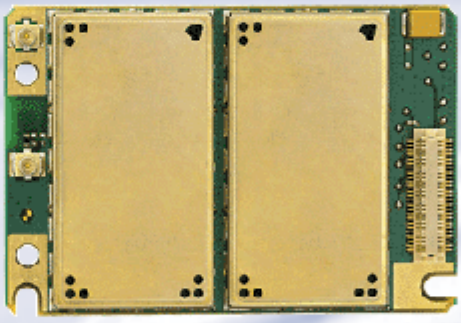
SIEMENS



AT Command Set

HC25

Siemens Cellular Engine

Version: 01.000
DocId: HC25_ATC_V01.000

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1. Introduction

1.1 Scope of the document

This document presents the AT Command Set for the Siemens Cellular Engine
HC25 Release 01.000.

Before using the Cellular Engine or upgrading to a new firmware version please read the latest product information provided in the Release Notes [1].

More information is available at the Siemens Website: http://www.siemens.com/wm.

1.2 Related documents

[1] HC25 Release Notes, Version 01.000

[2] HC25 Hardware Interface Description, Version 01.000

[3] User's Guide: Getting Started with HC25

[4] Remote-SAT User's Guide

[5] Application Note 16: Updating HC25 Firmware

[6] Application Note 22: Using TTY / CTM equipment with HC25

[7] Application Note 39: USB Interface Description for HC25

[8] ISO/IEC10646: "Universal Multiple-Octet Coded Character Set (UCS)"; UCS2, 16 bit coding

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

[10] ITU-T Recommendation V.250: Serial asynchronous automatic dialling and control

[11] 3GPP TS 100 918/EN 300 918 (GSM 02.04): General on supplementary services

[12] 3GPP TS 100 907 (GSM 02.30): Man-Machine Interface (MMI) of the Mobile Station (MS)

[13] 3GPP TS 23.038 (GSM 03.38): Alphabets and language specific information

[14] 3GPP TS 27.005 (GSM 07.05): Use of Data Terminal Equipment - Data Circuit terminating Equipment (DTE - DCE) interface for Short Message Service (SMS) and Cell Broadcast Service (CBS)

[15] 3GPP TS 27.007 (GSM 07.07): AT command set for User Equipment (UE)

[16] 3GPP TS 27.060 (GSM 07.60): Mobile Station (MS) supporting Packet Switched Services

[17] 3GPP TS 51.011 (GSM 11.11): Specification of the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface

[18] ETSI 102 221: Smart cards; UICC-Terminal interface; Physical and logical characteristics

[19] 3GPP TS 31.102: 3rd Generation Partnership Project; Technical Specification Group Network and Terminals; Characteristics of the USIM application

[20] 3GPP TS 11.14 (GSM 11.14): Specification of the SIM Application Toolkit for the Subscriber Identity Module - Mobile Equipment (SIM - ME) interface

[21] 3GPP TS 22.101 (GSM 22.101): Service principles

[22] Common PCN Handset Specification (CPHS) v4.2

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

1.3 Document Conventions

Throughout the document, the GSM engines are referred to as ME (Mobile Equipment), MS (Mobile Station), TA (Terminal Adapter), DCE (Data Communication Equipment) or facsimile DCE (FAX modem, FAX board).
To control your GSM engine you can simply send AT Commands via its serial interface. The controlling device at the other end of the serial line is referred to as TE (Terminal Equipment), DTE (Data Terminal Equipment) or plainly 'the application' (probably running on an embedded system).
All abbreviations and acronyms used throughout this document are based on the GSM specifications. For definitions please refer to TR 100 350 V7.0.0 (1999-08), (GSM 01.04, version 7.0.0 release 1998).

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 18.3, `Available AT Commands and Dependency on SIM PIN` uses the same symbols.

USB0-MDM: Is the AT command supported on the Modem interface?
- **+** Yes
- **-** No

USB0-APP: Is the AT command supported on the Application interface?
- **+** Yes
- **-** No

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	USB0-MDM	USB0-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.

Table 1.2: Symbols used to indicate the correlations with other commands

Parameter option	Meaning
<param>$^{(+CSCS)}$	Parameter value has to be (is) coded according to current setting of `<chset>` (see `AT+CSCS` for details)

Table 1.3: Symbols Used to Mark Different Types of Default Values of Parameters

Value option	Meaning
[x]	Default value: if the parameter is omitted, the value 'x' will be assumed
$x^{(\&F)}$	Factory default value, will be restored to 'x' with `AT&F`
$x^{(P)}$	Powerup default value of a parameter which is not stored at power down
$x^{(D)}$	Delivery default value of a parameter which cannot be restored automatically

1.4 HC25 AT Command Interpreter

After successful installation of the HC25 driver package, the physical USB interface of the module is represented in the operating system by two virtual interfaces, each assigned to a virtual COM port of its own:

- Modem interface:
  This interface is referred to as "Modem" if queried with `AT^SQPORT`. In the quick reference tables it is named USB0-MDM. In Windows XP, it will show up as "Siemens HSDPA USB Modem" in the *Windows Device Manager*, under *Modems*. The COM port number automatically assigned by Windows during the installation can be gathered from the *Modems* property page.
  The modem interface is intended particularly for data transmission (HSDPA, GPRS, CSD or FAX) established over a dial-up connection. Using AT commands on this interface is not recommended, except for data call related commands like `ATD` or `ATO`.
  URCs relevant for data calls (RING, NO CARRIER) are issued on the modem interface, all other URCs normally only on the application interface.
- Application interface:
  This port is referred to as "Application" if queried with `AT^SQPORT`. In the quick reference tables it is named USB0-APP. In Windows XP, it will show up as "Siemens HSDPA USB Com Port" in the *Windows Device Manager*, under *Ports (COM&LPT)*, along with the COM port number automatically assigned by Windows.
  The application interface is designed especially for controlling the HC25, i.e. for entering AT commands, receiving URCs, or sending and receiving short messages. It cannot be used as data interface for HSDPA, GPRS, CSD or FAX.
  Please note that URCs are normally indicated only on this interface, no matter which of the two interfaces was used to send the AT commands for activating their presentation.
  This URC management scheme is the default configuration recommended for a typical HC25 application. For further detail on URCs please refer to Section 1.8, Unsolicited Result Code Presentation.

If you need to operate the HC25 from both interfaces at a time, bear in mind that both are handled by the same AT command interpreter. As a result, AT commands entered on both interfaces are not executed in parallel but sequentially, one after the other. So, an AT command issued on one interface will be buffered on this interface to be executed after the other interface has completed processing earlier AT command(s). The buffered command string is not echoed, but will be indicated when executed.

When a dial-up connection is established over the modem interface, the application interface can be used simultaneously for any control functions. This eliminates the need for the user to enter AT commands, such as +++ and ATO, to switch back and forth between command and online mode when working on one interface only. Yet, it should be noted that the dial-up connection disables the echo on both interfaces, due to the initialization strings typically set by modems. The echo can be re-activated by executing `ATE`1.

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 mobile equipment returns the list of parameters and value ranges set with the corresponding Write command or by internal processes.
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 GSM engine.

1.5.1 Using Parameters

- Optional parameters are enclosed in square brackets. If optional parameters are omitted, 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 string it must be replaced by a comma. See also example 1.
- A parameter value enclosed in square brackets represents the value that will be used if an optional parameter is omitted. See also example 2.
- 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 quotaton marks.
- It is possible to omit the leading zeros of strings which represent numbers.
- If an optional parameter of a V.250 command is omitted, its value is assumed to be 0.

Example 1: Omitting parameters in the middle of a string

```
AT+CCUG?                    Query current setting
+CCUG: 1,10,1
OK
AT+CCUG=,9                  Set only the middle parameter
OK
AT+CCUG?                    Query new setting
+CCUG: 1,9,1
OK
```

1.6 Supported character sets

The ME supports two character sets: GSM 03.38 (7 bit, also referred to as GSM alphabet or SMS alphabet) and UCS2 (16 bit, refer to ISO/IEC 10646). See AT+CSCS for information about selecting the character set. Character tables can be found below.

Explanation of terms

- International Reference Alphabet (IRA)
  IRA means that one byte is displayed as two characters in hexadecimal format. For example, the byte 0x36 (decimal 54) is displayed as "36" (two characters). IRA is used here for input 8-bit or 16-bit data via terminal devices using text mode. This means only characters 'A'..F','a'..'f' and '0'..'9' are valid.
- Escape sequences
  The escape sequence used within a text coded in the GSM default alphabet (0x1B) must be correctly interpreted by the TE, both for character input and output. To the module, an escape sequence appears like any other byte received or sent.
- Terminal Adapter (TA)
  TA is an equivalent to Mobile Equipment (ME) which stands for the GSM module described here. It uses GSM default alphabet as its character set.
- Terminal Equipment (TE)
  TE is the device connected to the TA via serial interface. In most cases TE is an ANSI/ASCII terminal that does not fully support the GSM default alphabet, for example MS Hyperterminal.
- TE Character Set
  The character set currently used by Terminal Equipment is selected with AT+CSCS.
- 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.

The behavior when encountering characters that are not valid characters of the supported alphabets is undefined.
Due to the constraints described below it is recommended to prefer the USC2 alphabet in any external application.
If the GSM alphabet is selected all characters sent over the serial line (between TE and TA) are in the range from 0 to 127 (7 Bit range). CAUTION: ASCII alphabet (TE) is not GSM alphabet (TA/ME) !

Several problems resulting from the use of GSM alphabet with ASCII terminal equipment:

- "@" character with GSM alphabet value 0 is not printable by an ASCII terminal program (e.g. Microsoft© Hyperterminal®).
- "@" character with GSM alphabet value 0 will terminate any C string! This is because the 0 is defined as C string end tag. Therefore, the GSM Null character may cause problems on application level when using a 'C'-function as "strlen()". This can be avoided if it is represented by an escape sequence as shown in the table below.
  By the way, this may be the reason why even network providers often replace "@"with "@=*" in their SIM application.
- Other characters of the GSM alphabet are 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 both alphabets mean different characters with values hex. 7C or 00 and so on.
- In addition, decimal 17 and 19 which are used as XON/XOFF control characters when software flow control is activated, are interpreted as normal characters in the GSM alphabet.

When you write characters differently coded in ASCII and GSM (e.g. Ä, Ö, Ü), you need to enter escape sequences. Such a character is translated into the corresponding GSM character value and, when output later, the GSM character value can be presented. Any ASCII terminal then will show wrong responses.

Table 1.5: Examples for character definitions depending on alphabet

GSM 03.38 character	GSM character hex. value	Corresponding ASCII character	ASCII Esc sequence	Hex Esc sequence
Ö	5C	\	\5C	5C 35 43
"	22	"	\22	5C 32 32
@	00	NULL	\00	5C 30 30

CAUTION: Often, the editors of terminal programs do not recognize escape sequences. In this case, an escape sequence will be handled as normal characters. The most common workaround to this problem is to write a script which includes a decimal code instead of an escape sequence. This way you can write, for example, short messages which may contain differently coded characters.

1.6.1 GSM alphabet tables and UCS2 character values

This section provides tables for the GSM 03.38 alphabet supported by the ME. Below any GSM character find the corresponding two byte character value of the UCS2 alphabet.
(For related mapping definition see: http://www.unicode.org/Public/MAPPINGS/ETSI/GSM0338.TXT)

Main character table of GSM 03.38 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 03.38 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) As the standard GSM alphabet does not provide a backspace functionality the HC25 is designed to use the GSM character 08 (hex 0x08) as backspace. This allows the user to easily erase the last character when using an ASCII terminal. On the other hand, this solution requires entering the escape sequence \08 for writing the "ò" character in GSM alphabet.

Extension character table of GSM 03.38 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 03.38 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.

In the event that an MS receives a code where a symbol is not represented in Figure 1.2, Extension character table of GSM 03.38 alphabet the MS shall display the character shown in the main default 7 bit alphabet table (see Figure 1.1, Main character table of GSM 03.38 alphabet).

1.6.2 UCS2 and GSM data coding and conversion for SMS text mode and Remote SAT

This section provides basic information on how to handle input and output character conversion for SMS text mode and Remote SAT if internal (TA) and external (TE) character representation differ, i.e. if the Data Coding Scheme and the TE character use different coding.

1.6.2.1 Implementing output of SIM data to Terminal (direction TA 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 USC2 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"

1.6.2.2 Implementing input of Terminal data to SIM (direction TE to TA)

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 TA 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 repesenting 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.

1.7 Communication between Customer Application and HC25

Leaving hardware flow control unconsidered the Customer Application (TE) is coupled with the HC25 (ME) 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 the HC25 starts sending a URC. This will probably cause the TE to misinterpret of 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 milliseconds before sending the next one.
  This gives the HC25 the opportunity to transmit pending URCs and get necessary service.
  Note that some AT commands may require more delay after "OK" or "ERROR" response, refer to the following command specifications for details.
- The TE shall communicate with the HC25 using activated echo (`ATE`1), i.e. the HC25 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.

1.8 Unsolicited Result Code Presentation

URC stands for Unsolicited Result Code and is a report message issued by the ME 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 ME 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 18.5, `Summary of Unsolicited Result Codes (URC)`.

As specified in Section 1.4, HC25 AT Command Interpreter the modem interface is dedicated for data transmission (HSDPA, GPRS, CSD). The application interface is designed primarily for control functions. This implies that the majority of URCs are normally issued on the application interface, no matter which of the AT interfaces was used to send the AT command for activating their presentation. Only URCs relevant for data calls (RING, NO CARRIER) are issued on the modem interface to ensure compatability with existing modem applications.

If the interface is blocked by a running AT command, the URCs are buffered internally and issued when the interface becomes idle again. There is no inband signaling if a URC is buffered.

Enabled by default when the ME is powered up, the above URC management scheme is the recommended approach for a typical HC25 application. Yet, as an alternative to this approach, the configuration command `AT^SCFG` provides the option to determine the interface used for issuing the URCs. Refer to the `<udi>` parameter for details. IMPORTANT: When using the modem interface for URC output, keep in mind that if the interface is blocked by an active data connection you are required to suspend the connection at regular intervals to check for pending URCs because inband signaling is not supported.

1.8.1 Common URCs

This section contains all URCs not associated to a certain AT command. They cannot be defined by the user and appear automatically when the voltage 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 ME is close to the undervoltage threshold. If the undervoltage persists the ME keeps sending the URC up to three times within 60 seconds before switching off automatically. When the undervoltage threshold is exceeded before the 60-second period expires the ME will switch off instantly.

URC 2

`^SBC: Overvoltage Warning`

Module close to overvoltage.

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 2.4.1, Verbose and numeric result codes
- Section 3.2, AT+CEER

2. Configuration Commands

The AT Commands described in this chapter allow the external application to determine the HC25's behaviour under various conditions.

2.1 AT&F Set all current parameters to manufacturer defaults

AT&F sets all current parameters to the manufacturer defined profile.

Syntax

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Parameter Description

<value>(num)	
[0]	Set all TA parameters to manufacturer defaults

Notes

- List of parameters reset to manufacturer default can be found in Section 18.4, Factory Default Settings Restorable with AT&F.
- Every ongoing or incoming call will be terminated.

2.2 AT&V Display current configuration

AT&V returns the status of all AT command parameters applicable to the current operating mode, including the single-letter AT command parameters not otherwise readable.

Syntax

Exec Command
AT&V
Response(s)
... Status of all AT command parameters applicable to the current operating mode ...
OK

PIN	USB0-MDM	USB0-APP	Last
+	+	+	-

2.3 ATQ Set result code presentation mode

This parameter setting determines whether or not the TA transmits any result code to the TE. Information text transmitted in response is not affected by this setting.

Syntax

Exec Command
ATQ[<n>]
Response(s)
If <n>=0: OK If <n>=1: (none)

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Parameter Description

<n>(num)	
[0](&F)	DCE transmits result code
1	Result codes are suppressed and not transmitted

2.4 ATV Set 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 2.4.1, Verbose and numeric result codes.

Syntax

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	-	+	+	-

Parameter Description

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

2.4.1 Verbose and numeric result codes

Verbose format	Numeric format	Meaning
OK	0	Command executed, no errors
CONNECT	1	Link established
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
CONNECT 2400/RLP	47	Link with 2400 bps and Radio Link Protocol
CONNECT 4800/RLP	48	Link with 4800 bps and Radio Link Protocol
CONNECT 9600/RLP	49	Link with 9600 bps and Radio Link Protocol
CONNECT 14400/RLP	50	Link with 14400 bps and Radio Link Protocol
ALERTING		Alerting at called phone
DIALING		Mobile phone is dialing

2.5 ATX Set CONNECT result code format

ATX whether or not TA transmits particular result codes.

Syntax

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Parameter Description

<value>(num)	
[0](&F)	CONNECT result code only returned .
1	CONNECT <text> result code returned .
2	CONNECT <text> result code returned .
3	CONNECT <text> result code returned .
4	CONNECT <text> result code returned .

2.6 ATZ Reset all current parameters to the default configuration

ATZ resets all current parameters to the default configuration. It does not change DCE baud rate or PDP context profiles.

Syntax

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Parameter Description

<value>(num)	
[0]	Reset to user profile

2.7 AT+CFUN Set phone functionality

The AT+CFUN command serves to control the functionality level of the ME. It can be used to reset the ME and to choose between different modes
.

Syntax

Test Command
AT+CFUN=?
Response(s)
+CFUN: (list of supported <fun>s) , (list of supported <rst>s) OK ERROR +CME ERROR

Read Command
AT+CFUN?
Response(s)
+CFUN: <fun> OK ERROR +CME ERROR

Write Command
AT+CFUN=<fun>[, <rst>]
Response(s)
OK ERROR +CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP TS 27.007	-	+	+	-

Parameter Description

<fun>(num)	
0	Minimum functionality. TX and RX RF off. The ME logs off from the network. The SIM remains accessible for network independent functions.
1(P)	Normal functionality
4	Minimum functionality. TX and RX RF off. The ME logs off from the network. The SIM remains accessible for network independent functions.
5	Do not use.
6	Do not use.
7	Do not use.

<rst>(num)	
Due to the command syntax, you need to enter parameter <fun>, followed by <rst>, where <fun> needs to be set to 1.	
[0]	Do not reset the MT before setting it to <fun> power level.
1	ME resets and restarts. After this, PIN 1 authentication is necessary (AT+CPIN).

2.8 AT+CMEE Mobile Equipment Error Message Format

AT+CMEE controls the format of the error result codes that indicates errors related to HC25 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 2.1, General "CME ERROR" Codes (GSM 07.07)Table 2.2, GPRS related "CME ERROR" Codes (GSM 07.07) and Table 2.4, SMS related "CMS ERROR" Codes (GSM 07.05).

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>

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP 27.007	-	+	+	-

Parameter Description

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

Note

- The exec command performs a write command with factory default parameter setting.

2.8.1 CME/CMS Error Code Overview

Table 2.1: General "CME ERROR" Codes (GSM 07.07)

<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 2.2: GPRS related "CME ERROR" Codes (GSM 07.07)

<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
148	unspecified GPRS error
149	PDP authentication failure
150	invalid mobile class
273	minimum TFT per PDP address error
274	duplicate TFT eval prec index
275	invalid TFT param combination

Table 2.3: SIEMENS specific "CME ERROR" Codes

<err> Code	Text (if AT+CMEE=2)
257	network rejected supserv request
258	retry operation
259	invalid deflected to number
260	deflected to number
261	unknown subscriber
262	service not available
263	unknown class
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

Table 2.4: SMS related "CMS ERROR" Codes (GSM 07.05)

<err> Code	Text (if AT+CMEE=2)
0	None
300	ME failure

<err> Code	Text (if AT+CMEE=2)
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
332	Network timeout
340	NO +CNMA ACK EXPECTED
500	Unknown error
512	User abort

2.9 AT+CSCS Select TE character set

The AT+CSCS write command informs the TA which character set <chset> is used by the TE. This enables the TA to convert character strings correctly between TE and ME character sets. See also Section 1.6, Supported character sets.
Note that when the TA-TE interface is set to 8-bit operation and the used TE alphabet is 7-bit, the highest bit will be set to zero.

Syntax

Test Command	
AT+CSCS=?	
Response(s)	
+CSCS: (list of supported<chset>s) OK	

Read Command	
AT+CSCS?	
Response(s)	
+CSCS: <chset> OK	

Write Command	
AT+CSCS=[<chset>]	
Response(s)	
OK	

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP 27.007	+	+	+	-

Parameter Description

<chset>(str)	
“GSM“	GSM default alphabet (GSM 03.38 subclause 6.2.1); Note: This setting may cause software flow control problems since the codes used to stop and resume data flow (XOFF = decimal 19, XON = decimal 17) are interpreted as normal characters.
“UCS2“	16-bit universal multiple-octet coded character set (ISO/IEC10646 [32]); UCS2 character strings are converted to hexadecimal numbers from 0000 to FFFF; e.g. "004100620063" equals three 16-bit characters with decimal values 65, 98 and 99.
“IRA“(&F)(P)	International reference alphabet (ITU T T.50)

2.10 AT+GCAP Request complete TA capabilities list

AT+GCAP returns a list of additional capabilities.

Syntax

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

Exec Command
AT+GCAP
Response(s)
+GCAP: <name> OK

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Parameter Description

<name>(str)

e.g.: +CGSM

Note

- +CGSM: The response text shows which GSM commands of the ETSI standard are supported.

2.11 AT^SCFG Extended Configuration Settings

AT^SCFG can be used to query and configure various settings of the HC25.
The AT^SCFG read command returns a list of all supported parameters and their current values.
The AT^SCFG write command queries a configuration parameter (if no value is entered) or sets its value(s).

The following error messages may be returned by the AT^SCFG write commands:

- "+CME ERROR: operation temporary not allowed"
  Change of parameter value(s) temporarily not allowed.
- "+CME ERROR: invalid index"
  Invalid parameter name or value(s).
- "+CME ERROR: invalid characters in text string"
  Character set conversion of parameter value(s) failed.
- "+CME ERROR: memory failure"
  Could not allocate necessary memory or storing a parameter failed.
- "+CME ERROR: operation not allowed"
  Change of parameter value(s) not allowed
- "+CME ERROR: unknown"
  Other error

Syntax

Test Command

AT^SCFG=?

Response(s)

^SCFG: "GPRS/Auth", (list of supported <gauth>s)
^SCFG: "GPRS/AutoAttach", (list of supported <gaa>s)
^SCFG: "MEShutdown/OnIgnition", (list of supported <msi>s)
^SCFG: "URC/DstIfc", (list of supported <udi>s)
OK

Read Command

AT^SCFG?

Response(s)

^SCFG: "GPRS/Auth", <gauth>
^SCFG: "GPRS/AutoAttach", <gaa>
^SCFG: "MEShutdown/OnIgnition", <msi>
^SCFG: "URC/DstIfc", <udi>
OK

Write Command

Configure PPP authentication

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

Response(s)

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

Write Command

Automatic GPRS attach

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

Response(s)

^SCFG: "GPRS/AutoAttach", <gaa>
OK

Write Command (Continued)

Automatic GPRS attach

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

Response(s)

ERROR
+CME ERROR

Write Command

Enable/disable shutdown by ignition line

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

Response(s)

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

Write Command

Configure URC destination interface:

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

Response(s)

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

PIN	USB0-MDM	USB0-APP	Last
-	+	+	-

Parameter Description

<gauth>(str)

PPP authentication mechanism

This parameter can be used to configure which authentication algorithm is used by AT+CGDATA or ATD*99# during the PPP startup phase for not yet activated contexts.
For contexts which will be activated by AT+CGACT the AT command AT^SGAUTH should be used to configure the authentication method. Parameter is global for all interfaces, volatile and will not be reset by AT&F.

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

<gaa>(str)

GPRS with AutoAttach

This parameter can be used to control whether the ME will perform a GPRS attach immediately after power-up and registering to the network or not. If the setting is changed to "enabled" and the ME is not attached yet, it will not initiate an attach immediately but after the next restart and registration to the network.
Parameter is global for all interfaces, non volatile and will not be reset by AT&F.

“disabled“(D)	GPRS auto attach is disabled
“enabled“	GPRS auto attach is enabled

SIEMENS

`<msi>`(str)

MEShutdown/OnIgnition: Enable/disable shutdown by IGT line

The parameter specifies two different switching modes of the ignition line IGT: The line may either be used only to switch on the ME, or to switch it on and off.
Parameter `<msi>` is global for all interfaces, non-volatile and will not be reset by `AT&F`.

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

`<udi>`(str)

URC destination interface

This parameter can be used to configure the interface which will be used to output URCs. Note that the recommended approach for a typical HC25 application is using the default configuration. If you consider changing the configuration please carefully read Section 1.4, HC25 AT Command Interpreter and Section 1.8, Unsolicited Result Code Presentation.
Parameter is global for all interfaces, volatile and will not be reset by `AT&F`.
If the modem interface is used, then keep in mind, that if the interface is blocked by an active data connection, then this connection should be periodically suspended to check for pending URCs!

“usb0-mdm“	Use modem interface to output URCs
“usb0-app“(P)	Use application interface to output URCs

2.12 AT^SMSO Switch off mobile station

AT^SMSO initiates the power-off procedure.

Syntax

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

Exec Command
AT^SMSO
Response(s)
OK ERROR +CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	+

Note

- Do not send any other AT command after AT^SMSO.

2.13 AT^SUSB USB Configuration

AT^SUSB can be used to query and configure various settings of the USB interface.
The AT^SUSB read command returns a list of all supported parameters and their current values.
The AT^SUSB write commands query a configuration parameter (if no value is entered) or set the value(s).

Specifications of the USB interface are provided in [2]. Advice on how integrate the HC25 into different operating systems can be found in [7].

Syntax

Read Command

AT^SUSB?

Response(s)

^SUSB: "Startup", <start>
^SUSB: "MaxPower", <maxpow>
^SUSB: "PowerSource", <powsrc>
^SUSB: "MdmNet/TO", <mnto>
^SUSB: "MS/CRC", <mscrc>
^SUSB: "MS/OnEject", <msoe>
^SUSB: "MS/WProt", <mswprot>
OK
ERROR
+CME ERROR

Write Command

Startup configuration:

AT^SUSB="Startup"[, <start>]

Response(s)

^SUSB: "Startup", <start>
OK
ERROR
+CME ERROR

Write Command

Maximum power:

AT^SUSB="MaxPower"[, <maxpow>]

Response(s)

^SUSB: "MaxPower", <maxpow>
OK
ERROR
+CME ERROR

Write Command

Power source:

AT^SUSB="PowerSource"[, <powsrc>]

Response(s)

^SUSB: "PowerSource", <powsrc>
OK
ERROR
+CME ERROR

Write Command

Modem Class request timeout period:

AT^SUSB="MdmNet/TO"[, <mnto>]

Response(s)

^SUSB: "MdmNet/TO", <mnto>
OK
ERROR
+CME ERROR

Write Command

Query Mass Storage CRC:

AT^SUSB="MS/CRC"

Response(s)

^SUSB: "MS/CRC", <mscrc>
OK
ERROR
+CME ERROR

Write Command

Query usable Mass Storage size:

AT^SUSB="MS/FSize"

Response(s)

^SUSB: "MS/FSize", <msfs>
OK
ERROR
+CME ERROR

Write Command

Configure the mode after Mass Storage eject:

AT^SUSB="MS/OnEject"[, <msoe>]

Response(s)

^SUSB: "MS/OnEject", <msoe>
OK
ERROR
+CME ERROR

Write Command

Mass Storage write protection:

AT^SUSB="MS/WProt"[, <mswprot>]

Response(s)

^SUSB: "MS/WProt", <mswprot>
OK
ERROR
+CME ERROR

PIN	USB0-MDM	USB0-APP	Last
-	+	+	-

Parameter Description

`<start>`(str)

USB startup configuration

This parameter can be used to control the USB startup enumeration. Any change takes effect the next time the ME is re-enumerated.
Parameter is global for all interfaces, non-volatile and will not be reset by `AT&F`.

“MS“	On power-up the HC25 enumerates as USB mass storage device. The Product ID for the mass storage device is 0x0041. When you are finished using the mass storage you can easily switch over to composite device operation. To do so, use the Eject option. Under Windows XP, for example, open the Windows Explorer, right-click the "Removable Disk" drive and select "Eject". This deactivates the mass storage and, at the same time, activates the USB composite composite communication device without any need to restart the ME. Parameter `<msoe>` determines the type of USB composite communication device to activate when the mass storage is ejected. The option "Safely Remove the Hardware" commonly used for USB devices under Windows terminates the mass storage function without activating the composite device function.
“MdmNet“(D)	On power-up the HC25 enumerates as USB composite communication device with the following virtual ports: modem port, application port (VCOM) and wireless network adapter (NET). The Product ID for this enumeration is 0x0040.
“Mdm“	On power-up the HC25 enumerates as USB composite communication device supporting modem port and application port (VCOM), but no wireless network adapter (NET). The Product ID for this enumeration is 0x0047. Note: The "Mdm" enumeration variant is not supported by the HC25 USB driver package supplied by Siemens.

