 0,4,76,76,77,76             channel. Samples are taken every 250ms.
^SRADC: 0,5,77,77,76,76,76
^SRADC: 0,4,76,76,75,76
^SRADC: 0,4,76,76,75,76
AT^SRADC?                           Input of AT command and <CR> takes some sec-
                                    onds.
^SRADC: 0,1,250
^SRADC: 1,0,0
OK
^SRADC:                             Some URCs were buffered during command input
0,11,75,75,75,75,75,75,75,75,75,75,75   and sent after completion.
^SRADC: 0,8,75,75,75,75,75,75,75,77
^SRADC: 0,1,75
^SRADC: 0,4,76,76,75,76             More URCs are delivered.
^SRADC: 0,4,76,76,75,76
^SRADC: 0,5,77,77,76,76,76
^SRADC: 0,4,76,76,77,76
^SRADC: 0,4,76,76,75,76
AT^SRADC?                           Input of AT command and <CR> takes 90s.
^SRADC: 0,1,250
^SRADC: 1,0,0
OK
^SRADC:                             some URCs were buffered during command input
0,11,75,75,75,75,75,75,75,75,75,75,75   and sent after completion
^SRADC:
0,11,73,74,73,74,73,73,73,74,74,73,73
```

```
^SRADC: 0,11,74,73,74,73,73,73,73,73,73,73
^SRADC: 0,11,73,73,74,74,73,73,74,73,73,74,74
^SRADC: 0,11,73,73,73,73,73,73,73,74,74,73,73
^SRADC: 0,8,73,73,74,73,73,73,73,32767      The URC indicates lost measurement results.
^SRADC: 0,4,74,74,73,73                     More URCs are delivered.
^SRADC: 0,4,75,75,75,75
......
```

14. General Purpose I/O (GPIO) Pin related Commands

This chapter describes the AT commands used to access and configure the GPIO pins of PLAS9-W.

Please also refer to [2] for electrical specifications of the GPIO pins.

14.1 AT^SPIO GPIO Driver Open/Close

AT^SPIO write command opens and closes the General Purpose I/O (GPIO) driver. The command must be executed before any GPIO related command can be used.
The command does not reserve any GPIO lines, only the driver required for their management will be started.

Syntax

Test Command
AT^SPIO=?
Response(s)
^SPIO:(list of supported <mode>s) OK

Write Command
AT^SPIO=<mode>
Response(s)
OK ERROR +CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<mode>(num)	
0	Close General purpose I/O driver
1	Open General purpose I/O driver

14.2 AT^SCPIN Pin Configuration

The AT^SCPIN write command serves to configure GPIOs.
Keep in mind that each GPIO can be assigned only one function. This means that if configured for GPIO handling with AT^SCPIN this GPIO is locked for any alternative function, and vice versa. Mutually exclusive functions are:

- Configuring a GPIO with AT^SCPIN.
  - Using a GPIO configured as input with AT^SCPIN to wake up the UE from power saving. Suitable GPIOs (unless otherwise assigned): GPIO1, GPIO3, GPIO4, GPIO5, GPIO9. Reporting of level state changes at the specified GPIO shall be enabled with AT^SCPOL.
- Configuring a GPIO as Remote Wakeup line to wake up the TE (see AT^SCFG, <RemWakeLine>).
- Configuring a GPIO as Low Current Indicator (see AT^SCFG "MEopMode/PowerMgmt/LCI", <lci> and <gpio>).

Syntax

Test Command

```
AT^SCPIN=?
```

Response(s)

```
^SCPIN: (list of supported <mode>s), (list of supported <pin_id>s), (list of supported <direction>s), (list of supported <startValue>s)
OK
```

Write Command

```
AT^SCPIN=<mode>, <pin_id>, <direction>[, <startValue>]
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<mode>(num)

0	Close pin
1	Open pin

<pin_id>(num)

Pin identifier

0	GPIO1
1	GPIO2
2	GPIO3
3	GPIO4
4	GPIO5
5	GPIO6
6	GPIO7
7	GPIO8
8	GPIO9
9	GPIO10

<direction>(num)

Parameter <direction> is mandatory when opening a pin, but can be omitted when closing a pin.

0	Input
1	Output

<startValue>(num)

Can be set only for outputs.

[0]	Low
1	High

Notes

- Please refer to AT^SPIO for information on opening and closing the pin.
- For closing a pin with the write command (<mode>=0), the parameter <direction> is not needed.
- Before changing the configuration of a pin be sure to close the pin.

14.3 AT^SCPOL GPIO Level Polling Configuration

AT^SCPOL serves to control automatic level polling and reporting for PLAS9-W's GPIOs. The GPIO shall already be configured with AT^SCPIN. Level polling is only applicable to input pins.
After polling has been activated for a specified GPIO, its latest level state transition will be reported via "^SCPOL" URC.

GPIO monitoring is interrupt handled. If a state transition is detected at a configured GPIO, a debouncing routine will start. The signal state has to stay stable for at least 90 ms for proper detection of a state change.

If PLAS9-W stays in power save (SLEEP) state, a transition at GPIO1, GPIO3, GPIO4, GPIO5 and GPIO9 (<pin_id>=[0,2,3,4,8]) will wake up the UE.
For all other GPIOs the state detection will only be triggered when the UE suspends power saving state for another reason.
Refer to AT^SCFG, "MeOpMode/PwrSave" parameter <PwrSaveMode> and <PwrSaveWakeup> which allow to fine-tune power saving behaviour of the UE.

Syntax

Test Command

AT^SCPOL=?

