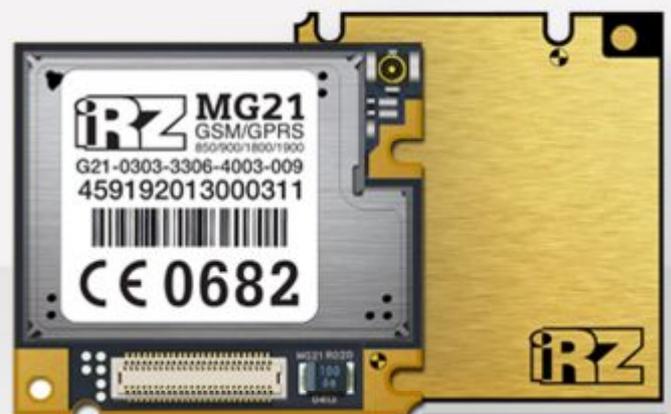


 **AT COMMAND SET**  
**Wireless module**  
**iRZ MG21**



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## 1. Introduction

This document contain the AT command set for iRZ MG21 module. All commands are divided into relevant sections (chapters).

They are:

- Configuration Commands;
- Status Control and Identification Commands;
- Call related Commands;
- Network Service Commands;
- Internet Service and GPRS Commands;
- Fax Commands;
- SMS Commands;
- SIM related Commands;
- Phonebook Commands;
- Audio Commands;
- Hardware related Commands;
- Security Commands;
- Miscellaneous Commands.



## 2. Configuration Commands



The AT Commands described in this chapter used to configure MG21, serial interface, display current configuration and other functions.

Display	Configure	Configure serial interface
AT&V	AT&F	AT\Q
AT+GCAP	AT&W	AT&C
AT+CSCS	ATQ	AT&D
AT+CFGRI	ATV	AT&S
	ATX	ATE
	ATZ	AT+CMUX
	AT+CEXTBUT	AT+ICF
	AT+CEXTHS	AT+IFC
	AT+CFUN	AT+ILRP
	AT+CHF	AT+ILRR
	AT+CIURC	AT+IPR
	AT+CLPORT	
	AT+CMEE	
	AT+CMTE	
	AT+CPOWD	
	AT+CSCLK	
	AT+CSDT	
	AT+CSMINS	
	AT+EXUNSOL	
	AT^SCFG	
	AT^SM20	
	AT^SMSO	



## 2.1. AT&V Display current configuration

**AT&V** returns the current parameter setting. The configuration varies depending on whether or not PIN authentication has been done and whether or not Multiplex mode is enabled (see [AT+CMUX](#)).

### Syntax

Exec Command		Response(s)															
AT&V[<value>]		ACTIVE PROFILE: ... OK															
<table border="1"> <tr> <td>PIN</td> <td>ASC0</td> <td>MUX1</td> <td>MUX2</td> <td>MUX3</td> <td></td> <td>Last</td> </tr> <tr> <td>-</td> <td>+</td> <td>+</td> <td>±</td> <td>±</td> <td>-</td> <td>-</td> </tr> </table>		PIN	ASC0	MUX1	MUX2	MUX3		Last	-	+	+	±	±	-	-	Reference(s)	
PIN	ASC0	MUX1	MUX2	MUX3		Last											
-	+	+	±	±	-	-											
		V.250															

### Parameter Description

<value> <sup>(num)</sup>	
[0]	Profile number

### Notes

- The parameters of [AT^SMGO](#) can only be displayed after the SMS 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 read the parameter will result in empty values.
- The parameter of [AT+CSDH](#) will only be displayed in SMS PDU mode, see [AT+CMGF](#).

#### 2.1.1. AT&V responses

The following tables show four different kinds of responses depending on whether or not the PIN is entered and whether or not the Multiplex mode is enabled (see [AT+CMUX](#)).