`<maxpow>`(str)

Maximum power

Maximum power consumption of the USB device from the USB bus. This parameter is reported to a USB host as part of the USB enumeration.
Only even values are supported. Odd values are truncated.
Any change of this parameter becomes active with the next device enumeration.
Parameter is global for all interfaces, non-volatile and will not be reset by `AT&F`.

0...10(D)...500	Device maximum power consumption in mA

`<powsrc>`(str)

Power source

This parameter can be used to specify the power source. Any change of this parameter becomes active with the next device enumeration.
Parameter is global for all interfaces, non-volatile and will not be reset by `AT&F`.

“BUS“	Device enumerates as bus powered device.
“SELF“(D)	Device enumerates as self powered device.

`<mnto>`(str)

Modem and Modem/Net Class Request timeout

This parameter specifies the time the HC25 waits for a Communication Device Class request from the host. Any change takes effect the next time the ME is restared.
Parameter is global for all interfaces, non-volatile and will not be reset by `AT&F`.

“0“	No timeout supervision Note: This configuration is not supported by the HC25 USB driver package supplied by Siemens.
100...10000(D)...65535	Timeout in ms If no Communication Device Class request is received within the specified time the ME enumerates as mass storage device.

`<msfs>`(str)

Mass storage size

This parameter reports the usable USB mass storage size.

0...2147483647	Usable mass storage size in bytes.

`<mscrc>`(str)

Mass storage CRC value

This parameter reports the USB mass storage CRC value.

00000000...FFFFFFFF	8 digit ASCII hex CRC value; if CRC recalculation is not finished yet, then a ASCII question mark is appended.

`<msoe>`(str)

Mode on mass storage eject

This parameter determines the type of USB composite communication device to activate when the mass storage is ejected.
Parameter is global for all interfaces, non-volatile and will not be reset by `AT&F`.

“MdmNet“(D)	After ejecting the mass storage the HC25 enumerates as USB composite communication device with modem port, application port (VCOM) and wireless network adapter (NET).
“Mdm“	After ejecting the mass storage the HC25 enumerates as USB composite communication device with modem port and application port (VCOM). Note: The "Mdm" enumeration is not supported by the HC25 USB driver package supplied by Siemens.

`<mswprot>`(str)

Mass storage write protection

This parameter can be used to enable or disable the USB mass storage write protection. communication device (modem). Any change of this parameter becomes active immediately.
Parameter is global for all interfaces, non-volatile and will not be reset by `AT&F`.

“Enabled“	Mass storage is write protected
“Disabled“(D)	Mass storage is not write protected

3. Status Control Commands

The AT Commands described in this chapter allow the external application to obtain various status information from the HC25.

3.1 AT^SIND Extended Indicator Control

The AT^SIND command controls the presentation of Indicator Event Reports. You can enable / disable URCs to be output each time when 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>]
...
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: <indDescr>, <mode>, <indValue>, <eonsOperator>, <servProvider>, <servProviderType>

In case of: <indDescr>="nitz" and <mode>=2
^SIND: <indDescr>, <mode>, <nitzUT>, <nitzTZ>, <nitzDST>
OK
ERROR
+CME ERROR: <err>

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	-

Unsolicited Result Codes

URC 1

Format of the standard indicator:

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

Value of an indicator has changed.

URC 2

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 3

Format of the "nitz" indicator:

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

Parameter Description

`<indDescr>`(str)

String values and their `<indValue>` ranges.

“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.
“sounder“	Sounder activity: Reports every event that causes the ME to generate a tone. 0 Tone generator not active. 1 Tone generator active. Value 1 means for example: Incoming call - ME is ringing. Note that in this case the URC "`+CIEV`: sounder" will be output only if ringing tones are enabled with `AT^SRTC`. Waiting call - ME generates waiting call tone (if call waiting is enabled). Outgoing call - ME generates Call Progress tone. Outgoing call - ME generates BUSY tone. Playback of ringing tones when tested with `AT^SRTC`.
“message“	Unread short message at memory location `<mem1>`. Refer to `AT+CPMS`. 0 No unread message(s) available. 1 Unread message(s) available.
“call“	Call in progress: 0 No call. 1 At least one MO or MT call is in state "active" (connection established) or "held".
“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.

“rssi“

Received signal (field) strength:
0 Signal strength ≤ -112 dBm
1 - 4 Signal strength in 15 dB steps
5 Signal strength ≥ -51 dBm
99 Signal strength not known or not detectable
Received signal (field) strength can also be obtained with AT+CSQ. However, the signal strength is scaled to value range 0..31 by this command.

“audio“

Activity of the built-in audio unit:
0 Audio unit not active.
1 Audio unit is active, for example:
MO voice call: Indicator is output with value 1 when dialing starts.
MT voice call: Indicator is output with value 1 when call is ringing.

“eons“

Enhanced Operator Name String (EONS) Indication:
The Enhanced Operator Name String indicator feature allows the HC25 to output various operator names for different PLMN identities via URC. 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.
The presentation of the "eons" indicator is determined by network activity. For example, the indicator appears every time a location update occurs or a NITZ information is sent, no matter whether or not the status of the EONS information has changed. This means that the same EONS information may be reported several times.
The EONS tables are stored in the SIM card and will be read at power-up.
Following are the SIM Elementary Files that are affected by the introduction of EONS feature in the SIM card:
EF_{SST} (SIM 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
If the Operator Name Source is CPHS Operator Name String long and short form, refer to <indValue>, the following two SIM Elementary Files will be used:
$EF_{ONString}$ (Operator Name String) - contains the name of the PLMN operator who issued the SIM.
$EF_{OPShort}$ (Operator Name Short form) - contains a short form of the name of the PLMN operator who issued the SIM.

“nitz“

Network Identity and Time Zone indication:
This indicator shows the time relevant information elements of an MM Information (MMI) or GMM Information (GMMI) message received from the network (see GSM 24.008, ch. 9.2.15a and 9.4.19). 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 module detaches from network. Also when a manual network selection fails and the module 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“

SIM Status Indication:
The SIM Status indicator allows the HC25 to output the status of the subscriber identity module (SIM) via URC.

0 SIM card removed.
Note: Another way to verify the SIM card connection is the "^SCKS" URC enabled with AT^SCKS.
1 SIM card inserted.
5 SIM initialization completed - ME has finished reading SIM data.

“psinfo“

Packet Switched Status Indication
"psinfo" indicates the status of the module related to packet switched data calls.

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

<indValue>(num)

Integer type value in the range stated above for the corresponding <indDescr>.

Notes specific to the EONS feature:
If the indicator is "eons", the <indValue> is a type associated to the operator name according to GSM 22.101 [21]. This type depends on the source of the operator name.
Priority of types associated to the operator names is defined as follows (the type listed first has the highest priority). If a type cannot be indicated the next one will be used.

0 Not registered.
1 EF-OPL and EF-PNN (alphanumeric format, can contain up to 24 characters.)
2 Operator Name String in long and short format according to Common PCN Handset Specification (CPHS) [22] (alphanumeric format, can contain up to 16 characters).
3 Name information received by the NITZ service long and short form (alphanumeric format, can contain up to 16 characters). The short form will be displayed only if $EF_{OPShort}$ from CPHS is available.
4 Any operator name stored internal to the ME (alphanumeric format, can contain up to 16 characters).
5 Broadcast MCC-MNC (numeric format which consists of a 3-digit country code plus a 2- or 3-digit network code).

If the type is 2, 4 or 5, AT+COPS with the appropriate <mode> displays the same operator name.

`<mode>`(num)

0(&F)(P)	Disables the presentation of a specific URC.
1	Enables the presentation of a specific URC. The URC will be buffered in the TA when the TA-TE link is reserved (e.g. in online data mode), and flushed to the TE when the TA-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.

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

Operator in format which depends on the type associated to the operator name. Refer to `<indValue>`.

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

Service Provider Name according to the status settings (SIM Service No. 17) in the SIM Service Table (SST) of the SIM.
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	No Service Provider Information available.
1	Service Provider Name will be displayed. RPLMN is the HPLMN.
2	Service Provider Display Information will be displayed. One list entry 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. Refer to `<indDescr>`.

3.2 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 GPRS attach or unsuccessful PDP context activation
- GPRS detach or PDP context deactivation

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

Syntax

Test Command
AT+CEER=?
Response(s)
OK ERROR +CME ERROR

Exec Command
AT+CEER
Response(s)
+CEER: <report> OK ERROR +CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Parameter Description

<report>(str)

release cause report

Reason for the last call failure to setup or release (listed in Section 3.2.1, List of status codes for the 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.

3.2.1 List of status codes for the extended error report

CS internal cause lookup
No cause information available (default)
Phone is offline
No service available
Network release, no reason given
Received incoming call

CS internal cause lookup
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 lookup
Unassigned/unalloacted 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

CS network cause lookup
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 >= ACMmax
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
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 lookup
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

CS network reject lookup
PLMN not allowed
Location Area not allowed
Roaming not allowed
GPRS services not allowed in PLMN
No Suitable Cells In Location Area
MSC temporarily not reachable
Network failure
MAC failure
Synch failure
Congestion
GSM authentication unacceptable
Service option not supported
Requested service option not subscribed
Service option temporarily 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
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 lookup
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

CS PS network cause lookup
LLC or SNDCP failure
Insufficient resources
Missing or unknown APN
Unknown PDP address or PDP type
User Aauthentication failed
Activation rejected by GGSN
Activation rejected, unspecified
Service option not supported
Requested service option not subscribed
Service option temporarily 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

CS PS network cause lookup
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

3.3 AT+CPAS Mobile equipment activity status

The AT+CPAS execute command indicates the activity status of the ME.

Syntax

Test Command
AT+CPAS=?
Response(s)
+CPAS: (list of supported<pas>s) OK

Exec Command
AT+CPAS
Response(s)
+CPAS: <pas> OK

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	-	+	+	-

Parameter Description

<pas>(num)	
0	Ready
3	Incoming call (ringing)
4	Call in progress

3.4 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)	
<n> OK	

Write Command	
AT+WS46=[<n>]	
Response(s)	
OK ERROR +CME ERROR	

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	-	+	+	-

Parameter Description

<n>(num)	
12	GSM Digital Cellular Systems (GERAN only)
22	UTRAN only
25	3GPP Systems (both 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 HC25's serial interface.

4.1 AT^SQPORT Query Port Type

AT^SQPORT enables the host application to query the type of virtual COM port it is connected to. Further details on the different types of virtual HC25 interfaces can be found in Section 1.4, HC25 AT Command Interpreter.

Syntax

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

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

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
Siemens	-	+	+	-

Parameter Description

<type>(str)	
“Modem“	The virtual COM port is defined for use as a modem, mainly intended for dial-up connections. Using AT commands is not recommended except for the dialing command ATD.
“Application“	The virtual COM port is defined as application interface. It is recommended that this interface be used for controlling the HC25, e.g. for entering AT commands, receiving URCs, or sending and receiving short messages. URCs are indicated only on this interface, no matter which of the two interfaces was used to send the AT commands for activating their presentation. For further detail on URCs please refer to Section 1.8, Unsolicited Result Code Presentation.

4.2 AT&C Set Data Carrier Detect (DCD) Line mode

The AT&C command determines how the state of the DCD line (circuit 109) of the virtual modem COM port reflects the HC25's internal activity.

Syntax

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Parameter Description

<value>(num)	
[0]	DCD line shall always be on.
1	DCD line shall be on only when data carrier signal is present.
2(&F)	Setting winks (briefly transitions off, then back on) the DCD line when data calls end.

4.3 AT&D Set circuit Data Terminal Ready (DTR) function mode

The AT&D determines how the TA responds when circuit 108/2 (DTR) is changed from ON to OFF during data mode.

Syntax

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Parameter Description

<value>(num)	
[0]	TA ignores status of DTR.
1	ON->OFF on DTR: Change to command mode while retaining the connected call.
2(&F)	ON->OFF on DTR: Disconnect data call, change to command mode. During state DTR = OFF auto-answer is off.

4.4 AT&S Set circuit Data Set Ready (DSR) function mode

The AT&S command determines how the TA sets circuit 107 (DSR) depending on the communication state of the TA interfacing TE.

Syntax

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	-	+	+	-

Parameter Description

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

4.5 ATE Enable command echo

The ATE command determines whether or not the TA echoes characters received from TE during command state.

Syntax

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	-	+	+	-

Parameter Description

<value>(num)	
0	Echo mode off
[1](&F)	Echo mode on

5. Security Commands

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

5.1 AT+CLCK Facility lock

AT+CLCK can be used to lock, unlock or interrogate a network or ME <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>]

Response(s)

if <mode> is not equal 2 and command successful:
OK
if <mode>= 2 and command successful:
+CLCK: <status>[, <class>]
[+CLCK: <status>[, <class>]]
[+CLCK: ...]
OK
If error is related to ME functionality
+CME ERROR

Reference(s)

GSM 07.07, GSM 02.04, GSM 02.88, GSM 03.88, GSM 04.88

PIN	USB0-MDM	USB0-APP	Last
+	+	+	-

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 cards). SIM requests password upon ME power-up and when this lock command is issued. <password>: SIM PIN1.
“FD“	SIM fixed dialling memory: If the mobile is locked to "FD", only the phone numbers stored to the "FD" memory can be dialled. (Capacity of FD phonebook depending on the SIM card). <password>: SIM PIN 2. If a lock on the SIM fixed dialing memory is active, the following applies:

- Outgoing voice, data or fax calls can be made only to numbers stored in "FD" phonebook.
  Result code depends on the type of the call:
  for voice calls, indication is "+CME Error 257: Call barred".
  for data and fax calls, indication is "NO CARRIER".
- Access to defined Supplementary Services such as Call barring, Call waiting, Call forwarding, Call hold and Multiparty is possible only if the exact corresponding public MMI *# code for the desired service is stored in the fixed dialing number phone book, and used with ATD.
  AT commands for supplementary service control are barred while "FD" lock is active.
  Indication is "+CME Error 257: Call barred".
- Access to Unstructured Supplementary Services ("USSD") is possible only if the exact desired USSD string is stored in the fixed dialling number phone book, and used with ATD.
  AT commands for USSD are barred while "FD" lock is active.
  Indication is "+CME Error 257: Call barred".
- SMS can be sent only to phone numbers which are stored in the "fixed dialling numbers" phonebook "FD".
  Indication is "+CMS Error 302: operation not allowed".
- GPRS commands can be used only if the "fixed dialling numbers" phonebook "FD" contains an entry with phone number "*99#". This single entry enables all GPRS commands, including AT commands and modem compatibility commands like "ATD*99***1#" or "ATD*98***1#".
  Indication is "+CME Error 257: Call barred".

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
1	lock
2	query status

<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 can be modified with AT+CPWD.

<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 "GSM 02.04".

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

Notes

- The AT+CLCK command offers the full range of <class> parameters according to the GSM 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 GSM 07.07. 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 GSM 02.04.
- If an outgoing Fax or Data Call is rejected due to an active "call barring" supplementary service, the call will be terminated with result code NO CARRIER.
  Under the same conditions, an outgoing Voice call will be terminated with result code NO DIALTONE.
- If an invalid <password> is entered several times in succession, a delay incremented after each failed attempt will increase the time to wait before the input of the <password> is accepted. To avoid blocking the serial interface the running AT+CLCK command is aborted after a short timeout and returns CME ERROR 100 ("unknown"). If then the AT+CLCK command is issued once again execution is denied with CME ERROR 256 ("Operation temporary not allowed"). For details regarding the delay see Section 5.2.1, What to do if PIN or password authentication fails?.

- If the user tries to set a lock although it is already active or, the other way round, tries to unlock an inactive lock, the response will be OK, but the `<password>` will not be checked or verified.
- 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.
- For PN (Network Personalisation) value of `<facility>` parameter refer to `AT^SCSL` command.

Example

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

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

`AT+CLCK="SC",0,"9999"` `OK`	Unlocks SIM card. When powered up, ME registers to the GSM 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 ME to register to the GSM network.

5.2 AT+CPIN PIN Authentication

AT+CPIN controls network authentication of the HC25.

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

The write command allows the HC25 to store the entered password. This may be for example the SIM PIN1 to register to the GSM 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 no PIN1 request is pending (for example if PIN1 authentication has been done and the same PIN1 is entered again) HC25 responds "+CME ERROR: operation not allowed"; no further action is required.

Each time a password is entered with AT+CPIN the module starts reading data from the SIM. The duration of reading varies with the SIM card. This may cause a delay of several seconds before all commands which need access to SIM data are effective. See Section 18.1, Restricted access to SIM data after SIM PIN authentication for further detail.

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>
```

Reference(s)
GSM 07.07

PIN	USB0-MDM	USB0-APP	Last
-	+	+	-

Parameter Description

<pin>(str)

Password (string type), usually SIM PIN1.
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>(text)

If the requested code was a PUK: specify a new password or restore the former disabled password. See Section 5.2.1, What to do if PIN or password authentication fails? for more information about when you may need to enter the PUK.

<code>(text)	
SIM PIN authentication	
READY	PIN has already been entered. No further entry needed.
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.
SIM PUK2	ME is waiting for PUK2 to unblock a disabled PIN2.
Phone security locks set by client or factory	
PH-SIM PIN	ME is waiting for phone-to-SIM card password if "PS" lock is active and the client inserts other SIM card than the one used for the lock. ("PS" lock is also referred to as phone or antitheft lock).
PH-FSIM PIN	ME is waiting for phone-to-very-first-SIM card. Necessary when "PF" lock was set. When powered up the first time, ME locks itself to the first SIM card put into the card holder. As a result, operation of the mobile is restricted to this one SIM card (unless the PH-FSIM PUK is used as described below).
PH-FSIM PUK	ME is waiting for phone-to-very-first-SIM card unblocking password to be given. Necessary when "PF" lock is active and other than first SIM card is inserted.
PH-NET PIN	ME is waiting for network personalisation password
PH-NET PUK	ME is waiting for network personalisation unblocking password
PH-NETSUB PIN	ME is waiting for network subset personalisation password
PH-NETSUB PUK	ME is waiting for network subset unblocking password
PH-SP PIN	ME is waiting for service provider personalisation password
PH-SP PUK	ME is waiting for service provider personalisation unblocking password
PH-CORP PIN	ME is waiting for corporate personalisation password
PH-CORP PUK	ME 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 ME fails to register to the network. This may be due to missing network coverage, denied network access with currently used SIM card, no valid roaming agreement between home network and currently available operators etc.
  HC25 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 ME 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

5.2.1 What to do if PIN or password authentication fails?

PIN1 / PUK1:
After three failures to enter PIN 1, the SIM card is blocked (except for emergency calls). +CME ERROR: 12 will prompt the client to unblock the SIM card by entering the associated PUK (= PIN Unblocking Key / Personal Unblocking Key). After ten failed attempts to enter the PUK, the SIM card will be invalidated and no longer operable In such a case, the card needs to be replaced. PIN1 consists of 4 to 8 digits, PUK1 is an 8-digit code only.
To unblock a disabled PIN1 you have two options:

- You can enter AT+CPIN=PUK1,new PIN1.
- You can use the ATD command followed by the GSM code **05*PUK*newPIN*newPIN#;.

PIN2 / PUK2:
PIN2 prevents unauthorized access to the features listed in AT+CPIN. The handling of PIN2 varies with the provider. PIN2 may either be a specific code supplied along with an associated PUK2, or a default code such as 0000. In either case, the client is advised to replace it with an individual code. Incorrect input of PUK2 will permanently block the additional features subject to PIN2 authentification, but usually has no effect on PIN1. PIN2 consists of 4 digits, PUK2 is an 8-digit code only.
To unblock a disabled PIN2 you have two options:

- You can enter AT+CPIN=PUK2,new PIN2.
- You can use the ATD command followed by the GSM code **052*PUK2*newPIN2*newPIN2#;.

SIM locks:
These are factory set locks, such as "PF", "PN", "PU", "PP", "PC". An 8-digit unlocking code is required to operate the mobile with a different SIM card, or to lift the lock. The code can only be obtained from the provider.
If incorrectly input, the password is governed by a specific timing algorithm: (n-1)*256 seconds (see table below).

Number of failed attempts	Time to wait before next input is allowed
1st failed attempt	No time to wait
2nd failed attempt	4 seconds
3rd failed attempt	3 * 256 seconds
4th failed attempt	4 * 256 seconds
5th failed attempt	5 * 256 seconds
6th failed attempt and so forth	6 * 256 seconds and so forth

Call barring:
Supported modes are "AO", "OI", "OX", "AI", "IR", "AB", "AG", "AC". If the call barring password is entered incorrectly three times, the client will need to contact the service provider to obtain a new one.

Related sections:
"+CME ERROR: <err>" values are specified at Section 2.8.1, CME/CMS Error Code Overview. For further instructions and examples see AT+CLCK and AT+CPWD.
For a complete list of Star-Hash codes please refer Section 18.2, Star-Hash (*#) Network Commands.

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 commands 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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

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 or ATD. For further details please refer to Section 5.2.1, What to do if PIN or password authentication fails?. <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 or ATD. For further detail please refer to Section 5.2.1, What to do if PIN or password authentication fails?. <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. Mandatory, if <old password> was an unblocking key (PUK).

Note

- 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 PIN2

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

EXAMPLE 2

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^SCSL Customer SIM Lock

AT^SCSL is a Siemens defined command especially designed to manage 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 depersonalization key.

Syntax

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

Write Command
AT^SCSL=<facility>, <action>[, <password>, <data>]
Response(s)
OK ERROR CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
Siemens	-	+	+	-

Parameter Description

<facility>(str)	
“PN“	Network Personalisation (= Customer SIM Lock)

<action>(num)	
0	Delete programmed SIM lock data 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 . To make the change take effect the ME must be restarted.
1	Program given Customer SIM lock data and activate lock. Required parameters: <facility>="PN", <action>=1, <password>, <data>. To make the change take effect the ME must be restarted.
2	Request Customer SIM Lock status. Required parameters: <facility>="PN", <action>=2.
3	Set Customer SIM Lock into prepared state (Autolock), the SIM lock data will be read from the first inserted SIM card. Required parameters: <facility>="PN", <action>=3, <password>. Setting the lock into prepared state will remove all <data>, i.e. the entire list of operators. To make the change take effect the ME must be restarted.
4	Request the depersonalization key, allowed if Customer SIM Lock has not already been programmed. Otherwise returns error. Required parameters: <facility>="PN", <action>=4.

<password>(str)

Depersonalization key associated with the device. The password is not needed for <action>=2 and <action>=4.

<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 D, Vodafone D2 and E-Plus you would enter the following data: 262.01:262.02:262.03
Note that each time the AT^SCSL write command is executed using the parameter <action>=1 the existing operator codes will not be overwritten, but all new data will be added to the list. This applies no matter whether the same operator code is already listed, i.e. entering the same operator again causes double entries.

Notes

- Usage of the Customer SIM lock features may be restricted by existing facility locks.
- Reprogramming active SIM lock is possible, but overwrites previous settings.

Example

To check <password>, configure and remove the Customer SIM Lock:

AT^SCSL="PN",4	Check the <password> - possible if Customer SIM Lock not programmed yet.
^SCSL: 12345678 OK	
AT^SCSL="PN",2	Request status
^SCSL: "" OK	SIM Lock disabled
AT^SCSL="PN",1,"12345678","MCC1.MNC1:MCC2.MNC2" OK	Program Customer SIM Lock
AT^SCSL="PN",2	Request status
^SCSL: "MCC1.MNC1:MCC2.MNC2" OK	SIM Lock disabled
AT^SCSL="PN",0,"12345678" OK	Remove Customer SIM Lock

6. Identification Commands

The AT Commands described in this chapter allow the external application to obtain various identification information related to the HC25 and linked entities.

6.1 ATI Display product identification information

The `ATI` execute command delivers a product information text.
The 'Revision' information consists of the following parts: Version xx and variant yy of software release.

Syntax

Exec Command
`ATI`
Response(s)
SIEMENS HC25 REVISION xx.yy `OK`

Exec Command
`ATI`
Response(s)
`OK`

Reference(s)
V.250

PIN	USB0-MDM	USB0-APP	Last
-	+	+	-

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)
SIEMENS AG OK

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	-	+	+	-

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)
SIEMENS AG OK

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

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)
HC25 OK

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	-	+	+	-

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)
HC25 OK

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	-	+	+	-

Parameter Description

<xx.yyy>(str)

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

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 delivers 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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	-	+	+	-

Parameter Description

<sn>(str)

International Mobile Equipment Identity (IMEI) used to identify a GSM mobile equipment to the GSM network

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

AT+GSN delivers 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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	-	+	+	-

Parameter Description

<sn>(str)

International Mobile Equipment Identity (IMEI) used to identify a GSM mobile equipment to the GSM 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 ME.

Syntax

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

Exec Command
AT+CIMI
Response(s)
<imsi> OK ERROR +CME ERROR: <err>

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Parameter Description

<imsi>(str)

International Mobile Subscriber Identity (string without quotes).

7. Call related Commands

The AT Commands described in this chapter are related to Mobile Originated (MOC, i.e. outgoing) Calls and Mobile Terminated (MTC, i.e. incoming) Calls.

7.1 ATA Answer a call

Syntax

Exec Command

`ATA`

Response(s)

In case of data call, if successfully connected (TA switches to data mode):
`CONNECT <text>`
In case of voice call, if successfully connected:
`OK`
When TA returns to command mode after call release:
`OK`
If no connection:
`NO CARRIER`

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Command Description

TA causes remote station to go off-hook (e.g. answer call).

Parameter Description

`<text>`(str)

Connection status

`<text>` output only if `ATX` parameter setting with value greater 0.

Notes

- The command may be aborted generally by receiving a character during execution. It can't be aborted in some connection setup states, such as handshaking.
- See also `ATX` for `<text>`.
- If an incoming call is no longer available (already disconnected/hanged up)a "NO CARRIER" result code will be given.

7.2 ATD Mobile originated call to specified number

Syntax

Exec Command

ATD<n>[<mgsm>][;]

Response(s)

If busy (parameter setting ATX3 or ATX4):
BUSY
If a connection cannot be set up:
NO CARRIER
NO ANSWER
OK
If successfully connected and non-voice call (TA switches to online data mode) at the modem port:
CONNECT <text>
When TA returns to command mode after call release:
OK
If voice call (successfully or not):
OK

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	±	+	+	-

Command Description

This command can be used to set up outgoing voice, data or fax calls. It also serves to control Supplementary Services. The termination character ";" is mandatory to set up voice calls or to send *# codes for Supplementary Services. It must not be used for data and fax calls.

Additional notes on the responses returned after dialing with ATD:

- For data connections, call setup always terminates when the call has been established (indicated by the result code "CONNECT <text>), or when it fails (indicated by "NO CARRIER" or "BUSY") at the modem port.
- For voice calls the ME responds once the call setup is completed either successfully or unsuccessfully with ("OK").

Parameter Description

<n>(text)

String of dialing digits and optional V.250 modifiers: 0-9,*, #, +, A, B, C
The following V.250 modifiers are ignored: ,(comma), T, P, !, W ,@

<mgsm>(str)

String of GSM modifiers:
I Activates CLIR (disables presentation of own phone number to called party)
i Deactivates CLIR (enables presentation of own phone number to called party)
G Activate Closed User Group explicit invocation for this call only.
g Deactivate Closed User Group explicit invocation for this call only.

Notes

- The command may be aborted generally when receiving a character during execution. It cannot be aborted in some connection setup states, such as handshaking.
- See also `ATX` for `<text>`.
- Emergency calls: HC25 supports (standardized GSM emergency number, usable with or without SIM).
  If a SIM with ECC-file is inserted, additional call numbers stored in the ECC-file cause an emergency call setup.
  If SIM without ECC-file is inserted, call numbers 000, 08, 110, 112, 911 and 999 cause an emergency call setup.
  If no SIM is inserted, call numbers 000, 08, 110, 112, 118,119, 911 and 999 cause an emergency call setup.

7.3 ATD><mem><n> Mobile originated call using specific memory and index number

Syntax

Exec Command

`ATD><mem><n>;`

Response(s)

`ERROR`
`+CME ERROR: <err>`
If no dialtone (parameter ATX2 or ATX4):
`NO DIALTONE`
If busy (parameter setting ATX3 or ATX4):
`BUSY`
If connection cannot be set up:
`NO CARRIER`
When TA returns to command mode after call release:
`OK`
If voice call setup successful or not:
`OK`

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Command Description

TA attempts to set up an outgoing call to the specified number.

Parameter Description

`<mem>`(text)

Phonebook storage:
For detailed description of storages see `AT+CPBS`.

FD	Fixed dialing phonebook
SM	SIM phonebook
ON	MSISDN list
ME	Mobile Equipment Phonebook
LD	Last number dialed phonebook
MC	Missed (unanswered received) calls list
RC	Received calls list
EN	Emergency numbers
DC	Dialled calls list

`<n>`(num)

Integer type memory location in the range of locations available in the selected memory, i.e. the index number returned by `AT+CPBR`.

Notes

- This command may be aborted generally by receiving a character during execution. Abortion is not possible during some states of connection setup such as handshaking.
- See `ATX` for setting result code and call monitoring parameters.

Examples

EXAMPLE 1

To query the location number of the phonebook entry:

```
AT+CPBR=1,xx
```

TA returns the entries available in the active phonebook.

EXAMPLE 2

To dial a number from the SIM phonebook, for example the number stored to location 15:

```
ATD>"SM15";
OK
```

EXAMPLE 3

To dial a phone number stored in the last dial memory on the SIM card:

```
ATD>"LD9";
OK
```

7.4 ATD><n> Mobile originated call from active memory using index number

Syntax

Exec Command

`ATD><n>;`

Response(s)

`ERROR`
`+CME ERROR: <err>`
If no dialtone (parameter ATX2 or ATX4):
`NO DIALTONE`
If busy (parameter setting ATX3 or ATX4):
`BUSY`
If connection cannot be set up:
`NO CARRIER`
When TA returns to command mode after call release:
`OK`
If successfully connected:
`OK`
If csv call successfully or not:
`OK`

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Command Description

TA attempts to set up an outgoing call to the stored number.

Parameter Description

`<n>`(str)

Integer type memory location in the range of locations available in the selected memory, i.e. the index number returned by `AT+CPBR`.

Note

- This command may be aborted generally by receiving a character during execution. Abortion is not possible during some states of connection setup such as handshaking.

7.5 ATD><str> Mobile originated call from active memory using corresponding field

Syntax

Exec Command

`ATD><str>;`

Response(s)

`ERROR`
`+CME ERROR: <err>`
If no dialtone (parameter ATX2 or ATX4):
`NO DIALTONE`
If busy (parameter setting ATX3 or ATX4):
`BUSY`
If connection cannot be set up:
`NO CARRIER`
When TA returns to command mode after call release:
`OK`
If successfully connected:
`OK`
If csv call successfully or not:
`OK`

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Command Description

This command searches the active phonebook for a given string `<str>` and dials the assigned phone number.

Parameter Description

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

String type value ("x"), which should equal an alphanumeric field in at least one phonebook entry in the searched memories; used character set should be the one selected with `AT+CSCS`. `<str>` can contain escape sequences as described in chapter "`Supported character sets`".
If `AT+CSCS` is set to "UCS2", with respect to the coding of UCS2-characters only phonebook entries that contain an alphanumeric string with as size less than the half of the parameter `<tlength>` from `AT+CPBW` can be dialed.

Note

- This command may be aborted generally by receiving a character during execution. Abortion is not possible during some states of connection setup such as handshaking.

7.6 ATH Disconnect existing data connection

Syntax

Exec Command
ATH[<n>]
Response(s)
OK

Reference(s)
V.250

PIN	USB0-MDM	USB0-APP	Last
+	+	+	-

Command Description

Disconnect existing data (csd) call from command line by local TE and terminate call.

Parameter Description

<n>(num)	
[0]	disconnect from line and terminate call

7.7 AT+CHUP Hang up call

Syntax

Test Command
`AT+CHUP=?`
Response(s)

`OK`
`ERROR`
`+CME ERROR`

Exec Command
`AT+CHUP`
Response(s)

`OK`
`ERROR`
`+CME ERROR`

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	-	+	+	-

Command Description

Cancels all active and held calls.

Note

- `AT+CHUP` supports only voice calls. Data or Fax connections can be disconnected with `ATH` only.

7.8 ATS0 Set number of rings before automatically answering a call

Syntax

Read Command
ATS0?
Response(s)
<n> OK ERROR

Write Command
ATS0=<n>
Response(s)
OK ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Parameter Description

<n>(num)	
000(&F)	Automatic answer mode is disabled.
001-255	Enable automatic answering after specified number of rings.

Notes

- This command works for MT data and fax calls.
- If <n> is set to higher values, the calling party may hang up before the call is automatically answered.
- The correlation between ATS7 and ATS0 is important.
  Example: Call setup may fail if ATS7=30 and ATS0=20.

7.9 ATS6 Set pause before blind dialing

Syntax

Read Command
ATS6?
Response(s)
<n> OK

Write Command
ATS6=<n>
Response(s)
OK ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Command Description

No effect for GSM.

Parameter Description

<n>(num)
002(&F)...10

7.10 ATS7 Set number of seconds to wait for connection completion

ATS7 specifies the number of seconds the TA will wait for the completion of the call setup when answering or originating a data call. Also referred to as "no answer timeout". To put it plainly, this is the time to wait for the carrier signal. If no carrier signal is received within the specified time, the TA hangs up.

Syntax

Read Command
ATS7?
Response(s)
<n> OK

Write Command
ATS7=<n>
Response(s)
OK ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Parameter Description

<n>(num)
Number of seconds to wait for connection completion 001...50(&F)...255

Notes

- Command ATS7 is only applicable to data calls.
- The correlation between ATS7 and ATS0 is important. If the called party has specified a high value for ATS0=<n> call setup may fail.
  Example: Call setup may fail if ATS7=30 and ATS0=20.

7.11 ATS8 Set number of seconds to wait for comma dialing modifier

This command specifies the amount of time, in seconds, that the DCE shall pause, during signalling of call addressing information to the network (dialling), when a "," (comma) dial modifier is encountered in a dial string.

Syntax

Read Command
ATS8?
Response(s)
<n> OK

Write Command
ATS8=<n>
Response(s)
OK ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Command Description

No effect for GSM.

Parameter Description

<n>(num)	
0	DCE does not pause when "," encountered in dial string
1...2(&F)...255	Number of seconds to pause

7.12 ATS10 Set disconnect delay after indicating the absence of data carrier

Syntax

Read Command
`ATS10?`
Response(s)
`<n>` `OK`

Write Command
`ATS10=<n>`
Response(s)
`OK` `ERROR`

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Command Description

This parameter setting determines the amount of time, that the TA remains connected in absence of a data carrier. If the data carrier is detected before disconnect, the TA remains connected.

Parameter Description

`<n>`(num)

number of tenths of seconds of delay

001...14(&F)...255

7.13 ATO Switch from command mode to data mode

Syntax

Exec Command
ATO[<n>]
Response(s)
If connection is not successfully resumed: NO CARRIER or TA returns to data mode from command mode CONNECT <text> Note: <text> output only if ATX parameter setting with value > 0.

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	-	-

Command Description

ATO is the corresponding command to the +++ escape sequence: When you have established a CSD call and TA is in command mode, ATO causes the TA to resume the data connection and takes you back to data mode mode.

Parameter Description

<n>(num)	
[0]	Switch from command mode to data mode

7.14 +++ Switch from data mode to command mode

Syntax

Exec Command
`+++`
Response(s)
`OK`

Reference(s)
V.250

PIN	USB0-MDM	USB0-APP	Last
-	+	-	-

Command Description

This command is only available during a CSD call connection. The +++ character sequence causes the TA to cancel the data flow over the AT interface and switch to command mode. This allows you to enter AT commands while maintaining the data connection to the remote device .
To prevent the +++ escape sequence from being misinterpreted as data, it must be preceded and followed by a pause of at least 1000 ms. The +++ characters must be entered in quick succession, all within 1000 ms.

Notes

- To return from command mode to data online mode: Enter `ATO`.
- The DTR function mode 1 provides the same functionality as "+++" (see `AT&D`).

7.15 AT+CLCC List current calls of ME

The execute command returns a list of current calls of ME. If command is successful, but no calls are available, no information response is sent to TE.

Syntax

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

Exec Command
AT+CLCC
Response(s)
[+CLCC: <idx>, <dir>, <stat>, <mode>, <mpty>[, <number>, <type>[, <alpha>]]] [+CLCC: <idx>, <dir>, <stat>, <mode>, <mpty>[, <number>, <type>[, <alpha>]]] [+CLCC: ...] OK ERROR +CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Parameter Description

<idx>(num)

Call identification number as described in GSM02.30 subclause 4.5.5.1; this number can be used in AT+CHLD command operations

<dir>(num)

0	Mobile originated call (MOC)
1	Mobile terminated call (MTC)

<stat>(num)

State of the call

0	Active
1	Held
2	Dialing (MOC)
3	Alerting (MOC)
4	Incoming (MTC)
5	Waiting (MTC)

<mode>(num)

Bearer/teleservice

0	Voice
1	Data
2	Fax

SIEMENS

<mpty>(num)	
0	Call is not one of multiparty (conference) call parties
1	Call is one of multiparty (conference) call parties

<number>(str)
Phone number in format specified by <type>

<type>(num)	
Type of address octect	
128	Restricted <number> includes unknown type and format.
145	Dialing string <number> includes international access code character '+'
129	Otherwise

<alpha>(str)(+CSCS)
Alphanumeric representation of <number> corresponding to the entry found in phonebook; used character set should be the one selected with command AT+CSCS (Select TE Character Set). The maximum displayed length of <alpha> is 14 characters.

7.16 AT+CR Service reporting control

AT+CR configures the TA whether or not to transmit an intermediate result code +CR: <serv> to the TE when a call is being set up.
Setting the value of <mode> to 1 may lead to connection failure, if the application (e.g. WinFax) waits for default result code/URC.

Syntax

Test Command
AT+CR=?
Response(s)
+CR: (list of supported<mode>s) OK ERROR

Read Command
AT+CR?
Response(s)
+CR: <mode> OK ERROR

Write Command
AT+CR=<mode>
Response(s)
OK ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Intermediate Result Code

If enabled, an intermediate result code is transmitted during connect negotiation when the TA has determined the speed and quality of service to be used, before any error control or data compression reports are transmitted, and before any final result code (e.g. CONNECT) appears.

+CR: <serv>

Parameter Description

<mode>(num)	
0(&F)	Disable
1	Enable

<serv>(str)	
“REL ASYNC“	Asynchronous non-transparent
“GPRS“	GPRS
“SYNC“	Fax connection

SIEMENS

7.17 AT+CRC Set Cellular Result Codes for incoming call indication

The AT+CRC command controls whether or not to use the extended format of incoming call indication. <mode>=1 may lead to connection failure, if the application (e.g. WinFax) waits for the default URC.

Syntax

Test Command

AT+CRC=?

Response(s)

+CRC: (list of supported<mode>s)
OK
ERROR

Read Command

AT+CRC?

Response(s)

+CRC: <mode>
OK
ERROR

Exec Command

AT+CRC

Response(s)

OK
ERROR

Write Command

AT+CRC=[<mode>]

Response(s)

OK
ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Unsolicited Result Codes

URC 1

RING

Indicates incoming call to the TE if <mode>=0.

URC 2

+CRING: <type>

Indicates incoming call to the TE if <mode>=1.

Parameter Description

<mode>(num)	
[0](&F)	Disable extended format
1	Enable extended format

<type>(str)	
“REL ASYNC“	Asynchronous non-transparent
“FAX“	Facsimile
“VOICE“	Voice

7.18 AT+CBST Select bearer service type

The AT+CBST write command selects the bearer service <name>, the data rate <speed> and the connection element <ce> to be used when data calls are originated. The settings also apply to mobile terminated data calls. See GSM 02.02[1].

Syntax

Test Command	
AT+CBST=?	
Response(s)	
+CBST: (list of supported<speed>s), (list of supported<name>s), (list of supported<ce>s) OK	

Read Command	
AT+CBST?	
Response(s)	
+CBST: <speed>, <name>, <ce> OK	

Write Command	
AT+CBST=<speed>[, <name>[, <ce>]]	
Response(s)	
OK ERROR	

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Parameter Description

<speed>(num)	
[0](&F)	Autobauding
7	9600 bps (V.32)
12	9600 bps (V.34)
14	14400 bps (V.34)
16	28800 bps (V.34)
17	33600 bps (V.34)
39	9600 bps (V.120)
43	14400 bps (V.120)
48	28800 bps (V.120)
51	56000 bps (V.120)
71	9600 bps (V.110)
75	14400 bps (V.110)
80	28800 bps (V.110 or X.31 flag stuffing)
81	38400 bps (V.110 or X.31 flag stuffing)
83	56000 bps (V.110 or X.31 flag stuffing; this setting can be used in conjunction with asynchronous non-transparent UDI or RDI service in order to get FTM)
84	64000 bps (X.31 flag stuffing; this setting can be used in conjunction with asynchronous non-transparent UDI service in order to get FTM)

116	64000 bps (bit transparent)
134	64000 bps (multimedia)

<name>(num)	
0(&F)	Asynchronous modem
1	Synchronous modem
4	Asynchronous (RDI)

<ce>(num)	
0	Transparent
1(&F)	Non-transparent

7.18.1 Parameter configurations supported by AT+CBST

Table 7.1: Parameter configurations supported by AT+CBST

<speed>	GSM	WCDMA	SYNC.	ASYNC.	TRANSP.	NON-TRANSP.
0	+	+		+		+
7	+			+	+	+
12	+			+	+	+
14	+	+		+	+	+
16		+		+		+
17		+		+		+
39	+			+		+
43	+	+		+		+
48		+		+		+
51		+		+		+
71	+			+		+
75	+	+		+		+
80	+	+		+		+
81	+	+		+		+
83	+	+		+		+
84		+		+		+
116		+	+		+	
134		+	+		+	

SIEMENS

7.19 AT+CRLP Select radio link protocol parameters for originated non-transparent data calls

The AT+CRLP write command sets radio link protocol (RLP) parameters used when non-transparent data calls are originated. The read command returns the current settings for the supported RLP version 0 till 2.

Syntax

Test Command

AT+CRLP=?

Response(s)

+CRLP: (list of supported<iws>s), (list of supported<mws>s), (list of supported<T1>s), (list of supported<N2>s), (list of supported<ver>s)
OK

Read Command

AT+CRLP?

Response(s)

+CRLP: <iws>, <mws>, <T1>, <N2>, <ver>
+CRLP: <iws>, <mws>, <T1>, <N2>, <ver>
+CRLP: <iws>, <mws>, <T1>, <N2>, <ver>
OK

Write Command

AT+CRLP=[<iws>[, <mws>[, <T1>[, <N2>[, <ver>]]]]]

Response(s)

OK
ERROR
+CME ERROR: <err>

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Parameter Description

<iws>(num)

Interworking window size (IWF to MS)

0...61(&F)

0...240(&F)...488 for <ver>=2

<mws>(num)

Mobile window size (MS to IWF)

0...61(&F)

0...240(&F)...488 for <ver>=2

<T1>(num)

Acknowledgement timer (T1 in 10 ms units)

38...48(&F)...255

42...52(&F)...255 for <ver>=2

`<N2>`(num)

Re-transmission attempts N2

1...6(&F)...255

`<ver>`(num)

RLP version number

0...2

7.20 ATP Select pulse dialing

Syntax

Exec Command
`ATP`
Response(s)
`OK`

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Note

- No effect for GSM.

7.21 ATT Select tone dialing

Syntax

Exec Command
`ATT`
Response(s)
`OK`

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Note

- No effect for GSM.

7.22 AT+ES Synchronous Data Mode Configuration

This command enables the Synchronous Data Mode

Syntax

Test Command

AT+ES=?

Response(s)

+ES: list of supported <orig_rqst>values, , list of supported <ans_fbk>values
OK
ERROR
+CME ERROR: <err>

Read Command

AT+ES?

Response(s)

+ES:[<orig_rqst>], [, <ans_fbk>]
OK
ERROR
+CME ERROR: <err>

Write Command

AT+ES=[<orig_rqst>], [, <ans_fbk>]

Response(s)

OK
ERROR
+CME ERROR: <err>

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
ITU-T V.80ter	±	+	+	-

Parameter Description

<orig_rqst>(num)

Requested mode

6(D)	Initiate Synchronous Access mode when connection is completed, and Data Suite is entered

<ans_fbk>(num)

Fallback mode answerer

8(D)	Initiate Synchronous Mode when connection is completed, and Data Suite is entered

7.23 AT+ESA Synchronous access mode configuration

This command configures the Synchronous access Mode

Syntax

Test Command

AT+ESA=?

Response(s)

+ESA: (list of supported <trans_idle>values), , , , (list of supported <crc_type>values), (list of supported <nrzi_en>values), (list of supported <syn1>values),
OK
ERROR
+CME ERROR: <err>

Read Command

AT+ESA?

Response(s)

+ESA:<trans_idle>, , , , <crc_type>, <nrzi_en>, <syn1>,
OK
ERROR
+CME ERROR: <err>

Write Command

AT+ESA=[<trans_idle>][,][,][,][,][<crc_type>][<nrzi_en>][<syn1>]

Response(s)

OK
ERROR
+CME ERROR: <err>

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
ITU-T V.80ter	+	+	+	-

Parameter Description

<trans_idle>(num)

transmitted_bit_sequence

specifies the bit sequence transmitted by the DCE when a transmit data buffer underrun condition occurs, while operating in Transparent sub-Mode.

0	In Transparent sub-Mode, DCE transmits 8-bit SYN sequence on idle. DCE receiver does not hunt for synchronization sequence

<crc_type>(num)

CRC checking

0	CRC generation and checking disabled

<nrzi_en>(num)

nrzi encoding

0	NRZI encoding and decoding disabled

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`<syn1>`(num)

When `<trans_idle>`=0, specifies the 8-bit transmit idle sequence to be used by the DCE. When `<trans_idle>`=1, specifies the 8-bit synchronization sequence to be used by the DCE. When `<trans_idle>`=2, specifies first 8 bits of 16-bit synchronization sequence to be used by the DCE

0 - 255

7.24 AT+CSTA Select type of address

Set command selects the type of number for further dialling commands `ATD` according to GSM/UMTS specifications. Test command returns values supported a compound value.

Syntax

Test Command	
`AT+CSTA=?`	
Response(s)	
`+CSTA:` (list of supported`<type>`s) `OK`	

Read Command	
`AT+CSTA?`	
Response(s)	
`+CSTA: <type>` `OK`	

Write Command	
`AT+CSTA=<type>`	
Response(s)	
`OK` `ERROR`	

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Parameter Description

`<type>`(num)	
145	when dialling string includes international access code character "+"
129	otherwise

8. Network Service Commands

The AT Commands described in this chapter are related to various network services. More commands related to this area can be found in Chapter 9., Supplementary Service Commands.

8.1 AT+COPN Read operator names

The AT+COPN command returns the list of operator names from the ME. Each operator code <numericn> that has an alphanumeric equivalent <alphan> in the ME memory is returned.

Syntax

Test Command

```
AT+COPN=?
```

Response(s)

```
OK
ERROR
+CME ERROR
```

Exec Command

```
AT+COPN
```

Response(s)

```
+COPN: <numericn>,<alphan>
+COPN: ...
OK
ERROR
+CME ERROR
```

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Parameter Description

<numericn>(str)

Operator in numeric format; GSM location area identification number.

<alphan>(str)

Operator in long alphanumeric format; can contain up to 16 characters.

8.2 AT+COPS Operator Selection

AT+COPS queries the present status of the HC25's network registration and allows to determine whether automatic or manual network selection shall be used. Additional service is available with AT^SOPS.

Three operator selection modes are available:

- Automatic
  HC25 searches for the home operator automatically. If successful the HC25 registers to the home network. If the home network is not found, HC25 goes on searching. If a permitted operator is found, HC25 registers to this operator.
  If no operator is found the HC25 remains unregistered.
- Manual
  Desired operator can be determined using the AT+COPS write command. If the operator is found, HC25 registers to it immediately. If the selected operator is forbidden, the HC25 remains unregistered.
- Manual/automatic
  The ME first tries to find the operator determined via AT+COPS write command. If the ME fails to register to this operator, then it starts to select another (permitted) operator automatically.

The AT+COPS test command lists sets of four 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 acccess 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 test command returns a list of operators with the same <AcT> used by the last AT+COPS write command. If the <mode> is set to automatic the test command will return a list of operators of the supported <AcT>s.
If the test command is used during an ongoing GPRS transfer, traffic will be interrupted for up to one minute.

The AT+COPS read command returns the current <mode> and the currently selected operator. If no operator is selected, <format> and <oper> are omitted.

The AT+COPS write command forces an attempt to select and register to the GSM network operator (see note below). 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.

The AT+COPS exec command returns OK and has no effect on the current <mode>.

Command settings are effective over all serial interfaces of the HC25.

Syntax

Test Command

AT+COPS=?

Response(s)

+COPS: [list of present operators (<opStatus>, long alphanumeric <oper>s, short alphanumeric <oper>s, numeric <oper>s , <AcT>], , (list of supported <mode>s), (list of supported <format>s)
OK
ERROR
+CME ERROR: <err>

Read Command
AT+COPS?
Response(s)
+COPS:<mode>[, <format>[, <oper>][, <AcT>]] OK ERROR +CME ERROR: <err>

Exec Command
AT+COPS
Response(s)
OK

Write Command
AT+COPS=<mode>[, <format>[, <oper>][, <AcT>]]
Response(s)
OK ERROR +CME ERROR: <err>

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Parameter Description

<opStatus>(num)	
Status	
0	Unknown
1	Operator available
2	Current operator
3	Operator forbidden

<oper>(str)
Operator
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)	
0(P)	Automatic mode; <oper> field is ignored.
1	Manual operator selection Write command requires <oper> in numeric format, i.e. <format> shall be 2. Read command returns the current <mode> and the currently selected <oper>. If no operator is selected, <format> and <oper> are omitted.
2	Manually deregister from network and remain unregistered until <mode>=0 or 1 or 4 is selected.
3	Set only <format> (for AT+COPS read command).
4	Automatic / manual selection; if manual selection fails, automatic mode (<mode>=0) is entered (<oper> field will be present).

<AcT>(num)	
Access technology selected	
0	GSM
2(D)	UTRAN

<format>(num)	
0(&F)	Long alphanumeric format of <oper>. Can be up to 16 characters long.
1	Short alphanumeric format of <oper>. Can be up to 8 characters long.
2	Numeric format of <oper>. This is the GSM 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

- It is not recommended to use the AT+COPS command before passing the CHV (card holder verification) / SIM PIN1 verification. This is because after PIN1 verification the module will automatically try to register to the network as though AT+COPS were 0, regardless of the settings done before with or without SIM, such as AT+COPS=2 which remains unchanged. Also, the test command should only be used after PIN1 authentication.
- The module will automatically try to register to the network with the same <AcT> used by the last AT+COPS write command. If the <mode> is set to automatic the module will try to register to network operators with supported <AcT>s.

8.3 AT^SOPS Extended Operator Selection

AT^SOPS queries the present status of the HC25's network registration. Since basic operator selection services are available with AT+COPS this command uses the methods of the Enhanced Operator Name String (EONS) specification while handling operator name strings. Additional EONS related information is available with AT^SIND.

AT^SOPS test command lists sets of five parameters, each representing an operator present in the network.
A set consists of

1. an integer indicating the availability of the operator,
2. specification of the source of the operator name <eonsOperator>,
3. operator name according to EONS Table,
4. Service Provider Name from the SIM Service Table and
5. numeric format representation 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.
After the operator list the HC25 returns lists of supported <mode>s and <format>s. These lists are delimited from the operator list by two commas.
If the test command is used while an ongoing GPRS transfer, traffic will be interrupted for up to one minute.

Command settings are effective over all serial interfaces of the HC25.

Syntax

Test Command

AT^SOPS=?

Response(s)

^SOPS:[list of present operator(<opStatus>, <eonsType>, <eonsOperator>, <servProvider>, <servProviderType>, <opName>, <acT>)s], , (list of supported <mode>)s, (list of supported <format>)s
OK
ERROR
+CME ERROR: <err>

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	+	+	+	-

Parameter Description

<opStatus>(num)

Status

0	unknown
1	operator available
2	current operator
3	operator forbidden

<eonsType>(num)

Specification of the source of the operator name <eonsOperator>. Details of EONS-supplied operator name types are available at AT^SIND.

`<eonsOperator>`

Operator name; format depends on the source of the operator name, specified by `<eonsType>`.

`<servProvider>`(str)

Service Provider Name according to setting of Service No. 17 in the SIM Service Table (EF_{SST}).
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	No Service Provider Information available.
1	Service Provider Name will be displayed. RPLMN is the HPLMN.
2	Service Provider Display Information will be displayed. One list entry is equal to the RPLMN.

`<opName>`

Operator

Operator name in numerical presentation contains the GSM 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).
Parameter is stored non-volatile to the SIM.

`<mode>`(num)

Parameter is not applicable.

`<acT>`(num)

Access technology selected

0	GSM
2(D)	UTRAN

`<format>`(num)

Parameter is not applicable.

Note

- The `AT^SOPS` Test command is only accepted by the module after a valid pin has been entered.

8.4 AT+CREG Network registration

The AT+CREG command serves to verify the network registration status of the ME. For this purpose two types of URCs are available.
The AT+CREG read command returns the URC presentation mode <n> and an integer <stat> that shows the registration status of the ME. The AT+CREG exec command sets the URC presentation mode <n> to the factory default value.

Syntax

Test Command

```
AT+CREG=?
```

Response(s)

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

Read Command

```
AT+CREG?
```

Response(s)

```
+CREG: <n>,<stat>[,<lac>,<ci>]
OK
ERROR
+CME ERROR: <err>
```

Exec Command

```
AT+CREG
```

Response(s)

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

Write Command

```
AT+CREG=[<n>]
```

Response(s)

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	-	+	+	-

Unsolicited Result Codes

URC 1

If <n>=1 and there is a change in the ME network registration status:

```
+CREG: <stat>
```

URC 2

If <n>=2 and there is a change in the ME network registration status or a change of the network cell:

```
+CREG: <stat>[, <lac>, <ci>]
```

Parameter Description

<n>(num)	
[0](&F)	Disable +CREG URC
1	Enable URC +CREG:<stat> to report status of network registration
2	Enable URC +CREG:<stat>[,<lac>,<ci>] to report status of network registration including location information. Optional parameters <lac> and <ci> will not be displayed during calls or if these values have not changed since last AT+CREG read command or since last indication by +CREG URC.

<stat>(num)	
0	Not registered, ME 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 ME is currently searching for a new operator The ME 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. • The ME 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 • 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 ME Either the SIM or the MS or the ME are unable to log into any network. User intervention is required. Emergency calls can be made, if any network is available.
4	Unknown (not used)
5	Registered, roaming The ME is registered at a foreign network (national or international network)

<lac>(str)
Two byte location area code in hexadecimal format (e.g. "00C3" equals 193 in decimal).

<ci>(str)

Two byte cell ID in hexadecimal format.

Example

AT+CREG=1	Activates URC mode.
OK	
AT+COPS=0	Forces ME to automatically search network operator.
OK	
+CREG: 2	URC reports that ME is currently searching.
+CREG: 1	URC reports that operator has been found.

8.5 AT+CSQ Signal quality

The AT+CSQ execute command indicates the quality of the received signal strength.

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

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

<ber>(num)	
99	The indication of the channel bit error rate is not supported. The value is always 99.

Note

- After using network related commands such as AT+CCWA, AT+CCFC, users are advised to wait 3s before entering AT+CSQ. This is recommended to be sure that any network access required for the preceding command has finished.

8.6 AT^SMONI Monitor idle mode

The AT^SMONI command supplies information of the serving cell. To retrieve the information use the execute command.

Syntax

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

Exec Command
AT^SMONI
Response(s)
See: Section 8.6.1, AT^SMONI responses
OK

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	-

Notes

- The parameters LAC and cell are presented as hexadecimal digits, the remaining parameters are composed of decimal digits.
- Not all parameters are shown. The output is still under development and will be extended in future releases. The order of the parameters will not be changed. Unsupported parameters are signed as "-" .

8.6.1 AT^SMONI responses

ME is not connected:
a) ME is camping on a 2G cell:

```
^SMONI: ACT,ARFCN,BCCH,MCC,MNC,LAC,cell,C1
Example:
^SMONI: 2G,71,-61,262,02,0143,83BA,33
```

b) ME is camping on a 3G cell:

```
^SMONI: ACT,UARFCN,PSC,EC/n0,RSCP,MCC,MNC,LAC,cell,C1
Example:
^SMONI: 3G,10564,296,7,-79,262,02,0143,3B2F,-92,-78
```

Columns for Serving Cell (2G parameters):

Column	Description
ACT	Access technology of the serving cell (2G/3G)
ARFCN	ARFCN (Absolute Radio Frequency Channel Number) of the BCCH carrier
BCCH	Receiving level of the BCCH carrier 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

Column	Description
cell	Cell ID
C1	Coefficient for base station selection

Columns for Serving Cell (3G parameters):

Column	Description
UARFCN	UARFCN (UTRAN Absolute Radio Frequency Channel Number) of the BCCH carrier
PSC	Primary Synchronisation Code
EC/n0	Carrier to noise ratio in dB
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)

8.7 AT^SMONP Monitor neighbour cells

The AT^SMONP supplies information of neighbour cells. To retrieve the information use the execute command.

Syntax

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

Exec Command
AT^SMONP
Response(s)
See: Section 8.7.1, AT^SMONP responses OK

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	-

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.
- Not all parameters are shown. The output is still under development and will be changed in future releases. Unsupported parameters are signed as "-" .

8.7.1 AT^SMONP responses

Response of AT^SMONP:

```
2G:
ARFCN1,BCCH1
ARFCN2,BCCH2
...
ARFCNn,BCCHn
3G:
UARFCN1,PSC1,EC/n01,RSCP1
UARFCN2,PSC2,EC/n02,RSCP2
...
UARFCNn,PSCn,EC/n0n,RSCPn

Example:

2G:
8,-110
12,-110
51,-110
55,-110
59,-110
```

```
67,-110
75,-110
737,-110
744,-110
746,-110
3G:
10564,296,6,-68
10564,96,35,-83
```

Columns for 2G paramaters:

Column	Description
ARFCN	Absolute Radio Frequency Channel Number of the BCCH carrier
BCCH	Receiving level of the BCCH carrier in dBm

Columns for 3G paramaters:

Column	Description
UARFCN	UTRAN Absolute Radio Frequency Channel Number of the BCCH carrier
PSC	Primary Synchronisation Code
EC/n0	Carrier to noise ratio in dB
RSCP	Received Signal Code Power in dBm

9. Supplementary Service Commands

The AT Commands described in this chapter are related to the Supplementary Services offered by the GSM network.

9.1 AT+CACM Accumulated call meter (ACM) reset or query

Syntax

Test Command

```
AT+CACM=?
```

Response(s)

```
OK
```

Read Command

```
AT+CACM?
```

Response(s)

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

Write Command

```
AT+CACM=[<passwd>]
```

Response(s)

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Command Description

The read command returns the current ACM value.

The write command resets the Advice of Charge related to the accumulated call meter (ACM) value in SIMfile EF(ACM). ACM contains the total number of home units for both the current and preceding calls.

Parameter Description

`<acm>`(str)

Three bytes of the current ACM value in hexadecimal format (e.g. "00001E" indicates decimal value 30) 000000 - FFFFFF.

`<passwd>`(str)

SIM PIN2

9.2 AT+CAMM Accumulated call meter maximum (ACMmax) set or query

Syntax

Test Command

```
AT+CAMM=?
```

Response(s)

```
OK
```

Read Command

```
AT+CAMM?
```

Response(s)

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

Write Command

```
AT+CAMM=<acmmax>[, <passwd>]
```

Response(s)

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

Reference(s)
GSM 07.07

PIN	USB0-MDM	USB0-APP	Last
+	+	+	-

Command Description

The read command returns the current ACMmax value.

The write command sets the Advice of Charge related to the accumulated call meter maximum value in SIM file EF (ACMmax). ACMmax contains the maximum number of home units allowed to be consumed by the subscriber.

Parameter Description

`<acmmax>`(str)

Three bytes of the max. ACM value in hexadecimal format (e.g. "00001E" indicates decimal value 30) 000000 disable ACMmax feature 000001-FFFFFF.

`<passwd>`(str)

SIM PIN2

9.3 AT+CAOC Advice of Charge information

Syntax

Test Command
`AT+CAOC=?`
Response(s)
`+CAOC:` (list of supported`<mode>`s) `OK`

Read Command
`AT+CAOC?`
Response(s)
`+CAOC: <mode>` `OK`

Exec Command
`AT+CAOC`
Response(s)

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

Write Command
`AT+CAOC=[<mode>]`
Response(s)

`ERROR`
`+CME ERROR: <err>`
If `<mode>`=0, TA returns the current `<ccm>` value.
`+CAOC: <ccm>`
`OK`

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Unsolicited Result Code

`+CCCM: <ccm>`

When activated, an unsolicited result code is sent when the CCM value changes, but not more often than every 10 seconds.

Command Description

The write command sets the Advice of Charge supplementary service function mode.

Parameter Description

`<mode>`(num)	
0	query CCM value
1	deactivate the unsolicited reporting of `<ccm>` value
2	activate the unsolicited reporting of `<ccm>` value

SIEMENS

<ccm>(str)
Three bytes of the current CCM value in hexadecimal format (e.g. "00001E" indicates decimal value 30); bytes are similarly coded as ACMmax value in the SIM 000000-FFFFFF.

9.4 AT+CCUG Closed User Group

Syntax

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

Read Command
AT+CCUG?
Response(s)
+CCUG:<n>, <index>, <info> OK ERROR +CME ERROR

Write Command
AT+CCUG=[[<n>][, <index>][, <info>]]
Response(s)
OK ERROR +CME ERROR

Reference(s)
GSM 07.07, GSM 02.85, GSM 03.85, GSM 04.85

PIN	USB0-MDM	USB0-APP	Last
+	+	+	-

Command Description

The Test command returns the supported parameters.

The Read command returns if the Explicit CUG invocation is activated (in parameter <n>), which CUG <index> is chosen, and if Preferential Group or Outgoing Access is suppressed (in parameter <info>).

The write command serves to activate or deactivate the explicit CUG invocation, to set the desired index, and to specify if Preferential Group or Outgoing Access shall be suppressed.

Parameter Description

<n>(num)	
explicit CUG invocation options	
0(D)	Deactivate explicit CUG invocation
1	Activate explicit CUG invocation

<index>(num)	
0-9	explicit selection of CUG index
10(D)	No index (preferred CUG taken from subscriber data)

<info>(num)	
state of the call	
0(D)	no information
1	suppress outgoing access

2	suppress preferential CUG
3	Suppress preferential CUG and Outgoing Access.

Notes

- The active settings for omitted parameters are retained without changes.
- Explicit CUG invocation means that at each call setup, CUG information is added to the called number.
- Upon delivery, settings are predefined with
  `<n>`=0,
  `<index>`=10,
  `<info>`=0.
  These delivery defaults cannot be recalled automatically.
- When starting a call with `ATD`, Parameter 'G' or 'g' of command `ATD` will have no effect if the option selected for this single call is identical to the option already selected with `AT+CCUG`.
- Current settings are saved in the ME automatically.
- `ATZ` or `AT&F` do not influence the current settings.
- some combinations of parameters may lead to rejection of CUG calls by the network. For more information, please consult GSM 04.85

9.5 AT+CCFC Call forwarding number and conditions control

AT+CCFC controls the call forwarding supplementary service. Registration, erasure, activation, deactivation and status query are supported.

Syntax

Test Command

AT+CCFC=?

Response(s)

+CCFC:(list/range of supported <reason>s)
OK

Write Command

AT+CCFC=<reason>, <mode>[, <number>, <type>][, <class>][, <sub-number>, <sub-type>][, <time>]

Response(s)

If <mode> is not equal 2 and command successful:
OK
If <mode>= 2, <reason> is not equal 2 and command successful:
+CCFC: <status>, <class>[, <number>, <type>, <sub-number>, <sub-type>]
OK
If <mode>= 2, <reason>= 2 and command successful:
+CCFC: <status>, <class>[, <number>, <type>, <sub-number>, <sub-type>, <time>]
OK
If error is related to ME functionality
+CME ERROR

Reference(s)

GSM 07.07, GSM 02.04, GSM 02.82, GSM 03.82, GSM 04.82

PIN	USB0-MDM	USB0-APP	Last
+	+	+	-

Parameter Description

<reason>(num)

Reason for call forwarding

0	unconditional
1	mobile busy
2	no reply
3	not reachable
4	all call forwarding (includes reasons 0, 1, 2 and 3)
5	all conditional call forwarding (includes reasons 1, 2 and 3)

<mode>(num)

Network operation to be performed for Supplementary service "call forwarding"

0	disable call forwarding (disable service)
1	enable call forwarding (enable service)
2	query status of call forwarding (query service status)
3	register <number> and activate call forwarding (register service)
4	erase <number> and deactivate call forwarding (erase service)

<number>(str)

String type phone number of forwarding address in format specified by <type>. If you select <mode>= 3, the phone <number> will be registered in the network. This allows you to disable / enable CF to the same destination without the need to enter the phone number once again. Depending on the services offered by the provider the registration may be mandatory before CF can be used. The number remains registered in the network until you register another number or erase it using <mode> = 4.

<type>(num)

Type of address octect

145	dialing string <number> includes international access code character '+'
129	otherwise

<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 "GSM 02.04"

1	voice
2	data <class> 2 (data) comprises all those <class> values 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 remaining 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 a specific data class.
4	fax
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 (CF for voice, data and fax). The value 255 covers all classes. If the <class> parameter is omitted, the default value 7 is used.

<sub-number>(str)

String type phone number of sub address in format specified by <type>.

<sub-type>(num)

Type of sub-address octect

145	international access code character '+'
129	otherwise

<time>(num)

5...[20]...30	Time to wait before call is forwarded, rounded to a multiple of 5 sec. (only for <reason>=no reply)

<status>(num)

0	Call forwarding not active
1	Call forwarding active

Notes

- For some networks, the interrogation command will return the same result for each requested class.
- You can register, disable, enable and erase <reason> 4 and 5 as described above. However, querying the status of <reason> 4 and 5 with AT+CCFC will result in an error.
- Most networks will not permit registration of new parameters for conditional call forwarding (reasons 1,2,3,5) while unconditional call forwarding is enabled.
- The AT+CCFC command offers a broad range of call forwarding options according to the GSM specifications. However, when you attempt to set a call forwarding 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 call forwarding status with <mode>=2.
- Some networks may choose to have certain call forwarding condtions permanently enabled (e.g. forwarding to a mailbox if the mobile is not reachable). In this case, erasure or deactivation of call forwarding for these conditions will not be successful, even if the CCFC request is answered with response "OK".
- The command has been implemented with the full set of <class> parameters according to GSM 07.07. For actual applicability of SS "call forwarding" to a specific service or service group (a specific <class> value) please consult table A.1 of GSM 02.04.
- There is currently no release of GSM standard "GSM 02.04", in which the call forwarding supplementary service is defined as applicable to SMS services.
- It may happen that the reponse of the query command shows only the inactive status of the class 1 or 255 instead of each requested class. This means, that the status is valid for all classes.
- 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 call forwarding 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.

Example

Please note that when you configure or query call forwarding without specifying any classes, the settings will refer to classes 1, 2 and 4 only (=default). The handling of classes is equivalent to AT+CLCK.

- To register the destination number for unconditional call forwarding (CFU):

```
at+ccfc=0,3,"+493012345678",145
OK
```

  The destination number will be registered for voice, data and fax services (default <class> 7).
  In most networks, the registration will also cause call forwarding to be activated for these <class> values.

- To query the status of CFU without specifying <class>:

```
at+ccfc=0,2
+CCFC: 1,1,"+493012345678",145
+CCFC: 1,4,"+493012345678",145
OK
```

- To erase the registered CFU destination number:

```
at+ccfc=0,4
OK
```

  Now, when you check the status, no destination number will be indicated:

```
at+ccfc=0,2
+CCFC: 0,1
+CCFC: 0,4
OK
```

- To query the status of CFU for all classes:

```
at+ccfc=0,2,,,255
+CCFC: 0,255
OK
```

- <reason> 4 or 5 cannot be used to query the status of all call forwarding reasons (see also notes above):

```
at+ccfc=4,2
error
at+ccfc=5,2
error
```

9.6 AT+CCWA Call Waiting

The AT+CCWA write command controls the call waiting supplementary service according to GSM 02.83. Activation, deactivation and status query are supported. The read command returns the current value of <n>.

Syntax

Test Command
AT+CCWA=?
Response(s)
+CCWA:(list of supported <n>s) OK

Read Command
AT+CCWA?
Response(s)
+CCWA:<n> OK

Write Command
AT+CCWA=[[<n>][, <mode>][, <class>]]
Response(s)
If <mode> is not equal 2 and command successful: OK If <mode>= 2 and command successful: +CCWA: <status>, <class> [+CCWA: <status>, <class>] [+CCWA: ...] OK If error is related to ME functionality +CME ERROR

Reference(s)
GSM 07.07, GSM 02.04, GSM 02.83, GSM 03.83, GSM 04.83

PIN	USB0-MDM	USB0-APP	Last
+	+	+	-

Unsolicited Result Code

Indication of a call that is currently waiting and can be accepted.

+CCWA: <calling number>, <type of number>[, <class>], [, <CLI validity>]

If <n>=1 and the call waiting supplementary service is enabled in the network, URC "+CCWA" indicates a waiting call to the TE. It appears while the waiting call is still ringing.

Parameter Description

<n>(num)	
Switch URCs "+CCWA" for call waiting on/off	
0	Disable display of URCs "+CCWA"
1	Enable display of URCs "+CCWA"

<mode>(num)

Network operation to be performed for Supplementary service call waiting

0	Disable call waiting (disable service)
1	Enable call waiting (enable service)
2	Query status of call waiting (query service status)

<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 "GSM 02.04".
In the write command, parameter <class> specifies the class of the active call during which an incoming call of any class is to be regarded as a waiting call.
In URC "+CCWA: <calling number>, <type of number>[, <class>], [, <CLI validity>]", parameter <class> specifies the class of the waiting call.

1	Voice
2	Data <class> 2 (data) comprises all those <class> values 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 remaining data classes (if supported). In addition, you can assign a different setting to a specific class. For example, you can activate call waiting for all data classes, but deactivate it for a specific data class.
4	Fax
[7]	Voice, data and fax (1+2+4)
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 (CF for voice, data and fax). The value 255 covers all classes. If parameter "class"is omitted, the default value 7 is used.

<status>(num)

0	Call waiting service is not active
1	Call waiting service is active

<calling number>(str)

Phone number of waiting caller in the format specified by parameter <type of number>.

<type of number>(num)

Type of address octet in integer format (refer to GSM 04.08, subclause 10.5.4.7)

145	<calling number> includes international access code character '+'
128	number restricted
129	Otherwise

<CLI validity>(num)

0	CLI valid

1	CLI has been withheld
2	CLI is not available

Notes

- With the AT+CHLD command, it is possible to establish a multiparty call or to set the active voice call on hold and then accept a waiting voice call (not possible with fax and data call). See also AT+CHLD
- Users should be aware that if call waiting is activated (<mode>=1), the presentation of URCs needs to be enabled, too (<n>=1).
  Otherwise, on the one hand, a waiting caller would be kept waiting due to lack of BUSY signals, while, on the other hand, the waiting call would not be indicated to the called party.
- The AT+CCWA command offers a broad range of options according to the GSM specifications. However, when you attempt to enable call waiting for a <class> for which the service is not provisioned or not supported , 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 current call waiting settings with <mode>=2.
- The AT+CCWA command has been implemented with the full set of <class> parameters according to GSM 07.07. For actual applicability of SS call waiting to a specific service or service group (a specific <class> value) please consult table A.1 of GSM 02.04
- Despite the specifications stated in GSM 02.04 call waiting is not handled uniformly among all networks:
  GSM 02.04, Annex A, provides the following specification:
  "The applicability of call waiting refers to the telecommunication service of the active call and not of the waiting call. The incoming, waiting, call may be of any kind." Nevertheless, networks do differ on the actual implementation of the service. For example, the activation of call waiting for <class> 4, "fax", causes some networks to send a call waiting indication if a call "of any kind" comes in during an active fax call, but others may (with the same settings active) indicate a waiting fax call during any kind of active call. Thus, the only reliable way to receive or prevent a call waiting indication under any circumstances and in any network, is to activate or deactivate call waiting for all tele- and bearer services (<class> 255).
- 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 call waiting 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.

9.7 AT+CHLD Call Hold and Multiparty

Syntax

Test Command
`AT+CHLD=?`
Response(s)
`+CHLD:` (list of supported `<n>`s) `OK`

Write Command
`AT+CHLD=[<n>]`
Response(s)

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Command Description

TA controls the Supplementary Services Call Hold and Multiparty. Calls can be put on hold, recovered, released, and added to a conversation.
Like for all Supplementary Services, the availability and detailed functionality of Call Hold and Multiparty services depends on the configuration of the GSM network. The HC25 can only request the service, but the network decides whether and how the request will be answered.

Parameter Description

`<n>`(num)	
0	Release all held calls or set User Determined User Busy (UDUB) for a waiting call: • If a call is waiting, release the waiting call. The calling party will receive a "BUSY" indication (Supplementary Service User Determined User Busy "UDUB") • Otherwise, terminate all held calls (if any).
1	Terminate all active calls (if any) and accept "the other call" as the active call: • If a call is waiting, the waiting call will be accepted. • Otherwise, if a held call is present, the held call becomes active.
1X	Terminate a specific call X (X= 1-7). The call may be active, held or waiting. The remote party of the terminated call will receive a "NO CARRIER" indication. Parameter X is the call number `<idx>` of the targeted call in the list of current calls available with AT command `AT+CLCC`.
2	Place all active calls on hold (if any) and accept "the other call" as the active call: • If a call is waiting, the waiting call will be accepted. • Otherwise, if a held call is present, the held call becomes active.
2X	Place all active calls except call X (X= 1-7) on hold. Parameter X is the call number `<idx>` of the targeted call in the list of current calls available with AT command `AT+CLCC`.

3	Add a held call to the active calls in order to set up a conference (multiparty) call.
4	Connects the two calls of a multiparty call and disconnects the subscriber from both calls (ECT).

Notes

- The AT+CHLD command offers a broad range of options according to the GSM specifications. However, if you attempt to invoke an option which is not provisioned by the network, or not subscribed to, invocation of this option will fail. The responses in these cases may vary with the network (for example "Operation not allowed", "Operation not supported" etc.).
- The handling of the supplementary service Call hold and Multiparty varies with the types of calls. This is because only voice calls can be put on hold, while data or fax calls cannot. The following procedures apply: With AT+CHLD=2 the user can simultaneously place a voice call on hold and accept another waiting voice, data or fax call. If the waiting call is a data or fax call, it is also possible to put the voice call on hold. The user needs to wait for the RING signal and manually answer the data / fax call with ATA. To switch back from the active data or fax call to the held voice call the active call must be terminated with AT+CHLD=1. If all active and held calls are voice calls it is possible to switch back and forth with AT+CHLD=2.
- In conflict situations, e.g. when a waiting call comes while there are already held calls, the above procedures apply to the waiting call only. For example, <n>=0 rejects the waiting call, but does not affect the held calls.
- See also the AT+CCWA command for details on how to display waiting calls.

Example

^SYSSTART	
at+cpin="9999"	
OK	
+CREG: 2	
+CREG: 1,"0145","0016"	The mobile is now registered.
at+ccwa=1,1,1	You activate the indication of waiting calls during voice calls.
OK	
atd"1234567";	You make a voice call.
OK	
+CCWA: "+491791292364",145,32,,0	You receive a URC indicating a waiting data call.
at+chld=2	You put the voice call on hold.
OK	
RING	You now receive the RING of the data call.
RING	
RING	
ATA	You accept the data call.
OK	
CONNECT 9600/RLP	The data connection is set up.
hello	
+++	With "+++" you go in command mode.
OK	
at+clcc	You interrogate the status of all established calls.
+CLCC: 1,0,1,0,0,"03038639268",129	
+CLCC: 2,1,0,1,0,"+491791292364",145	
OK	
at+chld=1	The active data call is terminated and the held voice call becomes active.
OK	

```
at+clcc
+CLCC: 1,0,0,0,0,"03038639268",129
OK
```

9.8 AT+CLIP Calling Line Identification Presentation

This command refers to the GSM supplementary service CLIP (Calling Line Identification Presentation) that enables a called subscriber to get the calling line identity (CLI) of the calling party when receiving a mobile terminated call.
The AT+CLIP write command enables or disables the presentation of the CLI at the TE. It has no effect on the execution of the supplementary service CLIP in the network.
The AT+CLIP read command gives the status of <n>, and also triggers an interrogation of the provision status of the CLIP service according to GSM 02.81 (given in <m>).

Syntax

Test Command

```
AT+CLIP=?
```

Response(s)

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

Read Command

```
AT+CLIP?
```

Response(s)

```
+CLIP: <n>,<m>
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CLIP=<n>
```

Response(s)

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07, GSM 02.81	+	+	+	-

Unsolicited Result Code

```
+CLIP: <number>, <type>, , [, <alpha>][, <CLI validity>]
```

When CLIP is enabled at the TE (and is permitted by the calling subscriber), this URC is delivered after every "RING" or "+CRING" URC when a mobile terminated voice call occurs. For data calls the URC is delivered only once.

Parameter Description

<n>(num)	
[0](&F)	Suppress unsolicited result codes
1	Display unsolicited result codes

<m>(num)	
0	CLIP not provisioned
1	CLIP provisioned
2	Unknown

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<number>(str)

String type phone number of calling address in format specified by <type>.

<type>(num)

Type of address octet in integer format; 145 when dialing string includes international access code character "+", otherwise 129.

TA shall return the recommended value 128 for <type> (TON/NPI unknown in accordance with GSM 04.08 subclause 10.5.4.7).

<alpha>(str)

String type alphanumeric representation of <number> corresponding to the entry found in phonebook; used character set is the one selected with AT+CSCS.

<CLI validity>(num)

0	CLI valid
1	CLI has been withheld by the originator.
2	CLI is not available due to interworking problems or limitations of originating network. <number> shall be an empty string ("") and <type> value will not be significant.

When CLI is not available (<CLI validity>=2), <number> shall be an plus string ("+") and <type> value will be "145". Nevertheless, TA shall return the recommended value 128 for <type> (TON/NPI unknown in accordance with GSM 04.08 subclause 10.5.4.7).

When CLI has been withheld by the originator, (<CLI validity>=1) and the CLIP is provisioned with the "override category" option (refer GSM 02.81 and GSM 03.81), <number> and <type> is provided. Otherwise, TA shall return the same setting for <number> and <type> as if the CLI was not available.

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9.9 AT+CLIR Calling Line Identification Restriction

The AT+CLIR command refers to the GSM supplementary service CLIR (Calling Line Identification Restriction).

Syntax

Test Command
AT+CLIR=?
Response(s)
+CLIR: (list of supported <n>s) OK

Read Command
AT+CLIR?
Response(s)
+CLIR<n>, <m> OK ERROR +CME ERROR: <err>

Write Command
AT+CLIR=[<n>]
Response(s)
+CLIR: <n>, <m> OK ERROR +CME ERROR: <err>

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Parameter Description

<n>(num)

Parameter shows the settings for outgoing calls:

[0](P)	Presentation indicator is used according to the subscription of the CLIR service
1	CLIR invocation
2	CLIR suppression

<m>(num)

Parameter shows the subscriber CLIR service status in the network:

0	CLIR not provisioned
1	CLIR provisioned in permanent mode
2	Unknown (e.g. no network, etc.)
3	CLIR temporary mode presentation restricted
4	CLIR temporary mode presentation allowed

Note

- The settings made with AT+CLIR=1 or AT+CLIR=2 are used for all outgoing calls until the ME is switched off or AT+CLIR=0 is used.

9.10 AT+COLP Connected Line Identification Presentation

This command refers to the GSM supplementary service COLP (Connected Line Identification Presentation) that enables a calling subscriber to get the connected line identity (COL) of the called party after setting up a mobile originated voice call. The command enables or disables the presentation of the COL at the TE. It has no effect on the execution of the supplementary service COLR in the network.

Syntax

Test Command

```
AT+COLP=?
```

Response(s)

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

Read Command

```
AT+COLP?
```

Response(s)

```
+COLP: <n>,<m>
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+COLP=[<n>]
```

Response(s)

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Unsolicited Result Code

Call response format:

```
+COLP: <number>, <type>[, <sub-number>][, <sub-type>][, <alpha>]
```

Parameter Description

<n>(num)	
0	Disable - suppress unsolicited result codes
1	Enable - display unsolicited result codes

<m>(num)	
0	COLP not provisioned (no presentation)
1	COLP provisioned
2	Unknown

<number>(str)

String type phone number of connected address in format specified by <type>

`<type>`(num)

Type of address octet in integer format; 145 when dialling string includes international access code character "+", otherwise 129.

`<sub-number>`(str)

String type phone number of sub address in format specified by `<sub-type>`.

`<sub-type>`(num)

Type of sub-address octect

145	international access code character '+'
129	otherwise

`<alpha>`(str)

String type alphanumeric representation of `<number>` corresponding to the entry found in phonebook; used character set is the one selected with `AT+CSCS`.

9.11 AT+CPUC Price per unit and currency table

Syntax

Test Command

```
AT+CPUC=?
```

Response(s)

```
OK
```

Read Command

```
AT+CPUC?
```

Response(s)

```
+CPUC: <currency>,<ppu>
OK
ERROR
+CME ERROR: <err>
```

Write Command

```
AT+CPUC=<currency>,<ppu>[,<passwd>]
```

Response(s)

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Command Description

Read command returns the current parameters of PUC.

Write command sets the parameters of Advice of Charge related price per unit and currency table. SIM PIN2 is usually required to set the parameters.

Parameter Description

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

Three-character currency code (e.g. "GBP", "EUR"). If the currency name is longer than three characters, all characters will be cut off after the third position. Before they are written to the SIM Card, these characters are converted to the standard GSM alphabet.

`<ppu>`(str)

Price per unit; dot is used as a decimal separator (e.g. "2.66"). The length is limited to 20 characters. If the string length is exceeded, the command is terminated with an error. This string may only contain digits and a dot. Leading zeros are removed from the string. The minimum and maximum value are determined by the structure of the SIM-PUCT file. The maximum price per unit value is 999 999 999.00. When successfully entered, this value is rounded to maximum accuracy.
Note: Due to storage in mantisse (range 0-4095) and exponent (-7 to 7) it is possible that rounding errors occur.

`<passwd>`(str)

SIM PIN2. String parameter which can contain any combination of characters. The maximum string length is limited to 8 characters. If this value is exceeded, the command terminates with an error message. If the PIN2 is incorrect, a CME error (+CME ERROR: incorrect password) is output.

9.12 AT+CSSN Supplementary service notifications

Syntax

Test Command	
AT+CSSN=?	
Response(s)	
+CSSN: (list of supported<n>s), (list of supported<m>s) OK	

Read Command	
AT+CSSN?	
Response(s)	
+CSSN: <n>, <m> OK	

Write Command	
AT+CSSN=<n>[, <m>]	
Response(s)	
OK ERROR +CME ERROR	

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	+	+	+	-

Unsolicited Result Codes

URC 1

+CSSI: <code 1>

When <n>=1 and a supplementary service notification is received after a mobile originated call setup, intermediate result code "+CSSI: <code 1>" is sent to TE before any other MO call setup result codes

URC 2

+CSSU: <code 2>

When <m>=1 and a supplementary service notification is received during a mobile terminated call setup or during a call, unsolicited result code "+CSSU: <code 2>" is sent to TE.

Command Description

The write command enables or disables the presentation of URCs for supplementary services.

Parameter Description

<n>(num)	
0(&F)	Suppress "+CSSI" URCs
1	Activate "+CSSI" URCs

<m>(num)	
0(&F)	Suppress "+CSSU" URCs
1	Activate "+CSSU" URCs

<code 1>(num)	
0	unconditional call forwarding is active
1	some of the conditional call forwardings are active
2	call has been forwarded
3	Waiting call is pending
5	Outgoing call are barreded

<code 2>(num)	
0	The incoming call is a forwarded call.
2	call has been put on hold (during a voice call).
3	call has been retrieved (during a voice call).
5	Held call was terminated by other party
10	additional incoming call forwarded

Note

- URCs will be displayed only if the call concerned is a voice call, but some URCs will be displayed as well as for data calls (like "+CSSU"=0).

9.13 AT+CUSD Unstructured supplementary service data

AT+CUSD allows control of the Unstructured Supplementary Service Data (USSD) according to GSM 02.90. Both network and mobile initiated operations are supported. The interaction of this command with other commands based on other GSM supplementary services is described in the GSM standard.

Parameter <n> is used to disable/enable the presentation of an unsolicited result code (USSD response from the network, or network initiated operation) "+CUSD: <m>[<str_urc>[<dcs>]]" to the TE.

When parameter <str_write> is given, a mobile initiated USSD string or a response USSD string to a network initiated operation is sent to the network. The response USSD string from the network is returned in a subsequent unsolicited result code "+CUSD"

Syntax

Test Command
AT+CUSD=?
Response(s)
+CUSD: (list of supported<n>s) OK

Read Command
AT+CUSD?
Response(s)
+CUSD: <n> OK

Write Command
AT+CUSD=<n>[, <str_write>[, <dcs>]]
Response(s)
OK +CME ERROR

Reference(s)
GSM 07.07, GSM 02.90, GSM 03.90, GSM 04.90

PIN	USB0-MDM	USB0-APP	Last
+	+	+	-

Unsolicited Result Code

+CUSD: <m>[<str_urc>[<dcs>]]

URC "+CUSD" indicates an USSD response from the network, or network initiated operation

Parameter Description

<n>(num)	
0(&F)	Disable the result code presentation in the TA
1	Enable the result code presentation in the TA
2	Cancel session (not applicable to read command response)

<str_write>(str)(+CSCS)
String type USSD-string (when <str_write> parameter is not given, network is not interrogated). For the write command, only <dcs>= 15 is supported.

<str_urc>(str)(+CSCS)

String type USSD-string .
If <dcs> indicates that GSM 03.38 default alphabet is used TA converts GSM alphabet into current TE character set according to rules of GSM 07.05 Annex A. Otherwise in case of invalid or omitted <dcs> conversion of <str_urc> is not possible.

<dcs>(num)

GSM 03.38 Cell Broadcast Data Coding Scheme in integer format (default 15). In case of an invalid or omitted <dcs> from the network side (MT) <dcs> will not be given out.

<m>(num)

0	No further user action required (network initiated USSD-Notify, or no further information needed after mobile initiated operation)
1	Further user action required (network initiated USSD-Request, or further information needed after mobile initiated operation). If <m>=1, then user input has to be done with an additional AT+CUSD=1 command <ESC>.
2	USSD terminated by network.
3	other local client has responded, this means the interface was not idle and an busy was send to the network already

Notes

- When a USSD string is sent via ATD, a "AT+CUSD=1" is executed implicitly.
- It is recommended to finalize or escape a pending USSD user interaction before further actions are done to prevent blocking situations.
- If a network initiated operation is left unanswered, several error codes may be output. The first error code is given when the AT command is timed out. Other network indications may follow, depending on the network.

10. GPRS Commands

This chapter describes AT commands that a TE (Terminal Equipment, e.g. an application running on a controlling PC) may use to control the HC25 acting as GPRS Mobile Termination (MT).

10.1 AT+CGATT PS attach or detach

The execution command is used to attach the MT to, or detach the MT from, the Packet Domain service. After the command has completed, the MT remains in V.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 read command returns the current Packet Domain service state.
The 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
```

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP 27.007	+	+	+	-

Parameter Description

<state>(num)

Indicates the state of PS attachment.