Response(s)

^SCPOL: (list of supported <mode>s), (list of supported <ioId>s)
OK

Write Command

AT^SCPOL=<mode>, <ioId>

Response(s)

OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Unsolicited Result Code

^SCPOL: <ioId>, <value>

Parameter Description

<mode>(num)

0(P)	Disable level polling for a general purpose I/O pin.
1	Enable level polling for a general purpose I/O pin.

<ioId>(num)

This can be either an already configured or an already opened <pin_id>.

<value>(num)

Level state transition detected on <ioId>.

0	<pin_id> is in low state.
1	<pin_id> is in high state.

14.4 AT^SGIO Get IO state of a specified pin

AT^SGIO write command returns the state of selected GPIO Pin. AT^SGIO requires GPIO drivers opened using AT^SPIO and AT^SCPIN.

Syntax

Test Command

AT^SGIO=?

Response(s)

^SGIO:(list of supported <io_id>s)
OK

Write Command

AT^SGIO=<io_id>

Response(s)

^SGIO: <value>
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<io_id>(num)

<pin_id> shows supported GPIO.

<value>(num)

State read on this <io_id>.

0	Low for <pin_id>
1	High for <pin_id>

14.5 AT^SSIO Set IO state of a specified pin

AT^SSIO write command sets the state of GPIO Pin. AT^SSIO requires GPIO drivers opened using AT^SPIO and AT^SCPIN. GPIO Pin must be set as ouput using AT^SCPIN first otherwise command will return error.

Syntax

Test Command

AT^SSIO=?

Response(s)

^SSIO: (list of supported <io_id>s), (list of supported <value>s)
OK

Write Command

AT^SSIO=<io_id>, <value>

Response(s)

OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	+	-

Parameter Description

<io_id>(num)

This is an already configured <pin_id>.

<value>(num)

State to be set for this <io_id>.

0	Low for <pin_id>
1	High for <pin_id>

15. Miscellaneous Commands

The AT Commands described in this chapter are related to various areas.

15.1 A/ Repeat Previous Command Line

Repeat previous AT command line.
In general, after beginning a command line with character "a" or "A" a second character "t", "T" or "/" has to follow. "/" acts as line terminating character. In case of using a wrong second character, it is necessary to start again with character "a" or "A".

Syntax

Exec Command
A/
Response(s)

PIN	MDM	APP	✈	Last
-	+	+	+	-

Reference(s)
V.250

15.2 +++ Escape from Data Mode to AT Command Mode

The +++ character sequence causes the PLAS9-W to pause data mode and return to AT command mode. To prevent the +++ character sequence from being misinterpreted as data, it must be preceded and followed by a pause of 1000 ms. The +++ characters must be entered in quick succession, all within 1000 ms.

+++ is not supported in Packet Switched and PPP connections.

Syntax

Exec Command
+++
Response(s)
OK

PIN	MDM	APP	✈	Last
-	+	+	-	-

Reference(s)
ITU-T V.250 [13]

15.3 AT^SFDL Enter Firmware Download Mode

AT^SFDL allows the application manufacturer to download PLAS9-W firmware into the module by starting the download process from the host application or a customer-designed download program.

The download can be performed via the following serial interfaces: USB.
The PLAS9-W firmware update file must be available in the *.USF format. It consists of records to be transferred one by one from the host application to the module.
This manual only describes the handling of the AT^SFDL command. All technical requirements and steps to prepare the host application for this download solution can be found in the "Application Note 16: Updating PLAS9-W Firmware" [4]. An example for developing an appropriate download program is included.

The AT^SFDL execute command causes the module to enter the firmware download mode. If a valid firmware is still installed, but the AT^SFDL command is issued without sending any firmware afterwards the module will stay in ready state. In this case it must be switched off.
The AT^SFDL=2 write command causes the module to start the firmware update mode.

Syntax

Test Command

```
AT^SFDL=?
```

Response(s)

```
^SFDL:(list of supported <mode>s)
OK
```

Exec Command

```
AT^SFDL
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT^SFDL=<mode>
```

Response(s)

```
OK
ERROR
+CME ERROR: <err>
```

PIN	MDM	APP	✈	Last
-	+	-	+	+

Command Description

Enter firmware download mode or start firmware update mode.

Parameter Description

<mode>(num)

Parameter to start the firmware update using AT^SFDL=2 write command.

2	Launches firmware update mode to replace the PLAS9-W's existing firmware with a new firmware provided on the internal flash.

Note

- The software update program sends first answer code OK and waits for data. If no data is received and after a 2 seconds timeout, the program ends with an error and the AT command interpreter outputs an error message.

15.4 AT^SRVCFG Service Configuration Settings

The AT^SRVCFG can be used to query and configure various settings of extra services supported by the PLAS9-W.
The AT^SRVCFG write command queries a configuration parameter (if no value is input) or sets its value(s).
All settings are stored non-volatile.
Input of parameter names is always coded in GSM character set.

Syntax

Test Command

AT^SRVCFG=?

Response(s)

^SRVCFG: "SLAE", (list of supported <action>)
OK

Write Command

Display and write configuration file.

AT^SRVCFG="SLAE", "read"

Response(s)

^SRVCFG: "SLAE","read","slae.xml"
OK
ERROR
+CME ERROR: <err>

Write Command

Display and write configuration file.

AT^SRVCFG="SLAE", "write"

Response(s)

ENTER DATA

After the response “ENTER DATA”, the configuration file content can be sent or pasted to the terminal.
The end of configuration file input is marked by input of CTRL-Z or Send Byte: Ox1a
^SRVCFG: "SLAE","write",,0
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	-	-

Parameter Description

<action>(str)

Actions for SensorLogic Service

The functionality provided by SensorLogic Service.

“read“	Display the configuration file.
“write“	Write the configuration file.