Table: Current configuration on ASC0 / MUX channel 1 (example)

PIN authentication done	No PIN authentication
ACTIVE PROFILE: E1 Q0 V1 X4 &C1 &D2 &S0 \Q0 S0:000 S3:013 S4:010 S5:008 S6:000 S7:060 S8:000 S10:002 S18:000 +CBST: 7,0,1 +CRLP: 61,61,78,6 +CR: 0	ACTIVE PROFILE: E1 Q0 V1 X4 &C1 &D2 &S0 \Q0 S0:000 S3:013 S4:010 S5:008 S6:000 S7:060 S8:000 S10:002 S18:000 +CBST: 7,0,1 +CRLP: 61,61,78,6 +CR: 0



<pre>+FCLASS: 0 +CRC: 0 +CMGF: 1 +CSDH: 0 +CNMI: 0,0,0,0,1 +ILRR: 0 +IPR: 57600 +CME: 2 ^SMGO: 0,0 +CSMS: 0,1,1,1 ^SACM: 0,"000000","000000" ^SLCC: 0 ^SCK: 0,1 ^SSET: 0 +CREG: 0,1 +CLIP: 0,2 +CAOC: 0 +COPS: 0,0,"operator" +CGSMS: 3 OK</pre>	<pre>+FCLASS: 0 +ILRR: 0 +IPR: 57600 +CME: 2 ^SCK: 0,1 ^SSET: 0 OK</pre>
--	--

Table: Current configuration on MUX channel 2 and 3 (example)

PIN authentication done	No PIN authentication
<pre>ACTIVE PROFILE: E1 Q0 V1 X4 &amp;C1 &amp;D0 &amp;S0 \Q0 S0:000 S3:013 S4:010 S5:008 +CR: 0 +CRC: 0 +CMGF: 1 +CSDH: 0 +CNMI: 0,0,0,0,1 +ILRR: 0 +IPR: 57600 +CME: 2 ^SMGO: 0,0 +CSMS: 0,1,1,1 ^SACM: 0,"000000","000000" ^SLCC: 0 ^SCK: 0,1 ^SSET: 0 +CREG: 0,1 +CLIP: 0,2 +CAOC: 0 +COPS: 0,0,"operator" +CGSMS: 3 OK</pre>	<pre>ACTIVE PROFILE: E1 Q0 V1 X4 &amp;C1 &amp;D0 &amp;S0 \Q0 S0:000 S3:013 S4:010 S5:008 +CR: 0 +FCLASS: 0 +ILRR: 0 +IPR: 57600 +CME: 2 ^SCK: 0,1 ^SSET: 0 OK</pre>



## 2.2. AT+GCAP Capabilities List

**AT+GCAP** displays a list of basic capabilities supported by the MG21. This allows the TE to determine which groups of extended-syntax AT commands can be used with the ME.

### Syntax

Test Command

AT+GCAP=?

Response(s)

OK

Exec Command

AT+GCAP

Response(s)

+GCAP: <name>

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

Reference(s)

V.250

### Parameter Description

<name><sup>(str)</sup>

e.g. +CGSM, +FCLASS



## 2.3. AT+CSCS Character Set

**AT+CSCS** write command informs the MG21 which character set is used by the TE. This enables the ME to convert character strings correctly between TE and ME character sets.

### 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

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 🔔 Last

- + + + + - -

Reference(s)

GSM 07.07, GSM 11.11

### Parameter Description

<chset><sup>(str)</sup>

“GSM”<sup>(i(&F)(P))</sup>

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 in the range 0000 to FFFF; e.g. "004100620063" equates to three 16-bit characters with decimal values 65, 98 and 99.



## 2.4. AT+CFGRI Indicate RI When Using URC

### Syntax

Read Command

AT+CFGRI?

Response(s)

+CFGRI: <status>

OK

Write Command

AT+CFGRI=[<status>]

Response(s)

OK

ERROR

### Parameter Description

<status><sup>(num)</sup>

0                      On

1                      Off



## 2.5. AT&F Reset AT Command Settings to Factory Default Values

AT&F resets AT command settings to their factory default values.

Every ongoing or incoming call will be terminated.

### Syntax

Exec Command							
AT&F[<value>]							
Response(s)							
OK							
PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last	Reference(s)
-	+	+	+	+	-	-	V.250

### Parameter Description

<value> <sup>(num)</sup>	
[0]	Reset parameters in Section “Factory Default Settings Restorable with AT&F” (see below) to their factory default values

### 2.5.1. Factory Default Settings Restorable with AT&F

Table: Factory Default Settings

AT Command	Factory Defaults
Configuration Commands	
ATQ	<n>=0
ATV	<value>=1
ATX	<value>=4
AT+CFUN	<fun>=1
AT+CMEE	<errMode>0=
AT+CSCS	<chset>="GSM"
AT^SM20	<CallMode>=1, <CmgwMode>=1
ATQ	<n>=0
AT&C	<value>=1
AT&D	<value>=2
AT&S	<value>=0
ATE	<value>=1
AT+ILRR	<value>=0