0(P)	detached
[1]	attached

10.2 AT+CGACT PDP context activate or deactivate

Syntax

Test Command
AT+CGACT=?
Response(s)
+CGACT: (list of supported <state>s) OK ERROR +CME ERROR

Read Command
AT+CGACT?
Response(s)
+CGACT: [<cid>, <state>] [+CGACT: <cid>, <state>] ... OK ERROR +CME ERROR

Write Command
AT+CGACT=<state>[, <cid>[, <cid>]]
Response(s)
OK ERROR +CME ERROR

Reference(s)
3GPP 27.007

PIN	USB0-MDM	USB0-APP	Last
+	+	+	-

Command Description

The test command is used for requesting information on the supported PDP context activation states.

The read command returns the current activation states for all the defined PDP contexts.

The write command is used to activate or deactivate the specified PDP context(s). After the 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 the MT is not GPRS attached when the activation form of the command is executed, the MT first performs a GPRS 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.

Parameter Description

<state>(num)

Indicates the state of PDP context activation.

0	deactivated
1	activated

<cid>(num)

PDP Context Identifier is a numeric parameter which specifies a particular PDP context definition. This parameter is used in other PDP context related commands.

1...16

Note

- A maximum of 1 contexts can be activated at the same time, no matter on which interface. Trying to activate more than 1 contexts will cause "+CME ERROR: no network service". Note that, depending on the provider, the number of activated contexts may be further restricted.
  Remember that contexts may be activated implicitly by using the `ATD*99#` GPRS compatibility command without specifying a `<cid>`.

10.3 AT+CGDATA Enter data state

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP 27.007	+	+	-	+

Command Description

The test command is used for requesting information on the supported layer 2 protocols to be used between the TE and MT.

The 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 GPRS PDP types. This may include performing a GPRS 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 the layer 2 protocol termination procedure has completed successfully, the command state is reentered and the MT returns the final result code OK.
If the <L2P> parameter value is unacceptable to the MT, the MT returns ERROR or +CME ERROR.
In the event of erroneous termination or a failure to start up, the command state is reentered and the MT returns NO CARRIER, or if enabled +CME ERROR.

Parameter Description

<L2P>(str)

Layer 2 protocol to be used between the TE and MT.

[“PPP“]	Layer 2 protocol PPP

<cid>(num)

Parameter specifies a particular PDP context definition and is also used in other PDP context-related commands.
If parameter is not specified, then the first defined primary context is used.

1...16

10.3.1 Automatic deactivation of PDP context during dial-up PPP

When using the AT+CGDATA write command or `ATD*99#` the MT issues the 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 the PDP context activation procedure if the context is not already activated. As a result, the 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&D`2), then the application should not toggle DTR during the implicit PDP context deactivation and before "NO CARRIER" is received.

10.4 AT+CGDCONT Define PDP Context

Syntax

Test Command

AT+CGDCONT=?

Response(s)

+CGDCONT: (range of supported<cid>s), <PDP_type>, , , (list of supported <d_comp>s), (list of supported <h_comp>s)
OK
ERROR
+CME ERROR

Read Command

AT+CGDCONT?

Response(s)

+CGDCONT: [<cid>, <PDP_type>, <APN>, <PDP_addr>, <d_comp>, <h_comp>]
[+CGDCONT: <cid>, <PDP_type>, <APN>, <PDP_addr>, <d_comp>, <h_comp>]
[+CGDCONT: ...]
OK
ERROR
+CME ERROR

Write Command

AT+CGDCONT=<cid>[, <PDP_type>[, <APN>[, <PDP_addr>[, <d_comp>[, <h_comp>]]]]]

Response(s)

OK
ERROR
+CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP 27.007	+	+	+	-

Command Description

The test command returns supported values as a compound value.

The read command returns the current settings for each defined PDP context.

The write command 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 test command. A special form of the write command (AT+CGDCONT=<cid>) causes the values for context <cid> to become undefined.

Parameter Description

<cid>(num)

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)

Packet Data Protocol type

Specifies the type of the packet data protocol.

“IP“	Internet Protocol (IETF STD 5)

`<APN>`(str)

Access Point Name

The logical name that is used to select the GGSN or the external packet data network. If the value is null or omitted, then the subscription value will be requested.

`<PDP_addr>`(str)

Packet Data Protocol address

Identifies the MT in the address space applicable to PDP (e.g. IP V4 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. The allocated address may be read using `AT+CGPADDR`.

`<d_comp>`(num)

Data Compression

Controls the PDP data compression (applicable for Subnetwork Dependent Convergence Protocol (SNDCP) only) 3GPP TS 44.065

[0]	off

`<h_comp>`(num)

Header Compression

Controls the PDP header compression 3GPP TS 44.065, 3GPP TS 25.323

[0]	off
1	on

Note

- All context definitions will be stored non volatile.

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10.5 AT+CGPADDR Show PDP address

Syntax

Test Command

AT+CGPADDR=?

Response(s)

[+CGPADDR: (list of defined <cid>s)]
OK

Exec Command

AT+CGPADDR

Response(s)

[+CGPADDR: <cid>, <PDP_address>]
[+CGPADDR: ...]
OK
ERROR
+CME ERROR

Write Command

AT+CGPADDR=<cid>[,<cid>[, ...]]

Response(s)

[+CGPADDR: <cid>, <PDP_address>]
[+CGPADDR: ...]
OK
ERROR
+CME ERROR

Reference(s)
3GPP 27.007

PIN	USB0-MDM	USB0-APP	Last
+	+	+	-

Command Description

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

The exec command returns a list of PDP addresses for all defined GPRS contexts.

The 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.

Parameter Description

<cid>(num)

A numeric parameter which specifies a particular PDP context definition (see AT+CGDCONT command).

<PDP_address>(str)

A string that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic.

10.6 AT+CGQMIN Quality of Service Profile (Minimum acceptable)

Syntax

Test Command
AT+CGQMIN=?
Response(s)
+CGQMIN: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s), (list of supported <peak>s), (list of supported <mean>s) OK ERROR +CME ERROR

Read Command
AT+CGQMIN?
Response(s)
+CGQMIN: [<cid>, <precedence>, <delay>, <reliability>, <peak>, <mean>] [+CGQMIN: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean>] [+CGQMIN: ...] OK ERROR +CME ERROR

Write Command
AT+CGQMIN=<cid>[, <precedence>[, <delay>[, <reliability>[, <peak>[, <mean>]]]]]
Response(s)
OK ERROR +CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP 27.007	+	+	+	-

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.

The read command returns the current settings for each context for which a QOS was explicitly specified.

This command allows the TE to specify a minimum acceptable profile which is checked by the MT against the negotiated profile returned in the Activate PDP Context Accept message.
The set command specifies a profile for the context identified by the context identification parameter, <cid>.
A special form of the set command, AT+CGQMIN= <cid> causes the minimum acceptable profile for context number <cid> to become undefined. In this case no check is made against the negotiated profile.

Parameter Description

<cid>(num)

Parameter specifies a particular PDP context definition. The parameter is also used in other PDP context-related commands.

1...16

<precedence>(num)

Precedence class

[0]	network subscribed value

1	High Priority Service commitments shall be maintained ahead of precedence classes 2 and 3
2	Normal priority Service commitments shall be maintained ahead of precedence class 3
3	Low priority Service commitments shall be maintained

`<delay>`(num)

Delay class

The delay parameter defines the end-to-end transfer delay incurred in the transmission of SDUs through the GPRS network(s).

[0]	network subscribed value
1..4	SDU size: 128 octets:

Delay Class	Mean Transfer Delay	95 percentile
1 (Predictive)	<0.5	<1.5
2 (Predictive)	<5	<25
3 (Predictive)	<50	<250
4 (Best Effort)	Unspecified	

SDU size: 1024 octets:

Delay Class	Mean Transfer Delay	95 percentile
1 (Predictive)	<0.5	<1.5
2 (Predictive)	<5	<25
3 (Predictive)	<50	<250
4 (Best Effort)	Unspecified	

`<reliability>`(num)

Reliability class

[0]	network subscribed value
1	Non real-time traffic, error-sensitive application that cannot cope with data loss
2	Non real-time traffic, error-sensitive application that can cope with infrequent data loss
3	Non real-time traffic, error-sensitive application that can cope with data loss, GMM/SM, and SMS
4	Real-time traffic, error-sensitive application that can cope with data loss
5	Real-time traffic, error non-sensitive application that can cope with data loss

`<peak>`(num)

Peak throughput class (in octets per second).

[0]	network subscribed value
1	Up to 1 000 (8 kbit/s).
2	Up to 2 000 (16 kbit/s).
3	Up to 4 000 (32 kbit/s).
4	Up to 8 000 (64 kbit/s).

5	Up to 16 000 (128 kbit/s).
6	Up to 32 000 (256 kbit/s).
7	Up to 64 000 (512 kbit/s).
8	Up to 128 000 (1024 kbit/s).
9	Up to 256 000 (2048 kbit/s).

`<mean>`(num)

Mean throughput class(in octets per hour).

[0]	network subscribed value
1	100 (~0.22 bit/s)
2	200 (~0.44 bit/s)
3	500 (~1.11 bit/s)
4	1 000 (~2.2 bit/s)
5	2 000 (~4.4 bit/s)
6	5 000 (~11.1 bit/s)
7	10 000 (~22 bit/s)
8	20 000 (~44 bit/s)
9	50 000 (~111 bit/s)
10	100 000 (~0.22 kbit/s)
11	200 000(~0.44 kbit/s)
12	500 000(~1.11 kbit/s)
13	1 000 000 (~2.2 kbit/s)
14	2 000 000 (~4.4 kbit/s)
15	5 000 000 (~11.1 kbit/s)
16	10 000 000 (~22 kbit/s)
17	20 000 000 (~44 kbit/s)
18	50 000 000 (~111 kbit/s)
31	best effort

`<PDP_type>`(str)

Packet Data Protocol Type

“IP“	Internet Protocol (IETF STD 5)

Notes

- Definitions of parameters can be found in 3GPP 23.107.
- All QOS settings will be stored non volatile.

10.7 AT+CGEQMIN 3G Quality of Service Profile (Minimum acceptable)

Syntax

Test Command

AT+CGEQMIN=?

Response(s)

+CGEQMIN: <PDP_type>, (list of supported <Traffic class>s), (list of supported <Maximum bitrate UL>s), (list of supported <Maximum bitrate DL>s), (list of supported <Guaranteed bitrate UL>s), (list of supported <Guaranteed bitrate DL>s), (list of supported <Delivery order>s), (list of supported <Maximum SDU size>s), (list of supported <SDU error ratio>s), (list of supported <Residual bit error ratio>s), (list of supported <Delivery of erroneous SDUs>s), (list of supported <Transfer delay>s), (list of supported <Traffic handling priority>s)
OK

Read Command

AT+CGEQMIN?

Response(s)

+CGEQMIN: [<cid>, <Traffic class>, <Maximum bitrate UL>, <Maximum bitrate DL>, <Guaranteed bitrate UL>, <Guaranteed bitrate DL>, <Delivery order>, <Maximum SDU size>, <SDU error ratio>, <Residual bit error ratio>, <Delivery of erroneous SDUs>, <Transfer delay>, <Traffic handling priority>]
[+CGEQMIN: <cid>, <Traffic class>, <Maximum bitrate UL>, <Maximum bitrate DL>, <Guaranteed bitrate UL>, <Guaranteed bitrate DL>, <Delivery order>, <Maximum SDU size>, <SDU error ratio>, <Residual bit error ratio>, <Delivery of erroneous SDUs>, <Transfer delay>, <Traffic handling priority>]
[+CGEQMIN: ...]

Write Command

AT+CGEQMIN=<cid>[, <Traffic class>[, <Maximum bitrate UL>[, <Maximum bitrate DL>[, <Guaranteed bitrate UL>[, <Guaranteed bitrate DL>[, <Delivery order>[, <Maximum SDU size>[, <SDU error ratio>[, <Residual bit error ratio>[, <Delivery of erroneous SDUs>[, <Transfer delay>[, <Traffic handling priority>]]]]]]]]]]]]]

Response(s)

OK
ERROR
+CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP TS 27.007	+	+	+	-

Command Description

The test command returns values supported as a compound value.

The read command returns the current settings for each defined context for which a QOS was explicitly specified.

The write command allows the TE to specify a Quality of Service Profile for the context identified by the context identification parameter <cid> which is checked by the MT against the negotiated profile returned in the Activate/Modify PDP Context Accept message.
A special form of the write command, AT+CGEQMIN=<cid> causes the requested profile for context number <cid> to become undefined.

Parameter Description

`<cid>`(num)

Parameter specifies a particular PDP context definition. The parameter is also used in other PDP context-related commands.

1...16

`<Traffic class>`(num)

0	conversational
1	streaming
2	interactive
3	background
[4]	subscribed value

`<Maximum bitrate UL>`(num)

This parameter indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as 32 (e.g. `AT+CGEQMIN`=...,32,...).

[0]	subscribed value

1...512

`<Maximum bitrate DL>`(num)

This parameter indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as 32 (e.g. `AT+CGEQMIN`=...,32,...).

[0]	subscribed value

1...16000

`<Guaranteed bitrate UL>`(num)

This parameter indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as 32 (e.g. `AT+CGEQMIN`=...,32,...).

[0]	subscribed value

1...512

`<Guaranteed bitrate DL>`(num)

This parameter indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as 32 (e.g. `AT+CGEQMIN`=...,32,...).

[0]	subscribed value

1...16000

`<Delivery order>`(num)

This parameter indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not.

0	no
1	yes
[2]	subscribed value

`<Maximum SDU size>`(num)

This parameter indicates the maximum allowed SDU size in octets.

[0]	subscribed value
10...1520	(value needs to be divisible by 10 without remainder)

`<SDU error ratio>`(str)

This parameter indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as "mEe". As an example a target SDU error ratio of $5*10^{-3}$ would be specified as "5E3" (e.g. `AT+CGEQMIN`=...,"5E3",...).

[“0E0“]	subscribed value
“1E2“	
“7E3“	
“1E3“	
“1E4“	
“1E5“	
“1E6“	
“1E1“	

`<Residual bit error ratio>`(str)

This parameter indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as "mEe". As an example a target residual bit error ratio of $5*10^{-3}$ would be specified as "5E3" (e.g. `AT+CGEQMIN`=...,"5E3",...).

[“0E0“]	subscribed value
“5E2“	
“1E2“	
“5E3“	
“4E3“	
“1E3“	
“1E4“	
“1E5“	
“1E6“	
“6E8“	

`<Delivery of erroneous SDUs>`(num)

This parameter indicates whether SDUs detected as erroneous shall be delivered or not.

0	no
1	yes
2	no detect
[3]	subscribed value

`<Transfer delay>`(num)

This parameter indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds.

[0]	subscribed value

10...150	(value needs to be divisible by 10 without remainder)
200...950	(value needs to be divisible by 50 without remainder)
1000...4000	(value needs to be divisible by 100 without remainder)

`<Traffic handling priority>`(num)

This parameter specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of the other bearers.

[0]	subscribed
1	
2	
3	

`<PDP_type>`(str)

Packet Data Protocol Type

“IP“	Internet Protocol (IETF STD 5)

Notes

- Definitions of parameters can be found in 3GPP 23.107.
- All QOS settings will be stored non volatile.

10.8 AT+CGREG GPRS Network Registration Status

AT+CGREG write command enables presentation of URC "+CGREG: <stat>" when <n>=1 and ME's GPRS network registration status 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.

Syntax

Test Command
AT+CGREG=?
Response(s)
+CGREG: (list of supported <n>s) OK

Read Command
AT+CGREG?
Response(s)
+CGREG: <n>, <stat> OK

Write Command
AT+CGREG=[<n>]
Response(s)
OK ERROR +CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP 27.007	+	+	+	-

Unsolicited Result Code

+CGREG: <stat>

Indicates a change in the ME's GPRS network registration status.

Parameter Description

<n>(num)	
0(&F)(P)	Disable GPRS network registration URC
1	Enable GPRS network registration URC "+CGREG: <stat>"

<stat>(num)	
0	Not registered, ME is not currently searching an operator to register to. The ME is in GMM state GMM-NULL or GMM-DEREGISTERED-INITIATED. GPRS service is disabled, the ME is allowed to attach to GPRS if requested by the user.
1	Registered, home network. The ME is in GMM state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED INITIATED on the home PLMN

2	Not registered, but ME is currently trying to attach or searching an operator to register to. The ME is in GMM state GMM-DEREGISTERED or GMM-REGISTERED-INITIATED. The GPRS service is enabled, but an allowable PLMN is currently not available. The ME will start a GPRS attach as soon as an allowable PLMN is available.
3	Registration denied. The ME is in GMM state GMM-NULL. The GPRS service is disabled, the ME is not allowed to attach to GPRS if requested by the user.
4	Unknown
5	Registered, roaming. The ME is in GMM state GMM-REGISTERED or GMM-ROUTING-AREA-UPDATING-INITIATED on a visited PLMN.

10.9 AT+CGQREQ Quality of Service Profile (Requested)

Syntax

Test Command
AT+CGQREQ=?
Response(s)
+CGQREQ: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s), (list of supported <peak>s), (list of supported <mean>s) OK

Read Command
AT+CGQREQ?
Response(s)
+CGQREQ: [<cid>, <precedence>, <delay>, <reliability>, <peak>, <mean>] [+CGQREQ: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean>] [+CGQREQ: ...]

Write Command
AT+CGQREQ=<cid>[, <precedence>[, <delay>[, <reliability>[, <peak>[, <mean>]]]]]
Response(s)
OK ERROR +CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP 27.007	+	+	+	-

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.

The read command returns the current settings for each defined context for which a QOS was explicitly specified.

This command allows the TE to specify a Quality of Service Profile that is used when the MT sends an Activate PDP Context Request message to the network.
The set command specifies a profile for the context identified by the context identification parameter, <cid>.
A special form of the set command, +CGQREQ=<cid> causes the requested profile for context number <cid> to become undefined.

Parameter Description

<cid>(num)

Parameter specifies a particular PDP context definition. The parameter is also used in other PDP context-related commands.

1...16

<precedence>(num)

Precedence class

[0]	network subscribed value
1	High Priority Service commitments shall be maintained ahead of precedence classes 2 and 3

2	Normal priority Service commitments shall be maintained ahead of precedence class 3
3	Low priority Service commitments shall be maintained

`<delay>`(num)

Delay class

This parameter defines the end-to-end transfer delay incurred in the transmission of SDUs through the network(s).

[0]	network subscribed value
1..4	with SDU size = 128 octets:

Delay Class	Mean Transfer Delay	95 percentile
1 (Predictive)	<0.5	<1.5
2 (Predictive)	<5	<25
3 (Predictive)	<50	<250
4 (Best Effort)	Unspecified	-

with SDU size = 1024 octets:

Delay Class	Mean Transfer Delay	95 percentile
1 (Predictive)	<0.5	<1.5
2 (Predictive)	<5	<25
3 (Predictive)	<50	<250
4 (Best Effort)	Unspecified	-

`<reliability>`(num)

Reliability class

[0]	network subscribed value
1	Non real-time traffic, error-sensitive application that cannot cope with data loss
2	Non real-time traffic, error-sensitive application that can cope with infrequent data loss
3	Non real-time traffic, error-sensitive application that can cope with data loss, GMM/SM, and SMS
4	Real-time traffic, error-sensitive application that can cope with data loss
5	Real-time traffic, error non-sensitive application that can cope with data loss

`<peak>`(num)

Peak throughput class

in octets per second

[0]	network subscribed value
1	Up to 1 000 (8 kbit/s)
2	Up to 2 000 (16 kbit/s)
3	Up to 4 000 (32 kbit/s)
4	Up to 8 000 (64 kbit/s)
5	Up to 16 000 (128 kbit/s)

6	Up to 32 000 (256 kbit/s)
7	Up to 64 000 (512 kbit/s)
8	Up to 128 000 (1024 kbit/s)
9	Up to 256 000 (2048 kbit/s)

`<mean>`(num)

Mean throughput class
in octets per hour

[0]	network subscribed value
1	100 (~0.22 bit/s)
2	200 (~0.44 bit/s)
3	500 (~1.11 bit/s)
4	1 000 (~2.2 bit/s)
5	2 000 (~4.4 bit/s)
6	5 000 (~11.1 bit/s)
7	10 000 (~22 bit/s)
8	20 000 (~44 bit/s)
9	50 000 (~111 bit/s)
10	100 000 (~0.22 kbit/s)
11	200 000(~0.44 kbit/s)
12	500 000(~1.11 kbit/s)
13	1 000 000 (~2.2 kbit/s)
14	2 000 000 (~4.4 kbit/s)
15	5 000 000 (~11.1 kbit/s)
16	10 000 000 (~22 kbit/s)
17	20 000 000 (~44 kbit/s)
18	50 000 000 (~111 kbit/s)
31	best effort

`<PDP_type>`(str)

Packet Data Protocol type

“IP“	Internet Protocol (IETF STD 5)

Notes

- Definitions of parameters can be found in 3GPP 23.107.
- All QOS settings will be stored non volatile.

10.10 AT+CGEQREQ 3G Quality of Service Profile (Requested)

Syntax

Test Command

AT+CGEQREQ=?

Response(s)

+CGEQREQ: <PDP_type>, (list of supported <Traffic class>s), (list of supported <Maximum bitrate UL>s), (list of supported <Maximum bitrate DL>s), (list of supported <Guaranteed bitrate UL>s), (list of supported <Guaranteed bitrate DL>s), (list of supported <Delivery order>s), (list of supported <Maximum SDU size>s), (list of supported <SDU error ratio>s), (list of supported <Residual bit error ratio>s), (list of supported <Delivery of erroneous SDUs>s), (list of supported <Transfer delay>s), (list of supported <Traffic handling priority>s)

OK

Read Command

AT+CGEQREQ?

Response(s)

+CGEQREQ: [<cid>, <Traffic class>, <Maximum bitrate UL>, <Maximum bitrate DL>, <Guaranteed bitrate UL>, <Guaranteed bitrate DL>, <Delivery order>, <Maximum SDU size>, <SDU error ratio>, <Residual bit error ratio>, <Delivery of erroneous SDUs>, <Transfer delay>, <Traffic handling priority>]

[+CGEQREQ: <cid>, <Traffic class>, <Maximum bitrate UL>, <Maximum bitrate DL>, <Guaranteed bitrate UL>, <Guaranteed bitrate DL>, <Delivery order>, <Maximum SDU size>, <SDU error ratio>, <Residual bit error ratio>, <Delivery of erroneous SDUs>, <Transfer delay>, <Traffic handling priority>]

[+CGEQREQ: ...]

Write Command

AT+CGEQREQ=<cid>[, <Traffic class>[, <Maximum bitrate UL>[, <Maximum bitrate DL>[, <Guaranteed bitrate UL>[, <Guaranteed bitrate DL>[, <Delivery order>[, <Maximum SDU size>[, <SDU error ratio>[, <Residual bit error ratio>[, <Delivery of erroneous SDUs>[, <Transfer delay>[, <Traffic handling priority>]]]]]]]]]]]]]

Response(s)

OK

ERROR

+CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP TS 27.007	+	+	+	-

Command Description

The test command returns values supported as a compound value.

The read command returns the current settings for each defined context for which a QOS was explicitly specified.

The write command allows the TE to specify a Quality of Service Profile for the context identified by the context identification parameter <cid> which is used when the MT sends an Activate PDP Context Request message to the network.
A special form of the write command, AT+CGEQREQ=<cid> causes the requested profile for context number <cid> to become undefined.

Parameter Description

`<cid>`(num)

Parameter specifies a particular PDP context definition. The parameter is also used in other PDP context-related commands.

1...16

`<Traffic class>`(num)

0	conversational
1	streaming
2	interactive
3	background
[4]	subscribed value

`<Maximum bitrate UL>`(num)

This parameter indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as 32 (e.g. `AT+CGEQREQ`=...,32,...).

[0]	subscribed value

1...512

`<Maximum bitrate DL>`(num)

This parameter indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as 32 (e.g. `AT+CGEQREQ`=...,32,...).

[0]	subscribed value

1...16000

`<Guaranteed bitrate UL>`(num)

This parameter indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as 32 (e.g. `AT+CGEQREQ`=...,32,...).

[0]	subscribed value

1...512

`<Guaranteed bitrate DL>`(num)

This parameter indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as 32 (e.g. `AT+CGEQREQ`=...,32,...).

[0]	subscribed value

1...16000

`<Delivery order>`(num)

This parameter indicates whether the UMTS bearer shall provide in-sequence SDU delivery or not.

0	no
1	yes
[2]	subscribed value

`<Maximum SDU size>`(num)

This parameter indicates the maximum allowed SDU size in octets.

[0]	subscribed value
10...1520	(value needs to be divisible by 10 without remainder)

`<SDU error ratio>`(str)

This parameter indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as "mEe". As an example a target SDU error ratio of $5*10^{-3}$ would be specified as "5E3" (e.g. `AT+CGEQREQ`=...,"5E3",...).