15.5 AT^SRVCTL Extra Service Control

AT^SRVCTL provides access to extra services. The following services are supported:

- SensorLogic Service: a M2M middleware service in JavaTM that seamlessly connects PLAS9-W modules to the SensorLogic Application Enablement Platform. The SL Agent exposes a set of easy-to-use JavaTM APIs for quick application development, allowing M2M solutions to be deployed in a fraction of the time.

Syntax

Test Command

AT^SRVCTL=?

Response(s)

^SRVCTL: "SLAE", (list of supported <action>s)
OK

Write Command

Start the SensorLogic Service.

AT^SRVCTL="SLAE", "start"

Response(s)

In case of service response:
^SRVCTL: "SLAE", "start", <response>[, <service message>]
OK
In case of command response:
OK
ERROR
+CME ERROR: <err>

Write Command

Stop the SensorLogic Service.

AT^SRVCTL="SLAE", "stop"

Response(s)

In case of service response:
^SRVCTL: "SLAE", "stop", <response>[, <service message>]
OK
In case of command response:
OK
ERROR
+CME ERROR: <err>

Write Command

List SensorLogic Service status.

AT^SRVCTL="SLAE", "status"

Response(s)

In case of service response:
^SRVCTL: "SLAE", "status", <response>, <status message>
OK
In case of command response:
OK
ERROR
+CME ERROR: <err>

PIN	MDM	APP	✈	Last
-	+	+	-	-

Parameter Description

`<action>`(str)

Actions for SensorLogic Service

The functionality provided by SensorLogic Service.

“start“	Start the SensorLogic Service.
“stop“	Stop the SensorLogic Service.
“status“	Display the SensorLogic Service status.

`<response>`(str)

Response code

This parameter shows the response code for SensorLogic Service.

“0“	Success
“1“	Error

`<service message>`(str)

Message for SensorLogic Service

This parameter shows the service message for SensorLogic start/stop action.

“warning: service already started“

“service start failed, configuration error“

“service start failed, service is not installed“

“service start failed“

“warning: service already stopped“

`<status message>`(str)

Message for Service Status

This parameter shows the status message for SensorLogic Service.

“service is not running“

“service is running“

16. Appendix

16.1 Available AT Commands and Dependency on SIM PIN

ø ... Command not available
- ... Command does not require PIN1
+ ... Command requires PIN1
± ... Command sometimes requires PIN1

Table 16.1: Available AT Commands and Dependency on SIM PIN

AT Command	Exec	Test	Read	Write
Configuration Commands				
AT&F	-	ø	ø	ø
AT&V	-	ø	ø	ø
AT&W	-	ø	ø	ø
ATQ	-	ø	ø	ø
ATV	-	ø	ø	ø
ATX	+	ø	ø	ø
ATZ	+	ø	ø	ø
AT+CMEE	-	-	-	-
AT+CSCS	ø	-	-	-
AT+CFUN	ø	-	-	-
AT+GCAP	+	+	ø	ø
AT^SMSO	-	-	ø	ø
AT^SCFG	ø	-	-	-
AT^SSRVSET	ø	-	-	-
Status Control Commands				
AT+CEER	+	+	ø	+
AT^SIND	ø	-	-	-
AT+WS46	ø	-	-	-
Serial Interface Control Commands				
AT&C		ø	ø	ø
AT&D	+	ø	ø	ø
AT&S	-	ø	ø	ø
ATE	-	ø	ø	ø
AT+IPR	ø	-	-	-
AT^SQPORT	-	-	-	ø
Security Commands				
AT+CPIN	ø	-	-	-
AT+CLCK	ø	+	ø	+

AT Command	Exec	Test	Read	Write
AT+CPWD	Ø	+	Ø	+
AT^SPIC	-	-	-	-
AT^SCSL	Ø	±	Ø	±
Identification Commands				
ATI	±	Ø	Ø	Ø
AT+CGMI	-	-	Ø	Ø
AT+GMI	-	-	Ø	Ø
AT+CGMM	-	-	Ø	Ø
AT+GMM	-	-	Ø	Ø
AT+CGMR	-	-	Ø	Ø
AT+GMR	-	-	Ø	Ø
AT+CGSN	-	-	Ø	Ø
AT+GSN	-	-	Ø	Ø
AT+CIMI	+	+	Ø	Ø
AT^SINFO	Ø	-	-	-
Network Service Commands				
AT+COPN	+	+	Ø	Ø
AT+COPS	Ø	+	+	+
AT+CPOL	Ø	+	+	+
AT+CPLS	Ø	+	+	+
AT+CREG	Ø	-	-	-
AT+CESQ	+	+	Ø	Ø
AT+CSQ	+	+	Ø	Ø
AT+CTZU	Ø	-	-	-
AT^SMONI	-	-	Ø	Ø
AT^SMONP	-	-	Ø	Ø
AT^SNMON	Ø	-	Ø	-
AT^SNCSGLS	+	+	Ø	Ø
AT^SNCSGSC	Ø	-	-	-
USIM Application Toolkit (USAT) Commands				
AT^SSTA	Ø	-	-	-
AT^SSTGI	Ø	-	-	-
AT^SSTGI	Ø	Ø	Ø	-
AT^SSTGI	Ø	Ø	Ø	-
AT^SSTGI	Ø	Ø	Ø	-
AT^SSTGI	Ø	Ø	Ø	-
AT^SSTGI	Ø	Ø	Ø	-
AT^SSTGI	Ø	Ø	Ø	-
AT^SSTGI	Ø	Ø	Ø	-