Table: Factory Default Settings

AT Command	Factory Defaults
Status Control and Identification Commands	
AT+CMER	<mode>=0, <keyp>=0, <disp>=0, <ind>=0, <bfr>=0
AT+CIND	<mode>=1
ATS18	<n>=0
Call related Commands	
ATS0	<n>=000
ATS7	<n>=060
ATS10	<n>=002
AT+CBST	<speed>=7, <name>=0, <ce>=1
AT+CRLP	<iws>=61, <mws>=61, <T1>=78, <N2>=6
AT^SLCC	<n>=0
AT+CR	<mode>=0
AT+CRC	<mode>=0
Network Service Commands	
AT+COPS	<format>=0
AT+CREG	<n>=0
AT^SALS	<view>=0, <line>=1
AT^SACM	<n>=0
AT+CLIP	<n>=0
AT+CSSN	<n>=0, <m>=0
AT+CUUSD	<ussdMode>=0
Internet Service and GPRS Commands	
AT+CGAUTO	<n>=3
AT+CGREG	<n>=0
AT+CGSMS	<service>=3
AT^SGAUTH	<auth>=000
ATS0	<n>=000
Fax Commands	
AT+FCLASS	<n>=0
SMS Commands	
AT+CMGF	<mode>=0
AT+CNMI	<mode>=0, <mt>=0, <bm>=0, <ds>=0, <bfr>=1
AT+CSCB	<mode>=0, <mids>=" ", <dcss>=" "
AT+CSDH	<show>=0
AT+CSMP	<fo>=17, <vp>=167, <dc>=0, <pid>=0
AT+CSMS	<service>=0
AT^SMGO	<n>=0
AT^SSCONF	<mode>=0
AT^SSDA	<da>=0
AT^SSMSS	<seq>=0



Table: Factory Default Settings

AT Command	Factory Defaults
SIM related Commands	
AT^SCKS	<mode>=0
AT^SSET	<n>=0
Phonebook Commands	
AT+CPBS	<storage>="SM"
AT^SPBS	<internal-counter>=0
Audio Commands	
AT+VTD	<duration>=1
Hardware related Commands	
AT^SCTM	<Urc>=0, <tempCtrl>=0
AT^SSPI	<connectionState>=0, <StopStartPeriod>=0
Miscellaneous Commands	
ATS3	<n>=013
ATS4	<n>=010
ATS5	<n>=008



## 2.6. AT&W Store AT Command Settings to User Defined Profile

**AT&W** stores the current AT command settings to a user defined profile in non-volatile memory of MG21. The AT command settings will automatically be restored from the user defined profile during power-up or if **ATZ** is used. **AT&F** restores AT command factory default settings. Hence, until first use of **AT&W**, **ATZ** works as **AT&F**.

### Syntax

Exec Command	
AT&W[<value>]	
Response(s)	
OK ERROR +CME ERROR: <err>	
PIN ASC0 MUX1 MUX2 MUX3  Last	Reference(s)
- + + + + - -	V.250

### Parameter Description

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



## 2.7. ATQ Result Code Presentation Mode

ATQ controls if the MG21 transmits any result code to the TE. Other information text transmitted as response is not affected.

### Syntax

Exec Command						
ATQ[<n>]						
Response(s)						
If <n>=0:						
OK						
If <n>=1:						
(none)						
PIN	ASC0	MUX1	MUX2	MUX3		Last
-	+	+	+	+	-	-
Reference(s)						V.250

### Parameter Description

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

Result Code Presentation Mode.

It is not recommended to change this value.

- |                         |  |
|-------------------------|--|
| [0] <sup>(&amp;F)</sup> | ME transmits result code.                        |
| 1                       | Result codes are suppressed and not transmitted. |



## 2.8. ATV Result code format mode

This command determines the contents of header and trailer transmitted with AT command result codes and information responses. Possible responses are described in Section "Verbose and numeric result codes" (see below).

### Syntax

Exec Command	
ATV[<value>]	
Response(s)	
OK ERROR	
PIN	ASC0
MUX1	MUX2
MUX3	🔔 Last
-	+
+	+
+	+
+	-
-	-
Reference(s)	
V.250	

### Parameter Description

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



### 2.8.1. 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
NO ANSWER	8	no answer
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



## 2.9. ATX CONNECT Result Code Format

**ATX** determines whether or not the MG21 transmits particular result codes to the TE. It also controls whether or not the ME verifies the presence of a dial tone when it begins dialing, and if engaged tone (busy signal) detection is enabled.