[“0E0“]	subscribed value
“1E2“	
“7E3“	
“1E3“	
“1E4“	
“1E5“	
“1E6“	
“1E1“	

`<Residual bit error ratio>`(str)

This parameter indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as "mEe". As an example a target residual bit error ratio of $5*10^{-3}$ would be specified as "5E3" (e.g. `AT+CGEQREQ`=...,"5E3",...).

[“0E0“]	subscribed value
“5E2“	
“1E2“	
“5E3“	
“4E3“	
“1E3“	
“1E4“	
“1E5“	
“1E6“	
“6E8“	

`<Delivery of erroneous SDUs>`(num)

This parameter indicates whether SDUs detected as erroneous shall be delivered or not.

0	no
1	yes
2	no detect
[3]	subscribed value

`<Transfer delay>`(num)

This parameter indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds.

[0]	subscribed value

10...150	(value needs to be divisible by 10 without remainder)
200...950	(value needs to be divisible by 50 without remainder)
1000...4000	(value needs to be divisible by 100 without remainder)

`<Traffic handling priority>`(num)

This parameter specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of the other bearers.

[0]	subscribed
1	
2	
3	

`<PDP_type>`(str)

Packet Data Protocol Type

“IP“	Internet Protocol (IETF STD 5)

Notes

- Definitions of parameters can be found in 3GPP 23.107.
- All QOS settings will be stored non volatile.

10.11 AT+CGSMS Select service for MO SMS 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`

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP 27.007	+	+	+	-

Command Description

The test command is used for requesting information on which services and service preferences can be set by using the `AT+CGSMS` write command

The read command returns the currently selected service or service preference.

The write command is used to specify the service or service preference that the MT will use to send MO SMS messages.

Parameter Description

`<service>`(num)

A numeric parameter which indicates the service or service preference to be used. Parameter is global for all interfaces and non-volatile.

0	GPRS (value is not really supported and is internally mapped to 2)
1	Circuit switched (value is not really supported and is internally mapped to 3)
2	GPRS preferred (use circuit switched SMS transfer if mobile is not GPRS attached)
3	Circuit switched preferred (use GPRS if circuit switched is not available)

10.12 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>, <srcaddr>, <protocolno>, <destportrange>, <srcportrange>, <ipsecidx>, <tos>, <flowlabel>]
[+CGTFT: ...]

Write Command

AT+CGTFT=[<cid>[, <filterid>[, <precedence>[, <srcaddr>[, <protocolno>[, <destportrange>[, <srcportrange>[, <ipsecidx>[, <tos>[, <flowlabel>]]]]]]]]]]

Response(s)

OK
ERROR
+CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP 27.007	+	+	+	-

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 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...2

`<precedence>`(num)

Evaluation Precedence Index

Parameter specifies a evaluation precedence index.

0...255

`<srcaddr>`(str)

Source address and subnet mask

Parameter specifies a source address and subnet mask.

0.0.0.0.0.0.0.0...255.255.255.255.255.255.255.255

`<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>`(str)

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>`(str)

Flow label

Parameter specifies the flow label (ipv6).

0...FFFFF

`<pdptype>`(str)

PDP type

Parameter specifies the PDP type.

“IP“

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.

10.13 ATD*99# Request GPRS 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. GPRS 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 10.3.1, Automatic deactivation of PDP context during dial-up PPP).

Syntax

Exec Command

ATD*99[* [<called_address>][* [<L2P>][* [<cid>]]]]#

Response(s)

```
CONNECT
NO CARRIER
```

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP TS 27.007	+	+	-	+

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>(str)

Layer 2 protocol to be used between the TE and MT.

“PPP“	layer 2 protocol PPP
“1“	layer 2 protocol PPP

<cid>(num)

Parameter specifies a particular PDP context definition (see AT+CGDCONT command).

[1]...16

10.14 AT^SGAUTH Set type of authentication for PDP-IP connections

Syntax

Test Command

`AT^SGAUTH=?`

Response(s)

`^SGAUTH:`(range of supported`<cid>`s), (list of supported `<auth_type>`s), ,
`OK`
`ERROR`
`+CME ERROR`

Read Command

`AT^SGAUTH?`

Response(s)

`^SGAUTH:<cid>`, `<auth_type>`[, `<user>`]
`^SGAUTH:<cid>`, `<auth_type>`[, `<user>`]
...
`OK`
`ERROR`
`+CME ERROR`

Write Command

`AT^SGAUTH=<cid>`[, `<auth_type>`[, `<passwd>`[, `<user>`]]]

Response(s)

`OK`
`ERROR`
`+CME ERROR`

PIN	USB0-MDM	USB0-APP	Last
+	+	+	-

Parameter Description

`<cid>`(num)

Parameter specifies a particular PDP context definition. This is also used in other PDP context-related commands.

1...16

`<auth_type>`(num)

Indicates the types of authentication to be used for the specified context. If CHAP is selected another parameter `<passwd>` needs to be specified. If PAP is selected two additional parameters `<passwd>` and `<user>` need to specified.

[0]	none
1	PAP
2	CHAP

`<passwd>`(str)

Parameter specifies the password used for authentication. It is required for the authentication types PAP and CHAP.

`<user>`(str)

Parameter specifies the user name used for authentication. It is required for the authentication type PAP.

Note

- All settings will be stored non volatile.

11. Short Message Service (SMS) Commands

The AT Commands described in this chapter allow an external application to use the Short Message Service with the HC25.

11.1 SMS parameters

Parameter Description

<ackpdu>(num)

Format is same for <pdu> in case of SMS, but without GSM 24.11 SC address field and parameter shall be bounded by double quote characters like a normal string type rarameter

<alpha>(str)(+CSCS)

String type alphanumeric representation of <da> or <oa> corresponding to the entry found in phonebook; implementation of this feature is manufacturer specific

<ct>(num)

Command Type

GSM 03.40 TP-Command-Type in integer format

[0]...255

<da>(str)(+CSCS)

Destination Address

GSM 03.40 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 case of SMS: GSM 03.40 TP-User-Data in text mode responses; format:

- If <dcs> indicates that GSM 03.38 default alphabet is used and <fo> indicates that GSM 03.40 TP-User-Data-Header-Indication is not set: ME/TA 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 GSM 03.40 TP-User-Data-Header-Indication is set: ME/TA 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: GSM 03.41 CBM Content of Message in text mode responses; format:

- If <dcs> indicates that GSM 03.38 default alphabet is used: ME/TA 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: ME/TA converts each 8-bit octet into hexadecimal numbers containing two IRA characters.

<dt>(num)

Discharge Time

GSM 03.40 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"

`<index>`(num)

Integer type; value in the range of location numbers supported by the associated memory. Indexing starts from 0.

`<length>`(num)

Message Length

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).

`<mem1>`(str)

Memory to be used when listing, reading and deleting messages:

“SM“	SIM message storage
“ME“	Mobile Equipment message storage
“MT“	Same as "ME" storage

`<mem2>`(str)

Memory to be used when writing and sending messages:

“SM“	SIM message storage
“ME“	Mobile Equipment message storage
“MT“	Same as "ME" storage

`<mem3>`(str)

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“	Mobile Equipment message storage
“MT“	Same as "ME" storage

`<mid>`(num)

Message Identifier

GSM 03.41 CBM Message Identifier in integer format

`<mn>`(num)

Message Number

GSM 03.40 TP-Message-Number in integer format

`<mr>`(num)

Message Reference

GSM 03.40 TP-Message-Reference in integer format

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

Originating Address

GSM 03.40 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

GSM 03.41 CBM Page Parameter bits 4-7 in integer format

<pages>(num)

Page Parameter

GSM 03.41 CBM Page Parameter bits 0-3 in integer format

<pdu>(num)

In the case of SMS: GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format: ME/TA 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> GSM 03.40 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

GSM 03.40 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>

<sca>(str)(+CSCS)

Service Center Address

GSM 04.11 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

GSM 03.40 TP-Service-Centre-Time-Stamp in time-string format (refer <dt>)

<sn>(num)

Serial Number

GSM 03.41 CBM Serial Number in integer format

<st>(num)

Status

GSM 03.40 TP-Status in integer format

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

GSM 04.11 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

GSM 04.11 TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>)

<tora>(num)

Type of Recipient Address

GSM 04.11 TP-Recipient-Address Type-of-Address octet in integer format (default refer <toda>)

<tosca>(num)

Type of Service Center Address

GSM 04.11 RP SC address Type-of-Address octet in integer format (default refer <toda>)

11.2 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

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

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. After the prompt a timer will be started to observe the input.

11.3 AT+CMGD Delete short message

The write command deletes a short message from the preferred message storage <mem1> location <index>.

Syntax

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

Write Command
AT+CMGD=<index>
Response(s)
OK ERROR +CMS ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

Notes

- 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.

11.4 AT+CMGF Select SMS message format

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`	

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

Command Description

The write command specifies the input and output format of the short messages.

Parameter Description

`<mode>`(num)	
[0](&F)	PDU mode
1	Text mode

11.5 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>, [<alpha>], [<scts>][, <tooa>/<toda>, <length>]
<data>
[...]
OK

For SMS-STATUS-REPORTs
+CMGL: <index>, <stat>, <fo>, <mr>, [<ra>], [<tora>], <scts>, <dt>, <st>
[...]
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>, [<alpha>], <length>
<pdu>
[...]
OK

If error is related to ME functionality
ERROR
+CMS ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

Notes

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

11.6 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>, [<alpha>], <scts>[, <tooa>, <fo>, <pid>, <dcs>, <sca>, <tosca>, <length>]
<data>
[...]
OK

For SMS-SUBMIT
+CMGR: <stat>, <da>, [<alpha>][, <toda>, <fo>, <pid>, <dcs>, [<vp>], <sca>, <tosca>, <length>]
<data>
[...]
OK

For SMS-STATUS-REPORT
+CMGR: <stat>, <fo>, <mr>, [<ra>], [<tora>], <scts>, <dt>, <st>
<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>, [<alpha>], <length>
<pdu>
[...]
OK
ERROR
+CMS ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

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.

11.7 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>. 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+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

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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

Notes

- Note that some providers do not recognize an @ symbol used in a short message. A widely used alternative is typing "*" as defined in GSM 03.40 (GPP TS 23.40).
- 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.

11.8 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

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

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.

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

Notes

- Note that some providers do not recognize an @ symbol used in a short message. A widely used alternative is typing "*" as defined in GSM 03.40 (GPP TS 23.40).
- 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.

11.9 AT+CMMS More Messages to Send

The AT+CMMS write command controls the continuity of the SMS relay protocol link. When the feature is enabled (and supported by network) multiple messages can be sent much faster as the link is kept open.

Syntax

Test Command
AT+CMMS=?
Response(s)
+CMMS: (list of supported) <mode>s

Read Command
AT+CMMS?
Response(s)
+CMMS: <mode> OK

Write Command
AT+CMMS=<mode>
Response(s)
OK ERROR +CMS ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

Parameter Description

<mode>(num)	
[0]	Disable
1	Keep link enabled until the time between the response of the latest message send command (AT+CMGS, AT+CMSS, etc.) and the next send command exceeds 1-5 seconds. Then the ME will close the link and TA switch <mode> automatically back to <mode> 0.
2	Enable (if the time between the response of the latest message send command and the next send command exceeds 1-5 seconds. Then the ME will close the link, but TA will not switch automatically back to <mode>=0).

Note

- After issuing the read command a delay of 5-10 seconds is required before issuing the write command, otherwise the "+CMS ERROR: 500" will appear.

11.10 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

Write Command

If PDU mode (AT+CMGF=0):

AT+CMSS=<index>[, <da>[, <toda>]]

Response(s)

+CMSS: <mr>[, <ackpdu>]
OK
ERROR
+CMS ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

11.11 AT+CNMA New Message Acknowledgement to ME/TE, only phase 2+

The write / execute command confirms successful receipt of a new message (SMS-DELIVER or SMS-STATUS-REPORT) routed directly to the TE. If ME does not receive acknowledgement within required time (network time-out), it will send RP-ERROR to the network. In this case routing to the TE will be disabled automatically by setting both <mt> and <ds> values of AT+CNMI to zero.

Syntax

Test Command
AT+CNMA=?
Response(s)
+CNMA: (list of supported <n>s) OK

Exec Command
AT+CNMA
Response(s)
OK ERROR +CMS ERROR

Write Command
AT+CNMA=<n>
Response(s)
OK ERROR +CMS ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

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

- The execute / write command shall only be used when AT+CSMS parameter <service> equals 1 (= phase 2+) and 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.

11.12 AT+CNMI New short Message Indication

The write command selects the procedure how the receipt of new short messages from the network is indicated to the TE when TE is active, e.g. DTR signal is ON. If TE is inactive (e.g. DTR signal is OFF), message receiving should be done as specified in GSM 03.38. If the DTR signal is not available or the state of the signal is ignored, reliable message transfer can be assured by using AT+CNMA acknowledgment procedure. 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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

Unsolicited Result Codes

URC 1

<mt>=1,2 or 3 - indication only:

+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

URC 8

<ds>=2:

+CDSI: <mem3>, <index>

Indicates that new SMS status report has been received

Parameter Description

<mode>(num)	
[0](&F)	Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.
1	Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode). Otherwise forward them directly to the TE.
2	Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in online data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.

<mt>(num)	
Rules for storing received short messages depend on the relevant data coding method (refer to GSM 03.38), preferred memory storage setting (AT+CPMS) and this value.	
[0](&F)	No SMS-DELIVER indications are routed to the TE.
1	If SMS-DELIVER is stored in ME/TA, indication of the memory location is routed to the TE using unsolicited result code.
2	SMS-DELIVERs, except class 2 messages and messages in the message waiting indication group (store message) are routed directly to the TE using unsolicited result code.
3	Class 3 SMS-DELIVERs are routed directly to the TE using unsolicited result codes defined in <mt>=2. Messages of other data coding schemes result in indication as defined in <mt>=1.

<bm>(num)	
Rules for storing received CBMs depend on the relevant data coding method (refer to GSM 03.38), the setting of Select CBM Types (AT+CSCB) and this value:	
[0](&F)	No CBM indications are routed to the TE.
2	New CBMs are routed directly to the TE using unsolicited result code.

<ds>(num)	
[0](&F)	No SMS-STATUS-REPORTs are routed to the TE.
1	SMS-STATUS-REPORTs are routed to the TE using unsolicited result code.
2	If SMS-STATUS-REPORT is routed into ME/TA, indication of the memory location is routed to the TE using unsolicited result code.

<bfr>(num)	
[1](&F)	TA buffer of unsolicited result codes defined within this command is cleared when <mode> changes from 0 to 1...3.

<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.
- If <mode> and <mt> are set to 1, an incoming short message will not be indicated while a data connection is in progress on the modem interface. To enable the indication of short messages during data connections please set 2 for <mode> and 1 for <mt>.

11.13 AT+CPMS Preferred SMS message storage

The write command selects memory storages <mem1>,<mem2>, <mem3> to be used for reading, writing, etc.

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

Write Command

AT+CPMS=<mem1>[, <mem2>[, <mem3>]]

Response(s)

+CPMS: <used1>, <total1>, <used2>, <total2>, <used3>, <total3>
OK
ERROR
+CMS ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

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>`.
- The `<mem1>`, `<mem2>` and `<mem3>` parameter will be stored in non-volatile memory.
- 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 the following specifications: GSM 03.38 and 3GPP TS23038.
- 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 parameter for all memory indices.
- 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.

11.14 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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

Notes

- This command writes the service center address to non-volatile memory.
- The SMS service center address should be entered as specified by the service provider.

11.15 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

Read Command
AT+CSCB?
Response(s)
+CSCB: <operation>, <mids>, <dcss> OK ERROR

Write Command
AT+CSCB=[<operation>[, <mids>[, <dcss>]]]
Response(s)
OK ERROR +CMS ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

Parameter Description

<operation>(num)

Add/delete operation

0(&F)	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 and <dcss>s will be deleted. (for more see notes)

<mids>(str)

Cell Broadcast Message ID specification

All different possible combinations of CBM message identifiers; e.g. "0,1,5,320-478,922".

SIEMENS

`<dcss>`(str)

CBM data coding scheme specification

All different possible combinations of CBM data coding schemes (e.g. "0-3,5"). If default empty string is used all CBMs are received independent of their dcss.
A given `<dcss>` replaces any former value and is used for consecutive requests.

11.16 AT+CSMP Set SMS text Mode Parameters

The write command selects values for additional parameters needed when the short message is sent to the network or placed in a storage when 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 range 0... 255) or define the absolute time of the validity period termination (<vp> is a string). The format of <vp> is given by <fo>. If TA supports the enhanced validity period format, see GSM 03.40), it shall be given as a 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)

+CSMP: <index>
OK
If sending fails
ERROR
+CMS ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

Parameter Description

<fo>(num)

First Octet

depending on the command or result code: first octet of GSM 03.40 SMS-DELIVER, SMS-SUBMIT, SMS-STATUS-REPORT, or SMS-COMMAND in integer format

0...255

<vp>(num)

Depending on SMS-SUBMIT <fo> setting: GSM 03.40 TP-Validity-Period either in integer format or in time-string format (refer <dt>)

0...255

<dcs>(num)

Data Coding Scheme

GSM 03.38 SMS Data Coding Scheme, or Cell Broadcast Data Coding Scheme in integer format

0(&F)...247

`<pid>`(num)

Protocol Identifier

GSM 03.40 TP-Protocol-Identifier in integer format

0(&F)...255

Notes

- 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>`.
- The command writes the parameters to the non-volatile memory.

11.17 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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.05	+	+	+	-

Parameter Description

<service>(num)	
0(&F)	GSM 03.40 and GSM 03.41 (the syntax of SMS AT commands is compatible with GSM 07.05 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	GSM 03.40 and GSM 03.41 (the syntax of SMS AT commands is compatible with GSM 07.05 Phase 2+ version; the requirement of <service> setting 1 is mentioned under corresponding command descriptions).

<mt>(num)	
Mobile Terminated Messages:	
0	Type not supported
1	Type supported

<mo>(num)	
Mobile Originated Messages:	
0	Type not supported
1	Type supported

<bm>(num)	
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.

SIEMENS

11.18 AT^SMGL List Short Messages from preferred store without setting status to REC READ

The write command lists messages stored in <mem1> without changing their status to "read". The execute command is identical to the write command with default <stat> (for defaults see "Section 11.1, SMS parameters).

Syntax

Test Command
AT^SMGL=?
Response(s)
(list of supported <stat>s)

Exec Command
AT^SMGL
Response(s)
^SMGL: (same as write command with default <stat>) OK

Write Command
AT^SMGL=[<stat>]
Response(s)
same as AT+CMGL

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	+	+	+	-

Notes

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

12. SIM related Commands

The AT commands described in this chapter are related to the Subscriber Identity Module (SIM) connected to HC25.

Note:
If using data from the SIM 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 SIM's data in the background via the SIM Application Toolkit (SAT) procedure "Data download to SIM". For a detailed description please refer to GSM 11.14, [20].
To get informed that changing Elementary Files has taken place the TA needs to hook to the SAT Proactive Command "REFRESH". To achieve this, the AT command interface of SAT, i.e. Remote-SAT, needs to be activated. An overview is given at Chapter 13., SIM Application Toolkit (SAT) Commands, additional information is available with the document "Remote-SAT User Guide" [4].

12.1 AT+CRSM Restricted SIM Access

AT+CRSM offers easy access of the Elementary Files on the SIM. Access to the SIM database is restricted to the commands which are listed at <command>.
All parameters of AT+CRSM are used as specified by GSM 11.11 [17]. HC25 handles internally all required SIM interface locking and file selection routines.
As response to the command, the HC25 sends the actual SIM information parameters and response data. Error result code "+CME ERROR" may be returned if the command cannot be passed to the SIM, e.g. if the SIM is not inserted. However, failure in the execution of the command in the SIM is reported in <sw1> and <sw2> parameters.

Please beware of *possible changes to Elementary Files* by the network at any time, refer Chapter 12., SIM 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>
```

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
3GPP TS 27.007	-	+	+	-

Parameter Description

<command>(num)

SIM 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 SIM, if used by `<command>`.

`<P1>`(num)

Parameter to be passed on by the HC25 to the SIM.

0...255

`<P2>`(num)

Parameter to be passed on by the HC25 to the SIM.

0...255

`<P3>`(num)

Parameter to be passed on by the HC25 to the SIM.

0...255

`<data>`(str)

Information which shall be written to the SIM (hexadecimal character format).

`<sw1>`(num)

Status information from the SIM 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 SIM 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.

12.2 AT+CSIM Generic SIM Access

AT+CSIM allows direct control of the SIM.
Compared to Restricted SIM Access command AT+CRSM, the definition of AT+CSIM allows the ME to take more control over the SIM interface.
For parameter and SIM result coding please refer GSM 11.11 [17].
However, the SIM Application Toolkit functionality is not supported by AT+CSIM. Therefore the following SIM commands can not 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>
```

Reference(s)

3GPP TS 27.007, 3GPP TS 31.102,
ETSI TS 102 221

PIN	USB0-MDM	USB0-APP	Last
-	+	+	-

Parameter Description

<length>(num)

Length of <command> or <response> string.

<command>(str)

Command passed on by the ME to the SIM.
Parameter length: maximum 260 Bytes.

<response>(str)

Response data of the command returned by the SIM.
Parameter length: maximum 257 Bytes.

Example

The following examples explain how to use AT+CSIM.

AT+CSIM=14,"A0A40000027F10"	Select DF-Telecom
+CSIM: 4,"9F19" OK	Command successful, length '19' of the response data
AT+CSIM=14,"A0A40000026F3A"	Select EF-ADN (Abbreviated dialling numbers)
+CSIM: 4,"9F0F" OK	Command successful, length '0F' of the response data
AT+CSIM=16,"A0C000000F000000"	Get Response

```
+CSIM: 34,"000002306F3A040011F0220102011C9000"
OK
```

12.3 AT^SCKS Query SIM and Chip Card Holder Status

This command controls the SIM connection presentation mode and queries the connection status of the SIM and the card holder tray of the HC25.

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>
```

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	-

Unsolicited Result Codes

URC 1

^SCKS: <SimStatus>

If the HC25's SIM connection status has changed an unsolicited result code (URC) is issued.

URC 2

^SCRD: <MCC>

If the SIM is not supported by HC25 and the connection is rejected an unsolicited result code (URC) is issued. The presentation of this URC cannot be suppressed.

Command Description

The read command returns the URC presentation mode and the status of the SIM card connection.

The write command enables or disables the presentation of URCs to report the SIM card connection.
If the ME is powered down or reset (AT+CFUN or AT^SMSO) the current presentation mode setting <mode> will not be retained. Therefore the setting <mode>=1 needs to be restored after power on the HC25.

Parameter Description

<mode>(num)	
0(&F)	Suppress unsolicited result code ^SCKS
1	Output unsolicited result codes

<SimStatus>(num)	
0	SIM connection error
1	SIM inserted (refer to note)

<MCC>(num)
The MCC (Mobile Country Code) of a SIM that is not supported by HC25.

Notes

- <SimStatus> reflects the status of the SIM and the card holder tray.
- <MCC> specifies the MCC (Mobile Country Code) of a SIM that is not supported by HC25.

Example

AT^SCKS=1 OK	Activates the presentation of unsolicited result code ^SCKS

Now, after removing a card tray the following URCs appear:

^SCKS: 0	No SIM card found

13. SIM Application Toolkit (SAT) Commands

This chapter offers a brief reference of commands and responses related to the HC25's SIM Application Toolkit (SAT) implementation. Detailed information is available with the document "Remote-SAT User Guide" [4]. Please contact the Wireless Modules Application Engineering Department at Siemens AG for details.
ETSI specification GSM 11.14 [20] defines SAT in detail.
SAT allows for the execution of applications provided by a Subsciber Identity Module (SIM). Usually SIM cards are used for storing GSM network provider and user specific data, e.g. phonebook entries and Short Messages (SMS). However, a SIM card may also hold a SIM Application.
Since the HC25 has SAT functionality it is able to execute the commands issued by applications implemented on a network provider specific SIM card.
Two groups of commands are used between the ME and the SIM Application:

- Proactive Commands are issued to the HC25's SAT from the SIM Application, such as "DISPLAY TEXT".
- Envelope Commands are responded to the SIM Application from the HC25, such as "MENU SELECTION".

13.1 AT^SSTA SAT Interface Activation

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>`
`OK`

Write Command

`AT^SSTA=<mode>[, <Alphabet>]`

Response(s)

`OK`

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	-

Command Description

The read command can be used to request the current operating status and the used alphabet of the Remote-SAT interface.

The write command is used to activate the AT command interface of the SIM Application Toolkit in the HC25 and needs to be issued after every power on. However, 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) could be executed without activating Remote-SAT.

Parameter Description

<state>(num)	
HC25 Remote-SAT interface states	
0	RESET
1	OFF
2	IDLE
3	PAC
4	WAIT

<Alphabet>(num)	
0	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)	
0	SAT is already used on another instance (logical channel in case of the multiplex protocol). Only test and read commands can be used.
1	SAT may be started on this instance via the write version of this command.

<SatProfile>(str)
SAT profile according to GSM 11.14 [20]. The profile tells the SIM Application which features (e.g. proactive commands) are supported by the SIM Application Toolkit implementation of the HC25.

<mode>(num)	
1	Activate Remote-SAT

Note

- To limit the time Remote-SAT is kept in states PAC or WAIT any ongoing (but unanswered) Proactive Command is automatically aborted after 10 minutes with Terminal Response "ME currently unable to process command" or "No response from user" if applicable. An URC "Terminate Proactive Command" will be send to the external application in this case, too.

13.2 ^SSTN SAT Notification

Unsolicited Result Codes

URC 1

Proactive Command notification

`^SSTN: <cmdType>`

Every time the SIM Application issues a Proactive Command, via the ME, the TA will receive a notification. This indicates the type of Proactive Command issued.
`AT^SSTGI` must then be used by the TA to request the parameters of the Proactive Command from the ME. Upon receiving the ^SSTGI response from the ME, the TA 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 ME, 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 TA should avoid sending any further commands related to the terminated Proactive Command, e.g. `AT^SSTGI` or `AT^SSTR`.

URC 3

Notification that SIM Application has returned to main menu

`^SSTN: 254`

Notification to the TA when the SIM Application has finished a command cycle and again enters its main menue, which was transferred with an URC "^SSTN: 37" (SET UP MENU) at start up.
This URC should be used to open this menue on the sreen.
The TA does not need to respond directly, i.e. `AT^SSTR` is not required.

URC 4

SIM reset notification

`^SSTN: 255`

Notification to the TA if a Proactive Command "REFRESH - SIM Reset" has been issued by the SIM Application, please refer to `AT^SSTGI`.
This URC should be used to set the TAs application to its initial state since the SIM Application will start from the beginning, too.
The TA does not need to respond directly, i.e. related `AT^SSTGI` and `AT^SSTR` are neither required nor allowed.
Since the ME is still busy on SIM access the ME may respond with "+CME ERROR: SIM blocked" or "+CME ERROR: SIM busy" on following PIN required AT Commands for a while. Then TA shall retry until the ME responds with "OK". The time needed for this process depends on the SIM and may take more than 10 seconds.

Parameter Description

`<cmdType>`(num)

Proactive Command number

`<cmdTerminateValue>`(num)

Defined as `<cmdType>` + terminate offset. The terminate offset equals 100.

13.3 AT^SSTGI SAT Get Information

Regularly this command is used upon receipt of an URC "^SSTN" to request the parameters of the Proactive Command.
Then the TA 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.
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

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	-

Parameter Description

<state>(num)

HC25 Remote-SAT interface states

0	RESET
1	OFF
2	IDLE
3	PAC
4	WAIT

<cmdType>(num)

Related Proactive Command

13.4 AT^SSTR SAT Response

The TA 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>]
Response(s)
OK

Reference(s)
SIEMENS

PIN	USB0-MDM	USB0-APP	Last
-	+	+	-

Parameter Description

<state>(num)

HC25 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 GSM 11.14 [20].

<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 GSM 11.14 [20].

<inputNumber>(num)

Response number entered by user

<inputString>(str)

Response string entered by user

14. Phonebook Commands

The AT commands described in this chapter allow the external application to access the phonebooks located in the HC25's memory or on the attached Subscriber Identity Module (SIM).

14.1 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>

Reference(s)
GSM 07.07

PIN	USB0-MDM	USB0-APP	Last
+	+	+	-

Parameter Description

<alpha>(str)

Optional alphanumeric string associated with <number>.

<number>(str)

Phone number in format specified by <type>.

<type>(str)

Type of address octet, see also: AT+CPBR <type>.

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. See Section 18.1, Restricted access to SIM data after SIM PIN authentication for further detail.

14.2 AT+CPBF Find phonebook entries

The AT+CPBF write command returns phonebook entries (from the current phonebook memory storage selected with AT+CPBS) which alphanumeric field start with string <findtext>.
Entry fields returned are location number <location>, phone number stored there <number> (of format <type>) and text <text> associated with the number.
The AT+CPBF test command returns the maximum lengths of <nlength> and <tlength> fields.

Syntax

Test Command

```
AT+CPBF=?
```

Response(s)

```
+CPBF: <nlength>,<tlength>
OK
ERROR
+CME ERROR
```

Write Command

```
AT+CPBF=<findtext>
```

Response(s)

```
+CPBF: <location>,<number>,<type>,<text>
OK
ERROR
+CME ERROR
```

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	+	+	+	-

Parameter Description

<location>(num)

The location number in the range of location numbers of phonebook memory.

<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). Please consider that for types other than 129 or 145 dialing from phonebook with ATD><mem><n> is, depending on the network, not always possible (refer to GSM 04.08 subclause 10.5.4.7 for details). See also <type> of AT+CPBW.
Possible values are:

128	Restricted <number> includes unknown type and format.
145	Dialing string <number> includes international access code character '+'.
161	National number. Network support of this type is optional.
177	Network specific number, ISDN format.
209	Dialing string <number> has been saved as ASCII string and includes non-digit characters other than "*", "#" or "+". 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	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 1.6, Supported character sets.

<findtext>(str)(+CSCS)

String for finding the <text> in the active phonebook.

<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.

<tlength>(num)

Maximum length of <text> assigned to the telephone number. The value indicated by the test command is given in octets. If <text> is given as GSM characters each character corresponds to one octet. If the <text> string is given in UCS2, the maximum number of characters depends on the coding scheme used for the alpha field of the SIM according to GSM 11.11, Annex B [17]. In the worst case the number of UCS2 characters is at least one less than half the number of GSM characters.

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 Section 18.1, Restricted access to SIM data after SIM PIN authentication for further detail.
- The search in the dialled calls (DC) phonebook is not supported.

Example

`AT+CPBF=?`	First run the `AT+CPBF` test command to find out the lengths of `<nlength>` and `<tlength>` in the active phonebook.
`+CPBF: 40,16`	HC25 returns the supported values, where 40 is the maximum length of the phone number and 16 is the maximum length of the associated text.
`AT+CPBF="cha"`	Then use the `AT+CPBF` write command to find any text string in the phonebook.
`+CPBF:1,"+999999",145,"Charlie"`	

SIEMENS

14.3 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
+CME ERROR
```

Write Command

```
AT+CPBR=<location1>[, <location2>]
```

Response(s)

```
[+CPBR: <location1>, <number>, <type>, <text>]
[+CPBR: <location2>, <number>, <type>, <text>]
OK
+CME ERROR
```

Reference(s)
GSM 07.07, GSM 11.11

PIN	USB0-MDM	USB0-APP	Last
+	+	+	-

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>, no list of entries will be shown and the output is terminated with "+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). Please consider that for types other than 129 or 145 dialing from phonebook with `ATD<mem><n>` is, depending on the network, not always possible (refer to GSM 04.08 subclause 10.5.4.7 for details). See also `<type>` of `AT+CPBW`.
Possible values are:

128	Restricted `<number>` includes unknown type and format.
145	Dialing string `<number>` includes international access code character '+'.
161	National number. Network support of this type is optional.
177	Network specific number, ISDN format.
209	Dialing string `<number>` has been saved as ASCII string and includes non-digit characters other than "*", "#" or "+". 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	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 1.6, Supported character sets.