AT Command	Exec	Test	Read	Write
AT^SSTGI	ø	ø	ø	-
AT^SSTGI	ø	ø	ø	-
AT^SSTGI	ø	ø	ø	-
AT^SSTGI	ø	ø	ø	-
AT^SSTGI	ø	ø	ø	-
AT^SSTGI	ø	ø	ø	-
AT^SSTGI	ø	ø	ø	-
AT^SSTGI	ø	ø	ø	-
AT^SSTGI	ø	ø	ø	-
AT^SSTGI	ø	ø	ø	-
AT^SSTGI	ø	ø	ø	-
AT^SSTGI	ø	ø	ø	-
AT^SSTR	ø	-	-	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
AT^SSTR	ø	ø	ø	-
Short Message Service (SMS) Commands				
AT+CMGC	ø	+	ø	+

AT Command	Exec	Test	Read	Write
AT+CMGD	Ø	+	Ø	+
AT+CMGF	Ø	+	+	+
AT+CMGL	+	+	Ø	+
AT+CMGR	Ø	+	Ø	+
AT+CMGS	Ø	+	Ø	+
AT+CMGW	+	+	Ø	+
AT+CMSS	Ø	+	Ø	+
AT+CNMA	+	+	Ø	+
AT+CNMI	Ø	+	+	+
AT+CPMS	Ø	+	+	+
AT+CSCA	Ø	+	+	+
AT+CSCB	Ø	+	+	+
AT+CSDH	Ø	+	+	+
AT+CSMP	Ø			
AT+CSMS	Ø			
AT^SMGL	+	+	Ø	+
AT^SMGR	Ø	+	Ø	+
AT^SSDA	Ø	-	-	-
AT^SCML	+	+	Ø	+
AT^SCMR	Ø	+	Ø	+
AT^SCMS	Ø	+	Ø	+
AT^SCMW	Ø	+	Ø	+
Packet Domain Related Commands				
AT+CGDCONT	Ø	-	-	-
AT+CGDSCONT	Ø	-	-	-
AT+CGTFT	Ø	-	-	-
AT+CGATT	Ø	+	+	+
AT+CGACT	Ø	+	+	+
AT+CGDATA	Ø		Ø	
AT+CGPADDR	+	+	Ø	+
AT+CGPIAF	Ø	+	+	+
AT+CGEREP	Ø	+	+	+
AT+CGREG	Ø	+	+	+
AT+CEREG	+	+	+	+
AT+CGCONTRDP	+	+	Ø	+
AT+CGSCONTRDP	+	+	Ø	+
AT+CGTFTRDP			Ø	
AT+CGEQOS	Ø	-	-	-
AT+CGEQOSRDP	+	+	Ø	+
AT+CGSMS	Ø	+	+	+
AT+CNMPSD			Ø	Ø

AT Command	Exec	Test	Read	Write
ATD*99#		Ø	Ø	Ø
AT^SGAPN	Ø	-	-	-
AT^SGAUTH	Ø	-	-	-
AT^SWWAN	Ø	+	+	+
USIM related Commands				
AT+CCHC	Ø	-	Ø	-
AT+CCHO	Ø	-	Ø	-
AT+CGLA	Ø	-	Ø	-
AT+CRSM	Ø	-	Ø	-
AT+CSIM	Ø	-	Ø	-
AT^SATR	Ø	-	Ø	-
AT^SCID	-	-	Ø	Ø
AT^SCKS	Ø	-	-	-
AT^SSET	Ø	-	-	-
Phonebook Commands				
AT+CPBS	Ø	+	+	+
AT+CPBR	Ø	±	Ø	±
AT+CPBW	Ø	+	Ø	+
AT+CSVM	Ø	+	+	+
AT+CNUM	+	+	Ø	Ø
Hardware related Commands				
AT+CCLK	Ø	-	-	-
AT^SAD	Ø	-	Ø	-
AT^SBV	-	-	Ø	Ø
AT^SCTM	Ø	-	-	-
AT^SRADC	Ø	-	-	-
General Purpose I/O (GPIO) Pin related Commands				
AT^SPIO	Ø	-	Ø	-
AT^SCPIN	Ø	-	Ø	-
AT^SCPOL	Ø	-	Ø	-
AT^SGIO	Ø	-	Ø	-
AT^SSIO	Ø	-	Ø	-
Miscellaneous Commands				
A/	-	Ø	Ø	Ø
+++	-	Ø	Ø	Ø
AT^SFDL	-	-	Ø	-
AT^SRVCFG	Ø	-	Ø	-
AT^SRVCTL	Ø	-	Ø	-

16.2 Availability of AT Commands Depending on Operating Mode of ME

- ... AT command not supported
+ ... AT command supported
± ... AT command partially supported
See description of AT command for details.

Table 16.2: Availability of AT Commands Depending on Operating Mode of ME

AT Command	Normal Mode	✈
Configuration Commands		
AT&F	+	
AT&V	+	
AT&W	+	
ATQ	+	
ATV	+	
ATX	+	
ATZ	+	
AT+CMEE	+	
AT+CSCS	+	
AT+CFUN	+	
AT+GCAP	+	
AT^SMSO	+	
AT^SCFG	+	+
AT^SSRVSET	+	
Status Control Commands		
AT+CEER	+	
AT^SIND	+	
AT+WS46	+	
Serial Interface Control Commands		
AT&C	+	
AT&D	+	
AT&S	+	
ATE	+	
AT+IPR	+	
AT^SQPORT	+	
Security Commands		
AT+CPIN	+	+
AT+CLCK	+	±
AT+CPWD	+	±
AT^SPIC	+	+
AT^SCSL	+	+