### Syntax

Exec Command						
ATX[<value>]						
Response(s)						
OK						
ERROR						
PIN	ASC0	MUX1	MUX2	MUX3		Last
-	+	+	+	+	-	-
Reference(s)						V.250

### Parameter Description

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



## 2.10. ATZ Restore AT Command Settings from User Defined Profile

First [ATZ](#) resets the AT command settings to their factory default values, similar to [AT&F](#). Afterwards the AT command settings are restored from a user defined profile in non-volatile memory of MG21, if one was stored with [AT&W](#) before. Any additional AT command on the same command line may be ignored. A delay of 300 ms is required before next AT command is sent.

If a connection is in progress, it will be terminated.

### Syntax

Exec Command							
ATZ[<value>]							
Response(s)							
OK							
PIN	ASC0	MUX1	MUX2	MUX3	☺	Last	Reference(s)
-	+	+	+	+	-	-	V.250

### Parameter Description

<value> <sup>(num){&amp;W}{&amp;V}</sup>	
[0]	User Profile Number



## 2.11. AT+CEXTBUT Headset Button Status Reporting

### Syntax

Test Command

AT+CEXTBUT=?

Response(s)

+CEXTBUT: (<mode>s)  
OK

Read Command

AT+CEXTBUT?

Response(s)

+CEXTBUT: <mode>,<headset button press>  
OK

Write Command

AT+CEXTBUT=<mode>

Response(s)

OK  
ERROR  
If error is related to ME functionality:  
+CME ERROR: <err>

### Unsolicited result code

+CEXTBUT: <mode>,<headset button press>

### Parameter Description

<mode><sup>(num)</sup>

a numeric parameter which indicates whether an unsolicited event code (indicating whether the headset button has been pressed) should be sent to the terminal.

0	not send unsolicited event code
1	send unsolicited event code



<headset attach><sup>(num)</sup>

a numeric parameter which indicates whether a headset button has been pressed or not

0                      not pressed

1                      pressed

**Note**

- For this command, please refer to actual model.



## 2.12. AT+CEXTHS External Headset Jack Control

### Syntax

Test Command

```
AT+CEXTHS=?
```

Response(s)

```
+CEXTHS: (<mode>s)  
OK
```

Read Command

```
AT+CEXTHS?
```

Response(s)

```
+CEXTHS: <mode>,<headset attach>  
OK
```

Write Command

```
AT+CEXTHS=<mode>
```

Response(s)

```
OK  
ERROR  
If error is related to ME functionality:  
+CME ERROR: <err>
```

### Unsolicited result code:

```
+CEXTHS: <mode>,<headset attach>
```

### Parameter Description

<view><sup>(num)</sup>

a numeric parameter which indicates whether an unsolicited event code (indicating whether the headset has been attached/detached) should be sent to the terminal.

0	not send unsolicited event code
1	send unsolicited event code

<headset attach><sup>(num)</sup>

a numeric parameter which indicates whether a headset has been attached or not

0	not attached
1	attached



### Note

- For this command, please refer to actual model.

## 2.13. AT+CFUN      Functionality Level

**AT+CFUN** controls the MG21's functionality level. It can be used to reset the ME, to choose one of the power save (SLEEP) modes or to return to full functionality.

Intended for power saving, SLEEP mode usage reduces the functionality of the ME to a minimum and thus minimizes the current consumption. Further information, particularly power supply ratings during the various operating modes and the timing of hardware signals in SLEEP mode can be found in the "Hardware Interface Description".

Power save (SLEEP) modes fall in two categories:

- NON-CYCLIC SLEEP mode selectable with **<fun>=0**
- and CYCLIC SLEEP modes selectable with **<fun>= 7 or 9**.

NON-CYCLIC SLEEP mode permanently blocks the serial interface. The benefit of CYCLIC SLEEP mode is that the serial interface remains accessible and that, in intermittent wake-up periods, characters can be sent or received without terminating the selected mode. This allows the ME to wake up for the duration of an event and, afterwards, to resume power saving. By setting/resetting the CTS signal the ME indicates to the application whether or not the UART is active. A summary of all SLEEP modes and the different ways of waking up the module can be found in Section "Wake up the ME from SLEEP mode" (see below).

For NON-CYCLIC and CYCLIC SLEEP mode both the ME and the application must be configured to use hardware flow control. The default setting of hardware flow control is **AT+Q0** which must be altered to **AT+Q3**. For use after restart you are advised to add it to the user profile saved with **AT+W**.