`<maxloc>`(num)

Maximum location number for the currently selected storage. For phonebooks located on the SIM this value depends on the SIM card type.

`<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.

`<tlength>`(num)

Maximum length of `<text>` assigned to the telephone number. The value indicated by the test command is given in octets. If `<text>` is given as GSM characters each character corresponds to one octet. If the `<text>` string is given in UCS2, the maximum number of characters depends on the coding scheme used for the alpha field of the SIM according to GSM 11.11, Annex B [17]. In the worst case the number of UCS2 characters is at least one less than half the number of GSM characters.

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 Section 18.1, Restricted access to SIM data after SIM PIN authentication for further detail.
- When storing a supplementary service command to the phonebook along with a "+" within the phone number please note that the ME will not display the "+" after restart, but correctly handles the phone number as international 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`	HC25 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.

14.4 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
+CME ERROR

Read Command

AT+CPBS?

Response(s)

+CPBS: <storage>, <used>, <total>
OK
+CME ERROR

Exec Command

All records of the "MC", "RC", "DC" and "LD" phonebooks stored on the ME will be deleted.

AT+CPBS

Response(s)

OK
+CME ERROR

Write Command

AT+CPBS=<storage>

Response(s)

OK
+CME ERROR:

Write Command

For write access to FD phonebook

AT+CPBS=<storage>, <pin>

Response(s)

OK
+CME ERROR:

Reference(s)
GSM07.07

PIN	USB0-MDM	USB0-APP	Last
+	+	+	-

Parameter Description

<storage>(str)

"SM"(&F)	SIM phonebook Capacity: depending on SIM card Location: SIM

“DC“	Dialled calls list Capacity: max. 10 entries Location: ME AT+CPBW command is not applicable to this storage.
“FD“	Fixed dialing phonebook Capacity: depending on SIM card Location: SIM
“LD“	Last number dialed phonebook. Stores all call numbers dialed with ATD. Capacity: max. 10 entries Location: depending on SIM this phonebook may reside partly or completely in ME. AT+CPBW command is not applicable to this storage.
“MC“	Missed (unanswered received) calls list Capacity: max. 10 entries Location: ME AT+CPBW command is not applicable to this storage.
“ME“	Mobile Equipment Phonebook Capacity: max. 250 entries Location: ME
“RC“	Received calls list Capacity: max. 10 entries Location: ME AT+CPBW command is not applicable to this storage.
“EN“	Emergency number Capacity: max. 50 entries Location: SIM or ME AT+CPBW command is not applicable to this storage.
“ON“	MSISDN list Capacity: depending on SIM card Location: SIM

`<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 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 Section 18.1, Restricted access to SIM data after SIM PIN authentication for further detail.
- To get write access to the "FD" phonebook the following input is required: AT+CPBS="FD","PIN2"

14.5 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

Write Command

AT+CPBW=[<location>][, <number>[[, <type>][, <text>]]]

Response(s)

OK
ERROR
+CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07, GSM 04.08	+	+	+	-

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. <number> may contain dialstring modifiers "*", "#" or "+".
If other printable non-alphabetic characters are used the entry needs to be saved with <type>=209. Otherwise, if <type>=209 is not used any non-digit characters other than "*", "#" or "+" will be removed from the string and only accepted modifiers from the GSM alphabet will be saved.
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). Please consider that for types other than 129 or 145 dialing from phonebook with ATD><mem><n> is, depending on the network, not always possible (refer GSM 04.08 subclause 10.5.4.7 for details).
If <type> is not specified the unknown <type>=129 is used. If <number> contains a leading "+" <type>=145 (international) 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. The network support for this type is optional.
177	Network specific number, ISDN format.
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 "+" 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.

<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 1.6, 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 <nlength> digits for normal numbers, but only <nlength>/2 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 ERROR.

<tlength>(num)

Maximum length of <text> assigned to the telephone number. The value indicated by the test command is given in octets. If the <text> string is given in GSM characters, each character corresponds to one octet. If the <text> string is given in UCS2, the maximum number of characters depends on the coding scheme used for the alpha field of the SIM. In the worst case the number of UCS2 characters is at least one less than half the number of GSM characters.
For a detailed description please refer to GSM 11.11, Annex B [17].

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 Section 18.1, Restricted access to SIM data after SIM PIN authentication for further detail.
- The UCS2 character set is not supported yet.

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!+-765()&54*654#",,"John"
AT+CPBW=7,"432!+-765()&54*654#",129,"Eve"
AT+CPBW=8,"432!+-765()&54*654#",145,"Tom"
AT+CPBW=9,"432!+-765()&54*654#",209,"Richard"
```

EXAMPLE 4

Read phonebook entries from locations 5 - 9 via `AT+CPBR`

```
+CPBR:5,"12345678",129,"Arthur"
+CPBR:6,"432!+-765()&54*654#",209,"John"
+CPBR:7,"432+76554*654#",129,"Eve"
+CPBR:8,"+432+76554*654#",145,"Tom"
+CPBR:9,"432!+-765()&54*654#",209,"Richard"
```

15. Audio Commands

The AT Commands described in this chapter are related to the HC25's audio interface.

15.1 ATL Set monitor speaker loudness

ATL is implemented for V.250ter compatibility reasons only, and has no effect.

Syntax

Exec Command
ATL[<val>]
Response(s)
OK

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Parameter Description

<val>(num)

15.2 ATM Set monitor speaker mode

ATM is implemented for V.250ter compatibility reasons only, and has no effect.

Syntax

Exec Command
ATM[<val>]
Response(s)
OK

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	+	+	+	-

Parameter Description

<val>(num)

15.3 AT+CMUT Mute control

The AT+CMUT command mutes the microphone input. The command can be used in all audio modes (1 to 6) and during a voice call only. See AT^SNFS for more details on the various audio modes.
During an active call, users should be aware that when they switch back and forth between different audio modes the value of <mute> does change.

Syntax

Test Command
AT+CMUT=?
Response(s)
+CMUT: (list of supported<mute>s) OK

Read Command
AT+CMUT?
Response(s)
+CMUT: <mute> OK ERROR

Write Command
AT+CMUT=<mute>
Response(s)
OK ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	-	+	+	-

Parameter Description

<mute>(num)	
0	Mute off
1	Mute on

Note

- When a voice connection will be established or an other audio mode will be started by AT^SNFS command during an active voice call then mute will be switched off.

15.4 AT+VTS DTMF and tone generation

AT+VTS is intended to send ASCII characters which cause the Mobile Switching Center (MSC) to transmit DTMF tones to a remote subscriber. The command can only be used during active voice calls and offers the following variant:

- AT+VTS=<dtmf>[,<duration>] allows to send a single DTMF tone. The duration can be indvidually determined during the call.

Syntax

Test Command
AT+VTS=?
Response(s)
+VTS: (list of supported<dtmf>s), (list of supported<duration>s) OK

Write Command
AT+VTS=<dtmf>[, <duration>]
Response(s)
OK ERROR +CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
GSM 07.07	-	+	+	-

Parameter Description

<dtmf>(str)

ASCII character in the set 0...9,#,*, A, B, C, D. The string must be enclosed in quotation marks ("...").

<duration>(num)

Tone duration in 1/10 seconds with tolerance. If not specified the default value (300 ms) is used.

The minimum duration of DTMF signals is 300ms. DTMF tones below 300ms cannot be generated.

1...[3]...255

15.5 AT^SNFI Set microphone path parameters

AT^SNFI controls the microphone settings. Read and write parameters of this command are related to the current audio mode. The write command works only in audio modes 2 to 6 to configure with AT^SNFS. Audio mode 1 is write protected for AT^SNFI.

Syntax

Test Command

AT^SNFI=?

Response(s)

^SNFI: (list of supported <micAmp1>s), (list of supported <micAmp2>s), (list of supported <micTxVol>s)
OK

Read Command

AT^SNFI?

Response(s)

^SNFI: <micAmp1>, <micAmp2>, <micTxVol>
OK

Write Command

AT^SNFI=<micAmp1>, <micAmp2>, <micTxVol>

Response(s)

OK
ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	-

Parameter Description

<micAmp1>(num)

First analogue amplifier, 0 dB or +24 dB.

0(D)	0 dB
1	24 dB

<micAmp2>(num)

Second analogue amplifier, adjustable in 22 steps of 1.5 dB from -6 dB to +25.5 dB.
(0 = -6 dB, 21 = +25.5 dB, 22 steps of 1.5 dB).

0...21

<micTxVol>(num)

Multiplication factor for digital gain of uplink speech.
The digital gain has a valid range from -84 dB to +12 dB and can be calculated according to following formula:
Gain = 20 * LOG(<micTxVol> / 16384)
The value 16384 for <micTxVol> corresponds to unity gain and the value 0 to mute state.

0...65535

Notes

- CAUTION! When you adjust audio parameters avoid exceeding the maximum allowed level. Bear in mind that exposure to excessive levels of noise can cause physical damage to users!
- All audio parameters handled by `AT^SNFI` and `AT^SNFO` will be stored volatile for the current audio mode.
- When current audio mode is changing by `AT^SNFS` all parameters handled by `AT^SNFI` and `AT^SNFO` will be set to start values of new audio mode. The same behaviour is noticed for customer specific audio modes.

15.6 AT^SNFO Set audio output parameter (loudspeaker path)

AT^SNFO controls the audio output path amplification. The read and write parameters of this commands are related to the current audio mode configured by AT^SNFS. The write command works only in audio modes 2 to 6. Audio mode 1 is write protected for AT^SNFO.

Syntax

Test Command	
AT^SNFO=?	
Response(s)	
^SNFO: (list of supported <cdcRxGain>s) , (list of supported <rxVol>s) , (list of supported <stGain>s) OK	

Read Command	
AT^SNFO?	
Response(s)	
^SNFO: <cdcRxGain>, <rxVol>, <stGain> OK	

Write Command	
AT^SNFO=<cdcRxGain>, <rxVol>, <stGain>	
Response(s)	
OK ERROR	

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	-

Parameter Description

<cdcRxGain>(num)

<cdcRxGain> is basis for digital gain of downlink speech for the purpose of speaker or driver sensitivity adjustment. The digital gain has a valid range of resulting gain from -84 dB to +12 dB. The resulting gain has to be calculated according to following formula:
Gain = 20 * LOG (<cdcRxGain> / 16384)
<cdcRxGain> value of 16384 corresponds to unity gain and the value 0 to mute state.

0...65535

<rxVol>(num)

<rxVol> is the speaker volume gain control (digital gain).
There are 42 volume gain levels covering the range from -50 dB to +12 dB which are adjustable in steps of 1.5 dB (-50 dB means mute).
(0 = mute, 1 = -48 dB, 41 = +12 dB, 42 steps of 1.5 dB).

0...41

<stGain>(num)

Multiplication factor for digital gain of the loop-back from speech TX to speech RX path (side tone gain).
The digital gain has a valid range from -96 dB to 0 dB and can be calculated according to following formula:
Gain = 20 * LOG(<stGain> / 16384) - 12 dB
<stGain> value 16384 results in -12 dB of gain and the value 0 in side tone muting.

0...65535

Notes

- CAUTION! When you adjust audio parameters avoid exceeding the maximum allowed level. Bear in mind that exposure to excessive levels of noise can cause physical damage to users!
- All audio parameters handled by `AT^SNFI` and `AT^SNFO` will be stored volatile for the current audio mode.
- When current audio mode is changing by `AT^SNFS` all parameters handled by `AT^SNFI` and `AT^SNFO` will be set to start values of new audio mode. The same behaviour is noticed for customer specific audio modes.

15.7 AT^SNFS Select audio hardware set

The AT^SNFS write command serves to set the audio mode required for the connected equipment. Each audio mode can be assigned to a specific interface.
The AT^SNFS read command delivers the last configured audio mode. When TTY/CTM mode is activated by AT^SNFTTY configured and delivered audio mode is invalid, because TTY/CTM mode is defined as an own internal audio mode.

Syntax

Test Command	
AT^SNFS=?	
Response(s)	
^SNFS: (list of supported <audMode>s) OK	

Read Command	
AT^SNFS?	
Response(s)	
^SNFS: <audMode> OK	

Write Command	
AT^SNFS=<audMode>	
Response(s)	
OK ERROR	

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	-

Parameter Description

<audMode>(num)	
[1]	Audio mode 1: Standard mode optimized for the reference handset, that can be connected to the analog interface (see "HC25 Hardware Interface Description" for information on this handset). Note: The default parameters are determined for type approval and are not adjustable with AT commands.
2	Audio mode 2: Customer specific mode. This mode will be used for router applications.
3	Audio mode 3: Customer specific mode. This mode will be used for a user handset.
4	Audio mode 4: Customer specific mode. This mode will be used for a mono-headset.
5	Audio mode 5: Customer specific mode. This mode will be used for a speakerphone.
6	Audio mode 6: Customer specific mode. This mode will be used for a transparent application.

Notes

- Audio mode 1 will be active each time after module is powered up.
- The write command can be used during a voice call to switch back and forth between different modes. This allows the user, for example, to switch handsfree operation (speakerphone) on and off.
- After the sequence `AT^SNFTTY`=1 has been invoked the `AT^SNFS` read command does still indicate the last active audio mode.
- Value returned by the `AT^SNFS` read command is however no more valid if HC25 is operating in TTY/CTM mode after invoking the `AT^SNFTTY`=1 AT sequence.
- After switching back from TTY/CTM mode to the no-TTY/CTM mode the audio mode in use before activating TTY/CTM mode becomes back active.

15.8 AT^SNFTTY Signal TTY/CTM audio mode capability

HC25 offers an integrated implementation of CTM modem (Cellular Text Telephone Modems). The benefit of CTM is that text characters typed on a TTY device (Text Telephone Type-writer) can be transformed into special audio burst signals for reliable transmission via the existing speech channels of a cellular phone system. The internal CTM modem supports a baud rate of 45.45bps. An automatic recognition of TTY devices isn't supported. If CTM mode is activated, the ME will set the necessary bearer capability bit on outgoing (mobile originated) calls and incoming calls with this bearer capability bit set are accepted. The TE needs to decode the special audio burst signals.
If CTM mode is disabled, the ME will clear the bearer capability bit on mobile originated calls and incoming calls with the bearer capability bit set are rejected because the HC25 expects that CTM coded speech data cannot be decoded by the TE.
Designed to set the module's speech system into CTM mode, the `AT^SNFTTY` command allows a TTY device to be connected to the audio interfaces of HC25.
Related documents: Refer to the relevant standards, such as 3GPP TS 26.226 (ETSI TS 126 226) and 3GPP TS 26.231 (ETSI TS 126 231). 3GPP documentation can be retrieved, for example, from http://www.3gpp.org/specs/specs.htm. Application Note 22 "Using TTY/CTM equipment" supplies information needed to connect TTY/CTM equipment to the HC25.

Requirements for using TTY/CTM features:

- TTY/CTM functionality requires an own audio mode with all audio parameters set to their factory default. This will be reached by an own internal audio mode for TTY/CTM use case which will be activated by `AT^SNFTTY` write command.
  When TTY/CTM mode is activated the delivered audio mode from `AT^SNFS` read command is invalid.

Syntax

Test Command

```
AT^SNFTTY=?
```

Response(s)

```
^SNFTTY:  (list of supported <audioState>s)
OK
```

Read Command

```
AT^SNFTTY?
```

Response(s)

```
^SNFTTY: <audioState>
OK
```

Write Command

```
AT^SNFTTY=<audioState>
```

Response(s)

```
OK
ERROR
```

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	-

Parameter Description

`<audioState>`(num)	
0(P)	Audio path is in normal speech mode.
1	Audio path is in TTY/CTM mode.

Notes

- TTY/CTM mode 0 will be active each time after module is powered up.
- The `AT^SNFTTY`=1 write command has to be set before `ATD` invocation.

15.9 AT^SRTC Ring tone configuration

The AT^SRTC test command returns a list of ranges for parameter <event>, <number> and <volume>.

The AT^SRTC read command returns the current ring tone configuration parameter ring tone melody <number> and ring tone volume <volume> for the incoming <event>s voice call, fax call and SMS.

The AT^SRTC write command allows to configure parameter ring tone melody <number> and ring tone volume <volume> for ring tone events <event> voice call, fax call and SMS.

The AT^SRTC execution command starts the ring tone test using current settings for fax calls. Please call AT^SRTC execution command again to stop ring tone test.
The settings can be changed no matter whether or not the ME is ringing. The selected parameters are saved in the volatile RAM memory and, thus, to select again after each Power Down.

Syntax

Test Command

AT^SRTC=?

Response(s)

^SRTC:(list of supported <event>s) , (list of supported <number>s) , (list of supported <volume>s)
OK

Read Command

AT^SRTC?

Response(s)

^SRTC: 0, <number>, <volume>
^SRTC: 1, <number>, <volume>
^SRTC: 2, <number>, <volume>
OK

Exec Command

AT^SRTC

Response(s)

OK

Write Command

AT^SRTC=<event>, <number>, <volume>

Response(s)

OK
ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	-

Parameter Description

<event>(num)

Ring tone melodies for incoming Voice calls, Fax calls or SMS messages are supported. Melody will be played from the audio output.

0	Ringing alert for incoming Voice calls.
1	Ringing alert for incoming Fax calls.
2	Ringing alert for incoming SMS messages.

`<number>`(num)

Type or number of ring tone melody. You have a choice of ring tone melody or mute. Ring tone melody will be played from the audio output. `<number>`=0 is only intended for muting.

0(D)	No ringing alert melody.
1	Melody #1 active.
2	Melody #2 active.
3	Melody #3 active.
4	Melody #4 active.
5	Melody #5 active.
6	Melody #6 active.
7	Melody #7 active.
8	Melody #8 active.
9	Melody #9 active.

`<volume>`(num)

The volume of ring tone melodies varies from 0 dB to mute.

0(D)	Mute.
1	Volume level 1, set to -12dB.
2	Volume level 2, set to -8dB.
3	Volume level 3, set to -4dB.
4	Volume level 4, set to 0dB.

Note

- The ring tone factory setting are `AT^SRTC`=0,0,0 (ring tones for incoming voice call is muted), `AT^SRTC`=1,0,0 (ring tones for incoming fax call is muted) and `AT^SRTC`=2,0,0 (ring tones for incoming SMS is muted). To activate ring tones please use the write command. After applying a firmware update or a new start of module please activate ring tone again because it is stored in the volatile memory.
  When the incoming fax call event was configured before with `<number>`=0 it's possible to mute a running tone (for example during a incoming call) by calling of `AT^SRTC` execution command. Otherwise please call `AT^SRTC` execution command two times.

16. Hardware Related Commands

The AT commands described in this chapter are related to the hardware interface of the HC25. Further information regarding this interface is available in the "HC25 Hardware Interface Description"[2].

16.1 AT^SLED LED Feature

The AT^SLED command controls the LED function provided by the two status pins (STATUS0 and STATUS1) of the HC25. Each pin acts as a current sink and can be used to control a connected LED. The electrical specifications of the status pins and advice on how to install the LED circuit can be found in [2]. The LEDs indicate the states listed below:

LED connected to STATUS0 line:

- Lights steadily (if <mode>=1) or flashes (depending on <flash_period> if <mode>=2) when the ME is registered to the GSM network and either awake or in power saving state.
- Flashes at 1Hz and 50% duty cycle (0.5s on, 0.5s off) when the ME is awake and not registered to any network.
- Flashes at 0.25 Hz and appr. 50% duty cycle (2s on, 2s off) when the ME is in power saving state and not registered to any network.
  When the ME is in power saving state and not registered, the flashing frequency may be less than 0.25Hz and the duty cycle may vary, for example between 45% and 55%. These variations are due to transitions from awake state to power saving state which may occur at the beginning of an LED flashing period (eg. at the beginning of a 1Hz or 0.25Hz flashing period). In the worst case, the LED will indicate a transition from awake to power saving after 4s.
- Is off if the ME is not registered to the GSM network or if <mode>=0.
- While the STATUS0 signal is active the STATUS1 signal is inactive.

LED connected to STATUS1 line:

- Lights steadily (if <mode>=1) or flashes (depending on <flash_period> if <mode>=2) when the ME is registered to the UMTS network and either awake or in power saving state.
- Is off if the ME is not registered to the UMTS network or if <mode>=0.
- While the STATUS1 signal is active the STATUS0 signal is inactive.

Syntax

Test Command

AT^SLED=?

Response(s)

^SLED: (list of supported <mode>s), (range of supported <flash_period>s)
OK

Read Command

AT^SLED?

Response(s)

^SLED: <mode>[, <flash_period>]
OK

Write Command

AT^SLED=<mode>[, <flash_period>]

Response(s)

OK

Write Command	(Continued)
AT^SLED=<mode>[, <flash_period>]	
Response(s)	
ERROR +CME ERROR: <err>	

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	-

Parameter Description

<mode>(num)	
LED operating mode	
0(P)	LED feature is disabled.
1	LED lights steadily when the ME is registered to the network and either awake or in power saving state.
2	LED is flashing when the ME is registered to the network and either awake or in power saving state. The duration of flashing can be configured using the parameter <flash_period>.

<flash_period>(num)	
LED flash period	
1...10(P)...50	LED flash period (in milliseconds) if <mode>=2. LED off-time between flashing is approximately 4 seconds and is not configurable.

16.2 AT^SBV Battery/Supply Voltage

The AT^SBV execute command allows to monitor the supply (or battery) voltage of the module. The voltage is continuously measured at intervals depending on the operating mode of the RF interface. The duration of a measurement period ranges from 0.5s in TALK / DATA mode up to 50s when HC25 is in IDLE mode or Limited Service (deregistered). The displayed value is averaged over the last measuring period before the AT^SBV command was executed.

The measurement is related to the test points of BATT+ and GND, both accessible on the bottom of the module. Refer to [1] for information on the module's test points.

Syntax

Test Command

```
AT^SBV=?
```

Response(s)

```
OK
ERROR
+CME ERROR:
```

Exec Command

```
AT^SBV
```

Response(s)