AT Command	Normal Mode	✈
Identification Commands		
ATI	+	
AT+CGMI	+	
AT+GMI	+	
AT+CGMM	+	
AT+GMM	+	
AT+CGMR	+	
AT+GMR	+	
AT+CGSN	+	
AT+GSN	+	
AT+CIMI	+	
AT^SINFO	+	
Network Service Commands		
AT+COPN	+	
AT+COPS	+	-
AT+CPOL	+	
AT+CPLS	+	-
AT+CREG	+	+
AT+CESQ	+	-
AT+CSQ	+	-
AT+CTZU	+	
AT^SMONI	+	-
AT^SMONP	+	-
AT^SNMON	+	-
AT^SNCSGLS	+	
AT^SNCSGSC	+	-
USIM Application Toolkit (USAT) Commands		
AT^SSTA	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+

AT Command	Normal Mode	✈
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTGI	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
AT^SSTR	+	+
Short Message Service (SMS) Commands		
AT+CMGC	+	-
AT+CMGD	+	+
AT+CMGF	+	+

AT Command	Normal Mode	✈
AT+CMGL	+	+
AT+CMGR	+	+
AT+CMGS	+	-
AT+CMGW	+	+
AT+CMSS	+	-
AT+CNMA	+	-
AT+CNMI	+	+
AT+CPMS	+	
AT+CSCA	+	
AT+CSCB	+	+
AT+CSDH	+	
AT+CSMP	+	
AT+CSMS	+	
AT^SMGL	+	
AT^SMGR	+	
AT^SSDA	+	
AT^SCML	+	
AT^SCMR	+	
AT^SCMS	+	-
AT^SCMW	+	
Packet Domain Related Commands		
AT+CGDCONT	+	+
AT+CGDSCONT	+	+
AT+CGTFT	+	
AT+CGATT	+	-
AT+CGACT	+	-
AT+CGDATA	+	-
AT+CGPADDR	+	+
AT+CGPIAF	+	
AT+CGEREP	+	+
AT+CGREG	+	+
AT+CEREG	+	+
AT+CGCONTRDP	+	-
AT+CGSCONTRDP	+	-
AT+CGTFTRDP	+	-
AT+CGEQOS	+	
AT+CGEQOSRDP	+	-
AT+CGSMS	+	
AT+CNMPSD	+	-
ATD*99#	+	-
AT^SGAPN	+	+

AT Command	Normal Mode	✈
AT^SGAUTH	+	+
AT^SWWAN	+	-
USIM related Commands		
AT+CCHC	+	
AT+CCHO	+	
AT+CGLA	+	
AT+CRSM	+	
AT+CSIM	+	
AT^SATR	+	
AT^SCID	+	
AT^SCKS	+	
AT^SSET	+	
Phonebook Commands		
AT+CPBS	+	+
AT+CPBR	+	+
AT+CPBW	+	+
AT+CSVM	+	+
AT+CNUM	+	+
Hardware related Commands		
AT+CCLK	+	
AT^SAD	+	
AT^SBV	+	
AT^SCTM	+	
AT^SRADC	+	
General Purpose I/O (GPIO) Pin related Commands		
AT^SPIO	+	
AT^SCPIN	+	
AT^SCPOL	+	
AT^SGIO	+	
AT^SSIO	+	
Miscellaneous Commands		
A/	+	
+++	+	-
AT^SFDL	+	+
AT^SRVCFG	+	-
AT^SRVCTL	+	-

16.3 AT Command Settings storable with AT&W

Table 16.3: Settings Stored to User Profile

AT Command	Stored Parameters
Configuration Commands	
ATQ	<n>
ATV	<value>
ATX	<value>
AT+CMEE	<errMode>
Serial Interface Control Commands	
AT&C	<value>
AT&D	<value>
AT&S	<value>
ATE	<value>
Network Service Commands	
AT+COPS	<format>
AT+CREG	<urcMode>
Short Message Service (SMS) Commands	
AT+CMGF	<mode>
AT+CNMI	<mode>, <mt>, <bm>, <ds>, <bfr>
AT+CSDH	<show>
AT+CSMS	<service>
USIM related Commands	
AT^SCKS	<mode>
AT^SSET	<n>

16.4 Factory Default Settings Restorable with AT&F

Table 16.4: Factory Default Settings Restorable with AT&F

AT Command	Factory Defaults
Configuration Commands	
ATQ	<n>=0
ATV	<value>=1
ATX	<value>=0
AT+CMEE	<errMode>=2
AT+CSCS	<charSet>="GSM"
Serial Interface Control Commands	
AT&C	<value>=1
AT&D	<value>=2
AT&S	<value>=0
ATE	<value>=1
Network Service Commands	
AT+COPS	<format>=0
AT+CREG	<urcMode>=0
AT+CTZU	<n>=0
Short Message Service (SMS) Commands	
AT+CMGF	<mode>=0
AT+CNMI	<mode>=0, <mt>=0, <bm>=0, <ds>=0, <bfr>=1
AT+CSCB	<operation>=0, <dcss>=" "
AT+CSDH	<show>=0
AT+CSMP	<fo>=17, <vp>=167, <pid>=0, <dcs>=0
AT+CSMS	<service>=0
AT^SSDA	<da>=1
Packet Domain Related Commands	
AT+CGPIAF	<format>=0, <subnet>=0, <lzeros>=0, <czeros>=0
AT+CGREG	<n>=0
AT+CEREG	<n>=0
USIM related Commands	
AT^SCKS	<mode>=0
AT^SSET	<n>=0
Phonebook Commands	
AT+CPBS	<storage>="SM"

AT Command	Factory Defaults
Hardware related Commands	
AT^SCTM	<UrcMode>=0

16.5 Summary of Unsolicited Result Codes (URC)

Table 16.5: Summary of Unsolicited Result Codes (URC)