**AT+CFUN** test command returns the values of the supported parameters.

**AT+CFUN** read command returns the current functionality value.

**AT+CFUN** write command can be used to reset the ME, to choose one of the SLEEP modes or to return to full functionality.

### Syntax

Test Command

**AT+CFUN=?**

Response(s)

**+CFUN:** (list of supported **<fun>s**) , (list of supported **<rst>s**)

OK



Read Command	
AT+CFUN?	
Response(s)	
+CFUN: <fun> OK	
Write Command	
AT+CFUN=[<fun>[, <rst>]]	
Response(s)	
OK ERROR +CME ERROR: <err>	
PIN ASC0 MUX1 MUX2 MUX3  Last	Reference(s)
- + ± ± ± + -	GSM 07.07

### ***Unsolicited Result Code***

^SYSSTART

Indicates that the ME has been started and is ready to operate. If autobauding is active ([AT+IPR=0](#)) the URC is not generated.



## Parameter Description

<fun><sup>(num)</sup>

- 0 NON-CYCLIC SLEEP mode:  
In this mode, the AT interface is not accessible. Consequently, after setting <fun>=0, do not send further characters. Otherwise these characters remain in the input buffer and may delay the output of an unsolicited result code.  
The first wake-up event stops power saving and takes the ME back to full functionality level <fun>=1.
- [1]<sup>(&F)(P)</sup> Full functionality (no power saving).  
If the ME is in one of the CYCLIC SLEEP modes you can issue [AT+CFUN=1](#) to stop power saving and return to full functionality.  
Keep in mind that, unlike the reset command described below, this action does not restart the ME but only changes the level of functionality. See parameter <rst> for details on the reset.
- 7 CYCLIC SLEEP mode:  
In this mode, the serial interface is shortly enabled while CTS is active. If characters are recognized on the serial interface, the ME stays active for 2 seconds after the last character was sent or received.  
The ME exits SLEEP mode only, if [AT+CFUN=1](#) is entered.
- 9 CYCLIC SLEEP mode:  
In this mode, the serial interface is shortly enabled while CTS is active. If characters are recognized on the serial interface, the ME stays active after the last character was sent or received for at least the time, which can be configured by [AT^SCFG="PowerSaver/Mode9/Timeout",<psm9to>](#) (temporary wakeup).  
In contrast to SLEEP mode 7 assertion of RTS can also be used to temporarily wake up the ME. In this case too, activity time is at least the time set with [AT^SCFG="PowerSaver/Mode9/Timeout",<psm9to>](#). RTS can be activated either from ASC0.  
The ME exits SLEEP mode only, if [AT+CFUN=1](#) is entered.



<rst><sup>(num)</sup>

The parameter can only be used if the serial interface is enabled.

Due to the command syntax, you need to enter parameter <fun>, followed by <rst>, where <fun> is only a placeholder and has no effect. See examples below.

- |     |  |
|-----|--|
| [0] | Placeholder for <fun> as stated above.   |
| 1   | ME resets and restarts to full functionality. After reset and restart, PIN1 authentication is necessary (AT+CPIN). |

### Notes

- The settings made with AT+CFUN apply to serial interface ASC0.
- CYCLIC SLEEP mode cannot be activated or resumed as long as data is buffered in one of the output buffers of the ME (ASC0). Therefore, ensure that the following requirements be met:
  - If hardware flow control is set in the ME (ATQ3), the host must also use hardware flow control.
- In Multiplex mode, the CFUN profile is shared by all multiplexer channels.
- If the ME is in Multiplexer mode, it is not recommended to activate SLEEP mode with AT+CFUN=<fun>. The best approach to properly control SLEEP mode in this case is to issue the PSC messages described in Multiplexer User's Guide.
- While a circuit-switched call is in progress, <fun>=7 or 9 can be activated without terminating the call. However, setting <fun>=0 during a circuit-switched call immediately disconnects this call.
- Power saving works properly only when PIN authentication has been done. If you attempt to activate power saving while the SIM card is not inserted or the PIN is not correctly entered, the selected <fun> level will be set, though power saving does not take effect. Furthermore, in order to accept incoming calls, SMS or network related URCs in SLEEP mode the ME must be registered when it enters the SLEEP mode.
- To check whether power saving is on, you can query the status with the read command AT+CFUN? only if the module is in full functionality mode or in CYCLIC SLEEP mode.
- Recommendation: In NON-CYCLIC SLEEP mode, you can set an RTC alarm to wake up the ME and return to full functionality. This is a useful approach because, in this mode, the AT interface is not accessible.