```
^SBV: <value>
OK
ERROR
+CME ERROR:
```

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	-

Parameter Description

`<value>`(num)

Supply (or battery) voltage in mV

16.3 AT^SCTM Set critical operating temperature presentation mode or query temperature

Use this command to monitor the temperature range of the module. The write command enables or disables the presentation of URCs to report critical temperature limits.
CAUTION: During the first 15 seconds after start-up, the module operates in an automatic report mode: URCs can be always displayed regardless of the selected mode <n>.

Syntax

Test Command
AT^SCTM=?
Response(s)
^SCTM:(list of supported <n>s) OK

Read Command
AT^SCTM?
Response(s)
^SCTM: <n>, <m> OK ERROR +CME ERROR

Write Command
AT^SCTM=<n>
Response(s)
OK ERROR +CME ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	-

Unsolicited Result Code

URCs will be automatically sent to the TA when the temperature reaches or exceeds the critical level, or when it is back to normal.

^SCTM_B: <m>

for module (board) temperature

Command Description

The read command returns:

- the URC presentation mode
- information about the current temperature range of the module

Select <n> to enable or disable the presentation of the URCs. Please note that the setting will not be stored upon Power Down, i.e. after restart or reset, the default <n>=0 will be restored. To benefit from the URCs <n>=1 needs to be selected every time you reboot the GSM engine.

Parameter Description

<n>(num)	
0(&F)(P)	Presentation of URCs is disabled (except for <m> equal to -2 or +2).
1	Presentation of URCs is enabled.

<m>(num)	
-2	Below lowest temperature limit (causes immediate switch-off)
-1	Below low temperature alert limit
0	Normal operating temperature
1	Above upper temperature alert limit
2	Above uppermost temperature limit (causes immediate switch-off)

Notes

- Please refer to the "Hardware Interface Description" for specifications on critical temperature ranges.
- To avoid damage the module will shut down once the critical temperature is exceeded.
  The procedure is equivalent to the power-down initiated with AT^SMSO.
- URCs indicating the alert level "1" or "-1" are intended to enable the user to take appropriate precautions, such as protect the module from exposure to extreme conditions, or save or back up data etc. The presentation of "1" or "-1" URCs depends on the settings selected with the write command:
  If <n>=0: Presentation is enabled for 15 s time after the module was switched on. After 15 s operation, the presentation will be disabled, i.e. no URCs will be generated.
  If <n>= 1: Presentation of "1" or "-1" URCs is always enabled.
- Level "2" or "-2" URCs are followed by immediate shutdown. The presentation of these URCs is always enabled, i.e. they will be output even though the factory setting AT^SCTM=0 was never changed.
- If the temperature limit is exceeded while an emergency call is in progress the engine continues to measure the temperature and to deliver alert messages, but deactivates the shutdown functionality. Once the call is terminated full temperature control will be resumed. If the temperature is still out of range ME switches off immediately.

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.
^SCTM_B: -2	Alert: Module is below undertemperature limit and switches off.

EXAMPLE 2

URCs issued when the temperature is back to normal (URC is output once):

^SCTM_B: 0	Module back to normal temperature.

17. Miscellaneous Commands

The AT Commands described in this chapter are related to various areas.

17.1 ATS3 Set command line termination character

The ATS3 command determines the character recognized by the TA to terminate an incoming command line. It is also generated for result codes and information text, along with the ATS4 parameter.

Syntax

Read Command
ATS3?
Response(s)
<n> OK

Write Command
ATS3=<n>
Response(s)
OK ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	-	+	+	-

Parameter Description

<n>(num)
command line termination character 000...13(&F)...127

Note

- Using a value other than the default 13 may cause problems when entering commands.

17.2 ATS4 Set response formatting character

The ATS4 command determines the character generated by the TA for result code and information text, along with the ATS3 parameter .

Syntax

Read Command
ATS4?
Response(s)
<n> OK

Write Command
ATS4=<n>
Response(s)
OK ERROR

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
V.250	-	+	+	-

Parameter Description

<n>(num)
response formatting character 000...10(&F)...127

17.3 ATS5 Write command line editing character

Syntax

Read Command
`ATS5?`
Response(s)
`<n>` `OK`

Write Command
`ATS5=<n>`
Response(s)
`OK` `ERROR`

Reference(s)
V.250

PIN	USB0-MDM	USB0-APP	Last
-	+	+	-

Command Description

This parameter setting determines the character recognized by TA as a request to delete the immediately preceding character from the command line.

Parameter Description

`<n>`(num)

command line editing character

000...8(&F)...127

17.4 AT^SFDL Enter Firmware Download Mode

The AT^SFDL command allows the application manufacturer to download HC25 firmware into the module by starting the download process from the host application or a customer-designed download program. The download can be done over the USB interface.

For this purpose, the HC25 firmware update file must be available in the format *.USF. The file can be requested from Siemens. The firmware file 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 "Updating Firmware". An example for developing an appropriate download program is included.

The AT^SFDL execute command causes the module to enter the firmware download mode (this may take some milliseconds). After entering the download mode the module sends the start pattern HEX 0x01 ("ANSWER_OK") to the application to indicate its ready state. Next, the application shall start to send the records of the firmware file. Each record received on the module is acknowledged to the host application. Once all records are successfully received, the module shuts down automatically.

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.

Syntax

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

Exec Command
AT^SFDL
Response(s)
OK

Reference(s)	PIN	USB0-MDM	USB0-APP	Last
SIEMENS	-	+	+	+

18. Appendix

18.1 Restricted access to SIM data after SIM PIN authentication

The following commands can be used only after data from the SIM have been read successfully for the first time. Reading starts after successful SIM authentication has been performed, and may take up to 30 seconds depending on the SIM used. While the read process is in progress, an attempt to use any of the following commands will result in "+CME Error: 14" (SIM busy).

ø ... AT Command not available
- ... AT command accessible immediately after PIN entry has returned OK
+ ... AT command fully accessible after SIM PIN authentication has been completed

AT Command	Exec	Test	Read	Write
AT+CMGL	+	-	ø	+
AT+CMGR	ø	-	ø	+
AT+CSCA	ø	-	+	-
AT+CNUM	+	+	ø	ø
AT+CPBF	ø	+	ø	+
AT+CPBR	ø	+	ø	+
AT+CPBS	ø	+	+	+
AT+CPBW	ø	+	ø	+

18.2 Star-Hash (*#) Network Commands

The following command strings can be sent to the network via ATD and have to be terminated with a semicolon. The command strings are defined with GSM 2.30 [12].

Table 18.1: Star-Hash (*#) Command Overview

Star-Hash Code	Functionality	Response, also refer to Table 18.3
Phone Security		
*#06#	Query IMEI	<IMEI> OK
**04[2]*oldPin[2]*newPin[2]*new-Pin[2]#	Change SIM pwd	+CME ERROR: <err> / OK
**05[2]*unblKey[2]*newPin[2]*new-Pin[2]#	Change/Unblocking SIM pwd	+CME ERROR: <err> / OK
[*]03[ZZ]*oldPw*newPw*newPw#	Registration of net password	+CME ERROR: <err> / OK
Phone number presentation		
*#30#	Check status of CLIP (Calling Line Identification Presentation)	+CLIP : <n>,<m> OK (see AT+CLIP)
*#31#	Check status of CLIR (Calling Line Identification Restriction)	+CLIR : <n>,<m> OK (see AT+CLIR)
*31#<Phonenumber>[;]	Suppress CLIR	(see AT+CLIR)
#31#<Phonenumber>[;]	Activate CLIR	(see AT+CLIR)
*#76#	Check status of COLP (Connected Line Identification Presentation)	+COLP : 0,<m> OK (where <m> = active or not active)
*#77#	Check status of COLR (Connected Line Identification Restriction)	+COLR : 0,<m> OK (where <m> = active or not active)
Call forwarding		
(choice of *,#,*#,**,##)21*DN*BS#	Act/deact/int/reg/eras CFU	+CCFC : <status>, <class> [,...] (see: AT+CCFC)
(choice of *,#,*#,**,##)67*DN*BS#	Act/deact/int/reg/eras CF busy	see above
(choice of *,#,*#,**,##)61*DN*BS*T#	Act/deact/int/reg/eras CF no reply	see above
(choice of *,#,*#,**,##)62*DN*BS#	Act/deact/int/reg/eras CF no reach	see above
(choice of *,#,*#,**,##)002*DN*BS*T#	Act/deact/int/reg/eras CF all	see above
(choice of *,#,*#,**,##)004*DN*BS*T#	Act/deact/int/reg/eras CF all cond.	see above
Call waiting		
(choice of *,#,*#)43*BS#	Activation/deactivation/int WAIT	+CCWA : <status>, <class> [,...]. (Refer to AT+CCWA)
Call barring		
(choice of *,#,*#)33*Pw*BS#	Act/deact/int BAOC	+CLCK : <status>, <class> [, ...].(Refer to AT+CLCK)
(choice of *,#,*#)331*Pw*BS#	Act/deact/int BAOIC	see above
(choice of *,#,*#)332*Pw*BS#	Act/deact/int BAOIC exc.home	see above

Star-Hash Code	Functionality	Response, also refer to Table 18.3
(choice of *,#,*#)35*Pw*BS#	Act/deact/int. BAIC	see above
(choice of *,#,*#)351*Pw*BS#	Act/deact/int BAIC roaming	see above
#330*Pw*BS#	Deact. All Barring Services	see above
#333*Pw*BS#	Deact. All Outg.Barring Services	see above
#353*Pw*BS#	Deact. All Inc.Barring Services	see above
Call Hold / Multiparty		
C[C] in call	Call hold and multiparty	+CME ERROR: <err> / OK
USSD messages		
[C]...[C]#	Send USSD message	+CME ERROR: <err> / OK
C[C] (excluded 1[C])	Send USSD message	+CME ERROR: <err> / OK

Table 18.2: Abbreviations of Codes and Parameters used in Table 18.1

Abbreviation	Meaning	Value
ZZ	Type of supplementary services: Barring services All services	 330 Not specified
DN	Dialing number	String of digits 0-9
BS	Basic service equivalent to parameter class: Voice FAX SMS SMS+FAX Data circuit asynchron Data circuit synchron Dedicated PAD access Dedicated Packet access Data circuit asynchron+PAD Data circuit synchron+Packet Data circuit asynchron+synchron+Packet+PAD All Services	 11 13 16 12 25 24 27 26 21 22 20 --
T	Time in seconds	In contrast to AT+CCFC, parameter T has no default value. If T is not specified, an operator defined default or the last known value may be used, depending on the network operator.
PW	Password	--
C	Character of TE character set (e.g. asterics, hash or digit in case of USSD, or digits in case of held calls or multiparty calls)	--

Table 18.3: Star-Hash Command Response Parameters

Parameter	Meaning
<m>	Mode: 0 = not active, 1 = active
<n>	Unsolicited result code: 0 = presentation disabled, 1 = presentation enabled
<status>	Status: 0 = not active, 1 = active
<class>	Represents BS = basic service, refer to AT+CCFC, AT+CLCK

Parameter	Meaning
<fac>	Facility lock, refer to AT+CLCK
<reason>	Call forwarding reason

For exact specification of format and parameters for Star-Hash commands refer to GSM 02.04, Table 3.2 [11] and GSM 02.30, Annex C [12].

Table 18.4: Star-Hash Commands for Supplementary Services

Star-Hash Code	Abbreviations in Table 18.1	Functionality
*	act	Activate (except for CLIR, see list above)
**	reg	Register and activate
*#	int	Check status (interrogate)
#	deact	Deactivate (except for CLIR, see list above)
##	eras	Unregister and deactivate

18.3 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 18.5: 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
ATQ	+	ø	ø	ø
ATV	-	ø	ø	ø
ATX	+	ø	ø	ø
ATZ	+	ø	ø	ø
AT+CFUN	ø	-	-	-
AT+CMEE	-	-	-	-
AT+CSCS	ø	+	+	+
AT+GCAP	+	+	ø	ø
AT^SCFG	ø	-	-	-
AT^SMSO	-	-	ø	ø
AT^SUSB	ø	ø	-	-
Status Control Commands				
AT^SIND	ø	-	-	-
AT+CEER	+	+	ø	ø
AT+CPAS	-	-	ø	ø
AT+WS46	ø	-	-	-
Serial Interface Control Commands				
AT^SQPORT	-	-	-	ø
AT&C	+	ø	ø	ø
AT&D	+	ø	ø	ø
AT&S	-	ø	ø	ø
ATE	-	ø	ø	ø
Security Commands				
AT+CLCK	ø	+	ø	+
AT+CPIN	ø	-	-	-
AT+CPWD	ø	+	ø	+
AT^SCSL	ø	-	ø	-

AT Command	Exec	Test	Read	Write
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
Call related Commands				
ATA	+	Ø	Ø	Ø
ATD	±	Ø	Ø	Ø
ATD><mem><n>	+	Ø	Ø	Ø
ATD><n>	+	Ø	Ø	Ø
ATD><str>	+	Ø	Ø	Ø
ATH	+	Ø	Ø	Ø
AT+CHUP	-	-	Ø	Ø
ATS0	Ø	Ø	+	+
ATS6	Ø	Ø	+	+
ATS7	Ø	Ø	+	+
ATS8	Ø	Ø	+	+
ATS10	Ø	Ø	+	+
ATO	+	Ø	Ø	Ø
+++	-	Ø	Ø	Ø
AT+CLCC	+	+	Ø	Ø
AT+CR	Ø	+	+	+
AT+CRC	+	+	+	+
AT+CBST	Ø	+	+	+
AT+CRLP	Ø	+	+	+
ATP	+	Ø	Ø	Ø
ATT	+	Ø	Ø	Ø
AT+ES	Ø	-	±	±
AT+ESA	Ø	-	+	+
AT+CSTA	Ø	+	+	+
Network Service Commands				
AT+COPN	+	+	Ø	Ø
AT+COPS	+	+	+	+
AT^SOPS	Ø	+	Ø	Ø

AT Command	Exec	Test	Read	Write
AT+CREG	-	-	-	-
AT+CSQ	+	+	ø	ø
AT^SMONI	-	-	ø	ø
AT^SMONP	-	-	ø	ø
Supplementary Service Commands				
AT+CACM	ø	+	+	+
AT+CAMM	ø	+	+	+
AT+CAOC	+	+	+	+
AT+CCUG	ø	+	+	+
AT+CCFC	ø	+	ø	+
AT+CCWA	ø	+	+	+
AT+CHLD	ø	+	ø	+
AT+CLIP	ø	-	+	-
AT+CLIR	ø	+	+	+
AT+COLP	ø	+	+	+
AT+CPUC	ø	+	+	+
AT+CSSN	ø	+	+	+
AT+CUSD	ø	+	+	+
GPRS Commands				
AT+CGATT	ø	+	+	+
AT+CGACT	ø	+	+	+
AT+CGDATA	ø	+	ø	+
AT+CGDCONT	ø	+	+	+
AT+CGPADDR	+	+	ø	+
AT+CGQMIN	ø	+	+	+
AT+CGEQMIN	ø	+	+	+
AT+CGREG	ø	+	+	+
AT+CGQREQ	ø	+	+	+
AT+CGEQREQ	ø	+	+	+
AT+CGSMS	ø	+	+	+
AT+CGTFT	ø	+	+	+
ATD*99#	+	ø	ø	ø
AT^SGAUTH	ø	+	+	+
Short Message Service (SMS) Commands				
AT+CMGC	ø	+	ø	+
AT+CMGD	ø	+	ø	+
AT+CMGF	ø	+	+	+
AT+CMGL	+	+	ø	+
AT+CMGR	ø	+	ø	+
AT+CMGS	ø	+	ø	+

AT Command	Exec	Test	Read	Write
AT+CMGW	+	+	Ø	+
AT+CMMS	Ø	+	+	+
AT+CMSS	Ø	+	Ø	+
AT+CNMA	+	+	Ø	+
AT+CNMI	Ø	+	+	+
AT+CPMS	Ø	+	+	+
AT+CSCA	Ø	+	+	+
AT+CSCB	Ø	+	+	+
AT+CSMP	Ø	+	+	+
AT+CSMS	Ø	+	+	+
AT^SMGL	+	+	Ø	+
SIM related Commands				
AT+CRSM	Ø	-	Ø	-
AT+CSIM	Ø	-	Ø	-
AT^SCKS	Ø	-	-	-
SIM Application Toolkit (SAT) Commands				
AT^SSTA	Ø	-	-	-
^SSTN	Ø	Ø	Ø	Ø
AT^SSTGI	Ø	-	-	-
AT^SSTR	Ø	-	-	-
Phonebook Commands				
AT+CNUM	+	+	Ø	Ø
AT+CPBF	Ø	+	Ø	+
AT+CPBR	Ø	+	Ø	+
AT+CPBS	+	+	+	+
AT+CPBW	Ø	+	Ø	+
Audio Commands				
ATL	+	Ø	Ø	Ø
ATM	+	Ø	Ø	Ø
AT+CMUT	Ø	-	-	-
AT+VTS	Ø	-	Ø	-
AT^SNFI	Ø	-	-	-
AT^SNFO	Ø	-	-	-
AT^SNFS	Ø	-	-	-
AT^SNFTTY	Ø	-	-	-
AT^SRTC	-	-	-	-
Hardware Related Commands				
AT^SLED	Ø	-	-	-

AT Command	Exec	Test	Read	Write
AT^SBV	-	-	ø	ø
AT^SCTM	ø	-	-	-
Miscellaneous Commands				
ATS3	ø	ø	-	-
ATS4	ø	ø	-	-
ATS5	ø	ø	-	-
AT^SFDL	-	-	ø	ø

18.4 Factory Default Settings Restorable with AT&F

Table 18.6: 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>=0
AT+CSCS	<chset>="IRA"
Status Control Commands	
AT^SIND	<mode>=0
Serial Interface Control Commands	
AT&C	<value>=2
AT&D	<value>=2
AT&S	<value>=0
ATE	<value>=1
Call related Commands	
ATS0	<n>=000
ATS6	<n>=2
ATS7	<n>=050
ATS8	<n>=2
ATS10	<n>=014
AT+CR	<mode>=0
AT+CRC	<mode>=0
AT+CBST	<speed>=0, <name>=0, <ce>=1
AT+CRLP	<iws>=61, <mws>=61, <T1>=48, <N2>=6
Network Service Commands	
AT+COPS	<format>=0
AT+CREG	<n>=0
Supplementary Service Commands	
AT+CLIP	<n>=0
AT+CSSN	<n>=0, <m>=0
AT+CUSD	<n>=0
GPRS Commands	
AT+CGREG	<n>=0

AT Command	Factory Defaults
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
AT+CSMP	<dcs>=0, <pid>=0
AT+CSMS	<service>=0
SIM related Commands	
AT^SCKS	<mode>=0
Phonebook Commands	
AT+CPBS	<storage>="SM"
Hardware Related Commands	
AT^SCTM	<n>=0
Miscellaneous Commands	
ATS3	<n>=013
ATS4	<n>=010
ATS5	<n>=008

18.5 Summary of Unsolicited Result Codes (URC)

Table 18.7: Summary of Unsolicited Result Codes (URC)

AT Command	URC
Unsolicited Result Code Presentation	
	^SBC: Undervoltage
	^SBC: Overvoltage Warning
	^SBC: Overvoltage Shutdown
Status Control Commands	
AT^SIND	+CIEV: <indDescr>, <indValue>
AT^SIND	+CIEV: <indDescr>, <indValue>, <eonsOperator>, <servProvider>, <servProviderType>
AT^SIND	+CIEV: <indDescr>, <nitzUT>, <nitzTZ>, <nitzDST>
AT+CRC	RING
AT+CRC	+CRING: <type>
Network Service Commands	
AT+CREG	+CREG: <stat>
AT+CREG	+CREG: <stat>[, <lac>, <ci>]
Supplementary Service Commands	
AT+CAOC	+CCCM: <ccm>
AT+CCWA	+CCWA: <calling number>, <type of number>[, <class>], [, <CLI validity>]
AT+CLIP	+CLIP: <number>, <type>, , [, <alpha>][, <CLI validity>]
AT+COLP	+COLP: <number>, <type>[, <sub-number>][, <sub-type>][, <alpha>]
AT+CSSN	+CSSI: <code 1>
AT+CSSN	+CSSU: <code 2>
AT+CUSD	+CUSD: <m>[<str_urc>[<dcs>]]
GPRS Commands	
AT+CGREG	+CGREG: <stat>
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>
AT+CNMI	+CDSI: <mem3>, <index>

AT Command	URC
SIM related Commands	
AT^SCKS	^SCKS: <SimStatus>
AT^SCKS	^SCRD: <MCC>
SIM Application Toolkit (SAT) Commands	
^SSTN	^SSTN: <cmdType>
^SSTN	^SSTN: <cmdTerminateValue>
^SSTN	^SSTN: 254
^SSTN	^SSTN: 255
Hardware Related Commands	
AT^SCTM	^SCTM_B: <m>

18.6 AT Commands Supported Only on the Modem Interface

Table 18.8: AT Commands Supported Only on the Modem Interface

AT Command
Call related Commands
ATO
+++
GPRS Commands
AT+CGDATA
ATD*99#

18.7 Alphabetical List of AT Commands

Table 18.9: Alphabetical List of AT Commands

AT Command	Description	Section and Page
+++	Switch from data mode to command mode	Section 7.14, page 97
^SSTN	SAT Notification	Section 13.2, page 220
AT&C	Set Data Carrier Detect (DCD) Line mode	Section 4.2, page 61
AT&D	Set circuit Data Terminal Ready (DTR) function mode	Section 4.3, page 62
AT&F	Set all current parameters to manufacturer defaults	Section 2.1, page 26
AT&S	Set circuit Data Set Ready (DSR) function mode	Section 4.4, page 63
AT&V	Display current configuration	Section 2.2, page 27
AT+CACM	Accumulated call meter (ACM) reset or query	Section 9.1, page 126
AT+CAMM	Accumulated call meter maximum (ACMmax) set or query	Section 9.2, page 127
AT+CAOC	Advice of Charge information	Section 9.3, page 128
AT+CBST	Select bearer service type	Section 7.18, page 103
AT+CCFC	Call forwarding number and conditions control	Section 9.5, page 132
AT+CCUG	Closed User Group	Section 9.4, page 130
AT+CCWA	Call Waiting	Section 9.6, page 136
AT+CEER	Extended Error Report	Section 3.2, page 52
AT+CFUN	Set phone functionality	Section 2.7, page 32
AT+CGACT	PDP context activate or deactivate	Section 10.2, page 153
AT+CGATT	PS attach or detach	Section 10.1, page 152
AT+CGDATA	Enter data state	Section 10.3, page 155
AT+CGDCONT	Define PDP Context	Section 10.4, page 157
AT+CGEQMIN	3G Quality of Service Profile (Minimum acceptable)	Section 10.7, page 163
AT+CGEQREQ	3G Quality of Service Profile (Requested)	Section 10.10, page 172
AT+CGMI	Request manufacturer identification	Section 6.2, page 77
AT+CGMM	Request model identification	Section 6.4, page 78
AT+CGMR	Request revision identification of software status	Section 6.6, page 79
AT+CGPADDR	Show PDP address	Section 10.5, page 159
AT+CGQMIN	Quality of Service Profile (Minimum acceptable)	Section 10.6, page 160
AT+CGQREQ	Quality of Service Profile (Requested)	Section 10.9, page 169
AT+CGREG	GPRS Network Registration Status	Section 10.8, page 167
AT+CGSMS	Select service for MO SMS messages	Section 10.11, page 176
AT+CGSN	Request International Mobile Equipment Identity (IMEI)	Section 6.8, page 80
AT+CGTFT	Traffic Flow Template	Section 10.12, page 177
AT+CHLD	Call Hold and Multiparty	Section 9.7, page 139
AT+CHUP	Hang up call	Section 7.7, page 90
AT+CIMI	Request International Mobile Subscriber Identity (IMSI)	Section 6.10, page 81
AT+CLCC	List current calls of ME	Section 7.15, page 98
AT+CLCK	Facility lock	Section 5.1, page 65
AT+CLIP	Calling Line Identification Presentation	Section 9.8, page 142
AT+CLIR	Calling Line Identification Restriction	Section 9.9, page 144

AT Command	Description	Section and Page
AT+CMEE	Mobile Equipment Error Message Format	Section 2.8, page 33
AT+CMGC	Send an SMS command	Section 11.2, page 187
AT+CMGD	Delete short message	Section 11.3, page 188
AT+CMGF	Select SMS message format	Section 11.4, page 189
AT+CMGL	List SMS messages from preferred store	Section 11.5, page 190
AT+CMGR	Read SMS messages	Section 11.6, page 192
AT+CMGS	Send Short Message	Section 11.7, page 194
AT+CMGW	Write Short Messages to Memory	Section 11.8, page 195
AT+CMMS	More Messages to Send	Section 11.9, page 196
AT+CMSS	Send short messages from storage	Section 11.10, page 197
AT+CMUT	Mute control	Section 15.3, page 236
AT+CNMA	New Message Acknowledgement to ME/TE, only phase 2+	Section 11.11, page 198
AT+CNMI	New short Message Indication	Section 11.12, page 199
AT+CNUM	Read own numbers	Section 14.1, page 223
AT+COLP	Connected Line Identification Presentation	Section 9.10, page 145
AT+COPN	Read operator names	Section 8.1, page 112
AT+COPS	Operator Selection	Section 8.2, page 113
AT+CPAS	Mobile equipment activity status	Section 3.3, page 58
AT+CPBF	Find phonebook entries	Section 14.2, page 224
AT+CPBR	Read from phonebook	Section 14.3, page 227
AT+CPBS	Select phonebook memory storage	Section 14.4, page 230
AT+CPBW	Write into phonebook	Section 14.5, page 232
AT+CPIN	PIN Authentication	Section 5.2, page 69
AT+CPMS	Preferred SMS message storage	Section 11.13, page 202
AT+CPUC	Price per unit and currency table	Section 9.11, page 147
AT+CPWD	Change Password	Section 5.3, page 72
AT+CR	Service reporting control	Section 7.16, page 100
AT+CRC	Set Cellular Result Codes for incoming call indication	Section 7.17, page 101
AT+CREG	Network registration	Section 8.4, page 118
AT+CRLP	Select radio link protocol parameters for originated non-transparent data calls	Section 7.19, page 105
AT+CRSM	Restricted SIM Access	Section 12.1, page 212
AT+CSCA	SMS Service Center Address	Section 11.14, page 204
AT+CSCB	Select Cell Broadcast Message Indication	Section 11.15, page 205
AT+CSCS	Select TE character set	Section 2.9, page 37
AT+CSIM	Generic SIM Access	Section 12.2, page 214
AT+CSMP	Set SMS text Mode Parameters	Section 11.16, page 207
AT+CSMS	Select Message Service	Section 11.17, page 209
AT+CSQ	Signal quality	Section 8.5, page 121
AT+CSSN	Supplementary service notifications	Section 9.12, page 148
AT+CSTA	Select type of address	Section 7.24, page 111

AT Command	Description	Section and Page
AT+CUSD	Unstructured supplementary service data	Section 9.13, page 150
AT+ES	Synchronous Data Mode Configuration	Section 7.22, page 108
AT+ESA	Synchronous access mode configuration	Section 7.23, page 109
AT+GCAP	Request complete TA capabilities list	Section 2.10, page 38
AT+GMI	Request manufacturer identification	Section 6.3, page 77
AT+GMM	Request model identification	Section 6.5, page 78
AT+GMR	Request revision identification of software status	Section 6.7, page 79
AT+GSN	Request International Mobile Equipment Identity (IMEI)	Section 6.9, page 80
AT+VTS	DTMF and tone generation	Section 15.4, page 237
AT+WS46	Select wireless network	Section 3.4, page 59
AT^SBV	Battery/Supply Voltage	Section 16.2, page 250
AT^SCFG	Extended Configuration Settings	Section 2.11, page 39
AT^SCKS	Query SIM and Chip Card Holder Status	Section 12.3, page 216
AT^SCSL	Customer SIM Lock	Section 5.4, page 74
AT^SCTM	Set critical operating temperature presentation mode or query temperature	Section 16.3, page 251
AT^SFDL	Enter Firmware Download Mode	Section 17.4, page 256
AT^SGAUTH	Set type of authentication for PDP-IP connections	Section 10.14, page 181
AT^SIND	Extended Indicator Control	Section 3.1, page 47
AT^SLED	LED Feature	Section 16.1, page 248
AT^SMGL	List Short Messages from preferred store without setting status to REC READ	Section 11.18, page 211
AT^SMONI	Monitor idle mode	Section 8.6, page 122
AT^SMONP	Monitor neighbour cells	Section 8.7, page 124
AT^SMSO	Switch off mobile station	Section 2.12, page 42
AT^SNFI	Set microphone path parameters	Section 15.5, page 238
AT^SNFO	Set audio output parameter (loudspeaker path)	Section 15.6, page 240
AT^SNFS	Select audio hardware set	Section 15.7, page 242
AT^SNFTTY	Signal TTY/CTM audio mode capability	Section 15.8, page 244
AT^SOPS	Extended Operator Selection	Section 8.3, page 116
AT^SQPORT	Query Port Type	Section 4.1, page 60
AT^SRTC	Ring tone configuration	Section 15.9, page 246
AT^SSTA	SAT Interface Activation	Section 13.1, page 218
AT^SSTGI	SAT Get Information	Section 13.3, page 221
AT^SSTR	SAT Response	Section 13.4, page 222
AT^SUSB	USB Configuration	Section 2.13, page 43
ATA	Answer a call	Section 7.1, page 82
ATD	Mobile originated call to specified number	Section 7.2, page 83
ATD*99#	Request GPRS service	Section 10.13, page 180
ATD><mem><n>	Mobile originated call using specific memory and index number	Section 7.3, page 85
ATD><n>	Mobile originated call from active memory using index number	Section 7.4, page 87

AT Command	Description	Section and Page
ATD><str>	Mobile originated call from active memory using corre-sponding field	Section 7.5, page 88
ATE	Enable command echo	Section 4.5, page 64
ATH	Disconnect existing data connection	Section 7.6, page 89
ATI	Display product identification information	Section 6.1, page 76
ATL	Set monitor speaker loudness	Section 15.1, page 235
ATM	Set monitor speaker mode	Section 15.2, page 235
ATO	Switch from command mode to data mode	Section 7.13, page 96
ATP	Select pulse dialing	Section 7.20, page 107
ATQ	Set result code presentation mode	Section 2.3, page 28
ATS0	Set number of rings before automatically answering a call	Section 7.8, page 91
ATS10	Set disconnect delay after indicating the absence of data carrier	Section 7.12, page 95
ATS3	Set command line termination character	Section 17.1, page 253
ATS4	Set response formatting character	Section 17.2, page 254
ATS5	Write command line editing character	Section 17.3, page 255
ATS6	Set pause before blind dialing	Section 7.9, page 92
ATS7	Set number of seconds to wait for connection completion	Section 7.10, page 93
ATS8	Set number of seconds to wait for comma dialing modifier	Section 7.11, page 94
ATT	Select tone dialing	Section 7.21, page 107
ATV	Set result code format mode	Section 2.4, page 29
ATX	Set CONNECT result code format	Section 2.5, page 30
ATZ	Reset all current parameters to the default configuration	Section 2.6, page 31