AT Command	URC
Unsolicited Result Code Presentation	
	^SBC: Undervoltage
	^SBC: Overvoltage Warning
	^SBC: Overvoltage Shutdown
Configuration Commands	
AT+CFUN	^SYSSTART
AT+CFUN	^SYSSTART AIRPLANE MODE
Status Control Commands	
AT^SIND	+CIEV: <indDescr>, <indValue>
AT^SIND	+CIEV: <indDescr>, <indValue>, <SmsMr>
AT^SIND	+CIEV: <indDescr>, <cmdType>, <commandDetails>[, <pathLen>, <fileNum>, <fileList>, <aidList>]
AT^SIND	+CIEV: <indDescr>, <cmdType>, <commandDetails>, <text>, <iconQualifier>, <iconId>
AT^SIND	+CIEV: <indDescr>, <cmdType>, <commandDetails>, , , , , <status>, <statAddInfo>
AT^SIND	+CIEV: <indDescr>, <indValue>, <eonsOperator>, <servProvider>, <servProviderType>
AT^SIND	+CIEV: <indDescr>, <nitzUT>, <nitzTZ>[, <nitzDST>]
AT^SIND	+CIEV: <indDescr>
AT^SIND	+CIEV: <indDescr>, <ceerRelCauseGroup>, <ceerReport>
AT^SIND	+CIEV: <indDescr>, <indValue>$_{slot\_1}$, <indValue>$_{slot\_2}$
AT^SIND	+CIEV: <indDescr>, <simreadEf>
AT^SIND	+CIEV: <indDescr>, <ltebotTimerstat>, <ltebotReason>, <APN>[, <ltebotReasonTxt>]
AT^SIND	+CIEV: <indDescr>, <provMm>, <provCur>
Network Service Commands	
AT+CREG	+CREG: <regStatus>
AT+CREG	+CREG: <regStatus>[, <netLac>, <netCellId>[, <AcT>]]
AT+CTZU	+CTZU:<nitzUT>, <nitzTZ>[, <nitzDST>]
USIM Application Toolkit (USAT) Commands	
^SSTN SAT Notification	^SSTN: <cmdType>
^SSTN SAT Notification	^SSTN: <cmdTerminateValue>
^SSTN SAT Notification	^SSTN: 254

AT Command	URC
^SSTN SAT Notification	^SSTN: 255
Short Message Service (SMS) Commands	
AT+CNMI	+CMTI: <mem3>, <index>
AT+CNMI	+CMT: <length><CR><LF><pdu>
AT+CNMI	+CMT: <oa>, , <scts>[, <tooa>, <fo>, <pid>, <dcs>, <sca>, <tosca>, <length>]<CR><LF><data>
AT+CNMI	+CBM: <length><CR><LF><pdu>
AT+CNMI	+CBM: <sn>, <mid>, <dcs>, <page>, <pages><CR><LF><data>
AT+CNMI	+CDS: <length><CR><LF><pdu>
AT+CNMI	+CDS: <fo>, <mr>[, <ra>][, <tora>], <scts>, <dt>, <st>
Packet Domain Related Commands	
AT+CGEREP	+CGEV: REJECT <PDP_type>, <PDP_addr>
AT+CGEREP	+CGEV: NW REACT <PDP_type>, <PDP_addr>[, <cid>]
AT+CGEREP	+CGEV: NW DEACT <PDP_type>, <PDP_addr>[, <cid>]
AT+CGEREP	+CGEV: ME DEACT <PDP_type>, <PDP_addr>[, <cid>]
AT+CGEREP	+CGEV: NW DETACH
AT+CGEREP	+CGEV: ME DETACH
AT+CGEREP	+CGEV: NW CLASS <class>
AT+CGEREP	+CGEV: ME CLASS <class>
AT+CGEREP	+CGEV: PDN ACT <cid>
AT+CGEREP	+CGEV: PDN DEACT <cid>
AT+CGEREP	+CGEV: ME ACT <pcid>, <cid>, <event-type>
AT+CGEREP	+CGEV: NW MODIFY <cid>,<change-reason>,<event-type>
AT+CGEREP	+CGEV: ME MODIFY <cid>, <change-reason>, <event-type>
AT+CGEREP	+CGEV: ME PDN ACT <cid>[, <reason>]
AT+CGREG	+CGREG: <stat>
AT+CGREG	+CGREG: <stat>[, <lac>][, <ci>][, <AcT>]
AT+CEREG	+CEREG: <stat>
AT+CEREG	+CEREG: <stat>[, [<tac>], [<ci>], [<AcT>]]
USIM related Commands	
AT^SCKS	^SCKS: <SimStatus>
AT^SSET	^SSIM READY
Hardware related Commands	
AT^SCTM	^SCTM_B: <UrcCause>
AT^SRADC	^SRADC: <ch>, <count>, <value>[, <value>[, <value>[, <value>[, <value>[, <value>[, <value>[, <value>]]]]]]]
General Purpose I/O (GPIO) Pin related Commands	
AT^SCPOL	^SCPOL: <ioId>, <value>

16.6 AT Commands Supported Only on the Modem Interface

Table 16.6: AT Commands Supported Only on the Modem Interface

AT Command
Serial Interface Control Commands
AT&D
AT&S
Packet Domain Related Commands
AT+CGDATA
ATD*99#
Miscellaneous Commands
AT^SFDL

16.7 Alphabetical List of AT Commands

Table 16.7: Alphabetical List of AT Commands

AT Command	Description	Section and Page
+++	Escape from Data Mode to AT Command Mode	Section 15.2, page 374
A/	Repeat Previous Command Line	Section 15.1, page 373
AT&C	Set Data Carrier Detect (DCD) line mode	Section 4.1, page 106
AT&D	Set Data Terminal Ready (DTR) line mode	Section 4.2, page 107
AT&F	Reset AT Command Settings to Factory Default Values	Section 2.1, page 29
AT&S	Set Data Set Ready (DSR) line mode	Section 4.3, page 108
AT&V	Display current Configuration	Section 2.2, page 30
AT&W	Store AT Command Settings to User Defined Profile	Section 2.3, page 31
AT+CCHC	Close logical channel	Section 11.1, page 333
AT+CCHO	Open logical channel	Section 11.2, page 334
AT+CCLK	Real Time Clock	Section 13.1, page 356
AT+CEER	Extended Error Report	Section 3.1, page 84
AT+CEREG	EPS Network Registration Status	Section 10.11, page 311
AT+CESQ	Extended Signal Quality	Section 7.6, page 151
AT+CFUN	PLAS9-W Functionality Level	Section 2.10, page 42
AT+CGACT	PDP Context Activate or Deactivate	Section 10.5, page 298
AT+CGATT	PS Attach or Detach	Section 10.4, page 297
AT+CGCONTRDP	PDP context read dynamic parameters	Section 10.12, page 313
AT+CGDATA	Enter Data State	Section 10.6, page 300
AT+CGDCONT	Define PDP Context	Section 10.1, page 287
AT+CGDSCONT	Define Secondary PDP Context	Section 10.2, page 292
AT+CGEQOS	Define EPS Quality of Service	Section 10.15, page 320
AT+CGEQOSRDP	EPS Quality of Service Read Dynamic Parameters	Section 10.16, page 322
AT+CGEREP	Packet Domain Event Reporting	Section 10.9, page 306
AT+CGLA	Generic logical channel access	Section 11.3, page 335
AT+CGMI	Request manufacturer identification	Section 6.2, page 131
AT+CGMM	Request model identification	Section 6.4, page 132
AT+CGMR	Request revision identification of software status	Section 6.6, page 133
AT+CGPADDR	Show PDP Address	Section 10.7, page 302
AT+CGPIAF	Select Printing IP address format	Section 10.8, page 304
AT+CGREG	Packet Domain Network Registration Status	Section 10.10, page 309
AT+CGSCONTRDP	Secondary PDP Context Read Dynamic Parameters	Section 10.13, page 315
AT+CGSMS	Select Service for MO Short Messages	Section 10.17, page 324
AT+CGSN	Request International Mobile Equipment Identity (IMEI)	Section 6.8, page 134
AT+CGTFT	Traffic Flow Template	Section 10.3, page 294
AT+CGTFTRDP	Traffic Flow Template Read Dynamic Parameters	Section 10.14, page 317
AT+CIMI	Request International Mobile Subscriber Identity (IMSI)	Section 6.10, page 135
AT+CLCK	Facility Lock	Section 5.2, page 114
AT+CMEE	Error Message Format	Section 2.8, page 36

AT Command	Description	Section and Page
AT+CMGC	Send an SMS command	Section 9.2, page 257
AT+CMGD	Delete short message	Section 9.3, page 258
AT+CMGF	Select SMS message format	Section 9.4, page 259
AT+CMGL	List SMS messages from preferred store	Section 9.5, page 260
AT+CMGR	Read SMS messages	Section 9.6, page 262
AT+CMGS	Send Short Message	Section 9.7, page 263
AT+CMGW	Write Short Messages to Memory	Section 9.8, page 264
AT+CMSS	Send short messages from storage	Section 9.9, page 265
AT+CNMA	New Message Acknowledgement to UE/TE	Section 9.10, page 266
AT+CNMI	SMS Event Reporting Configuration	Section 9.11, page 267
AT+CNMPSD	No more PS data	Section 10.18, page 325
AT+CNUM	Read own numbers	Section 12.5, page 355
AT+COPN	Read operator names	Section 7.1, page 140
AT+COPS	Operator Selection	Section 7.2, page 141
AT+CPBR	Read from phonebook	Section 12.2, page 347
AT+CPBS	Select phonebook memory storage	Section 12.1, page 345
AT+CPBW	Write into phonebook	Section 12.3, page 350
AT+CPIN	PIN Authentication	Section 5.1, page 112
AT+CPLS	Select Preferred Operator List	Section 7.4, page 147
AT+CPMS	Preferred SMS message storage	Section 9.12, page 270
AT+CPOL	Preferred Operator List	Section 7.3, page 145
AT+CPWD	Change Password	Section 5.3, page 120
AT+CREG	Network Registration Status	Section 7.5, page 148
AT+CRSM	Restricted USIM Access	Section 11.4, page 336
AT+CSCA	SMS Service Center Address	Section 9.13, page 272
AT+CSCB	Select Cell Broadcast Message Indication	Section 9.14, page 273
AT+CSCS	Character Set	Section 2.9, page 41
AT+CSDH	Show SMS text mode parameters	Section 9.15, page 275
AT+CSIM	Generic USIM Access	Section 11.5, page 338
AT+CSMP	Set SMS Text Mode Parameters	Section 9.16, page 276
AT+CSMS	Select Message Service	Section 9.17, page 278
AT+CSQ	Signal Quality	Section 7.7, page 153
AT+CSVM	Set voice mail number	Section 12.4, page 353
AT+CTZU	Automatic Time Zone Update	Section 7.8, page 154
AT+GCAP	Capabilities List	Section 2.11, page 44
AT+GMI	Request manufacturer identification	Section 6.3, page 131
AT+GMM	Request model identification	Section 6.5, page 132
AT+GMR	Request revision identification of software status	Section 6.7, page 133
AT+GSN	Request International Mobile Equipment Identity (IMEI)	Section 6.9, page 134
AT+IPR	Bit Rate	Section 4.5, page 110
AT+WS46	Select wireless network	Section 3.3, page 105
AT^SAD	Antenna Configuration	Section 13.2, page 358

AT Command	Description	Section and Page
AT^SATR	Query SIM's Answer to Reset Data	Section 11.6, page 340
AT^SBV	Battery/Supply Voltage	Section 13.3, page 359
AT^SCFG	Extended Configuration Settings	Section 2.13, page 46
AT^SCID	USIM Identification Number	Section 11.7, page 341
AT^SCKS	Query USIM and Chip Card Holder Status	Section 11.8, page 342
AT^SCML	List Concatenated Short Messages from preferred store	Section 9.21, page 283
AT^SCMR	Read Concatenated Short Messages	Section 9.22, page 284
AT^SCMS	Send Concatenated Short Messages	Section 9.23, page 285
AT^SCMW	Write Concatenated Short Messages to Memory	Section 9.24, page 286
AT^SCPIN	Pin Configuration	Section 14.2, page 368
AT^SCPOL	GPIO Level Polling Configuration	Section 14.3, page 370
AT^SCSL	Customer SIM Lock	Section 5.5, page 127
AT^SCTM	Critical Operating Temperature Monitoring	Section 13.4, page 360
AT^SFDL	Enter Firmware Download Mode	Section 15.3, page 375
AT^SGAPN	Configure APN class settings	Section 10.20, page 327
AT^SGAUTH	Set Type of Authentication for PDP-IP Connections	Section 10.21, page 329
AT^SGIO	Get IO state of a specified pin	Section 14.4, page 371
AT^SIND	Extended Indicator Control	Section 3.2, page 93
AT^SINFO	Information Output	Section 6.11, page 136
AT^SMGL	List Short Messages from preferred store without setting status to REC READ	Section 9.18, page 280
AT^SMGR	Read short message without setting status to REC READ	Section 9.19, page 281
AT^SMONI	Monitoring Serving Cell	Section 7.9, page 156
AT^SMONP	Monitoring Neighbour Cells	Section 7.10, page 162
AT^SMSO	Switch Off PLAS9-W	Section 2.12, page 45
AT^SNCSGLS	Operator CSG lists on USIM	Section 7.12, page 172
AT^SNCSGSC	Closed Subscriber Group Network Scan	Section 7.13, page 173
AT^SNMON	Network Monitoring	Section 7.11, page 166
AT^SPIC	Display PIN Counter	Section 5.4, page 123
AT^SPIO	GPIO Driver Open/Close	Section 14.1, page 367
AT^SQPORT	Query Port Type	Section 4.6, page 111
AT^SRADC	Configure and Read A/D Converter	Section 13.5, page 363
AT^SRVCFG	Service Configuration Settings	Section 15.4, page 377
AT^SRVCTL	Extra Service Control	Section 15.5, page 378
AT^SSDA	Set SMS Display Availability	Section 9.20, page 282
AT^SSET	USIM Data Ready Indication	Section 11.9, page 344
AT^SSIO	Set IO state of a specified pin	Section 14.5, page 372
AT^SSRVSET	Service Interface Configuration	Section 2.14, page 78
AT^SSTA	Remote-SAT Interface Activation	Section 8.4, page 185
AT^SSTGI	SAT Get Information	Section 8.6, page 189
AT^SSTGI	SAT Get Information - Refresh (1)	Section 8.7, page 190
AT^SSTGI	SAT Get Information - Set Up Event List (5)	Section 8.8, page 192

AT Command	Description	Section and Page
AT^SSTGI	SAT Get Information - Set Up Call (16)	Section 8.9, page 193
AT^SSTGI	SAT Get Information - Send SS (17)	Section 8.10, page 195
AT^SSTGI	SAT Get Information - Send USSD (18)	Section 8.11, page 196
AT^SSTGI	SAT Get Information - Send Short Message (19)	Section 8.12, page 197
AT^SSTGI	SAT Get Information - Send DTMF (20)	Section 8.13, page 198
AT^SSTGI	SAT Get Information - Launch Browser (21)	Section 8.14, page 199
AT^SSTGI	SAT Get Information - Play Tone (32)	Section 8.15, page 201
AT^SSTGI	SAT Get Information - Display Text (33)	Section 8.16, page 203
AT^SSTGI	SAT Get Information - Get Inkey (34)	Section 8.17, page 205
AT^SSTGI	SAT Get Information - Get Input (35)	Section 8.18, page 207
AT^SSTGI	SAT Get Information - Select Item (36)	Section 8.19, page 209
AT^SSTGI	SAT Get Information - Set up Menu (37)	Section 8.20, page 211
AT^SSTGI	SAT Get Information - Set up Idle Mode Text (40)	Section 8.21, page 213
AT^SSTGI	SAT Get Information - Language Notification (53)	Section 8.22, page 214
AT^SSTGI	SAT Get Information - Open Channel (64)	Section 8.23, page 215
AT^SSTGI	SAT Get Information - Close Channel (65)	Section 8.24, page 216
AT^SSTGI	SAT Get Information - Receive Data (66)	Section 8.25, page 217
AT^SSTGI	SAT Get Information - Send Data (67)	Section 8.26, page 218
AT^SSTR	SAT Response	Section 8.27, page 219
AT^SSTR	SAT Response - Refresh (1)	Section 8.28, page 221
AT^SSTR	SAT Response - Set Up Event List (5)	Section 8.29, page 222
AT^SSTR	SAT Response - Set Up Call (16)	Section 8.30, page 223
AT^SSTR	SAT Response - Send SS (17)	Section 8.31, page 224
AT^SSTR	SAT Response - Send USSD (18)	Section 8.32, page 225
AT^SSTR	SAT Response - Send Short Message (19)	Section 8.33, page 226
AT^SSTR	SAT Response - Send DTMF (20)	Section 8.34, page 227
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