## Examples

### EXAMPLE 1

To check the level of functionality use the read command:

```
AT+CFUN?  
+CFUN: 1 Default mode after ME was restarted
```

Remember that the AT interface is not accessible in NON-CYCLIC SLEEP mode. The read command is only useful when the ME is set to full functionality or CYCLIC SLEEP mode.

```
AT+CFUN?  
+CFUN: 9 CYCLIC SLEEP mode
```

### EXAMPLE 2

To set the ME to NON-CYCLIC SLEEP mode enter

```
AT+CFUN=0  
OK
```

When, for example, an SMS is being received and indicated by an unsolicited result code (URC), the ME wakes up to full operation.

```
+CMTI: "SM",5 Note that the URC used in this example will appear only, if AT+CNMI=1,1  
was configured before.
```

After this, you may want to verify the operating status:

```
AT+CFUN?  
+CFUN: 1 Indicates that ME has entered full functionality mode.
```

### EXAMPLE 3

To stop CYCLIC SLEEP mode and return to full functionality:

```
AT+CFUN?  
+CFUN: 9  
OK  
AT+CFUN=1  
OK
```

Remember that this approach is not applicable to the NON-CYCLIC SLEEP mode (since the serial interface is disabled). The NON-CYCLIC SLEEP mode ends with the first wake-up event.

### EXAMPLE 4

To reset and restart the ME:

```
AT+CFUN=1,1 or alternatively, AT+CFUN=0,1 or 7,1 or 9,1  
OK
```

```
^SYSSTART The ^SYSSTART URC confirms that the ME has been rebooted. Note that  
^SYSSTART appears only if AT+IPR ≠ 0. Remember to enter the SIM PIN  
after restart.
```



### 2.13.1. Wake up the ME from SLEEP mode

A wake-up event is any event that causes the ME to draw more current. Depending on the selected mode, the wake-up event either switches the SLEEP mode off and takes the ME back to full functionality `AT+CFUN=1`, or activates the ME temporarily without terminating the selected SLEEP mode.

Definitions of the state transitions described in Table “Wake-up events in NON-CYCLIC and CYCLIC SLEEP modes”

Quit: ME exits SLEEP mode.

Temporary: ME becomes active temporarily for the duration of the event and the mode-specific follow-up time after the last character was sent or received on the serial interface.

No effect: Event is not relevant in the selected SLEEP mode. The ME does not wake up.

Table: Wake-up events in NON-CYCLIC and CYCLIC SLEEP modes

Event	Selected mode: <fun>=0	Selected mode: <fun>=7 or 9
Ignition line	No effect	No effect
RTS0 or RTS1 activation	Quit	Mode 7: No effect (RTS is only used for flow control) Mode 9: Temporary
Unsolicited Result Code (URC)	Quit	Temporary
Incoming voice or data call	Quit	Temporary
Any AT command (incl. outgoing SMS, voice or data call)	Not possible (UART disabled)	Temporary
Incoming SMS ( <code>AT+CNMI</code> is set to 0,0 (this is the default setting))	No effect	No effect
Incoming SMS ( <code>AT+CNMI</code> is set to 1,1)	Quit	Temporary
GPRS data transfer	Not possible (UART disabled)	Temporary
RTC alarm ( <code>AT+CALA</code> )	Quit	Temporary
<code>AT+CFUN=1</code>	Not possible (UART disabled)	Quit



## 2.14. AT+CHF Configure Hands Free Operation

### Syntax

Test Command

```
AT+CHF=?
```

Response(s)

```
+CHF: (0-1),(0-1)  
OK
```

Read Command

```
AT+CHF?
```

Response(s)

```
+CHF: <ind>,<state>  
OK
```

Write Command

```
AT+CHF=[<ind>[,<state>]]
```

Response(s)

```
OK  
ERROR  
If error is related to ME functionality:  
CME ERROR: <err>
```

### Parameter Description

<ind><sup>(num)</sup>

0	Unsolicited result code disabled
1	Unsolicited result code enabled (non-volatile)

<state><sup>(num)</sup>

0	Hands free operation disabled
1	Hands free operation enabled (volatile)

### Note

- For this command, please refer to actual model.



## 2.15. AT+CIURC      Enable Or Disable Initial URC Presentation

### Syntax

Test Command

```
AT+CIURC=?
```

Response(s)

```
+CIURC: (0,1)  
OK
```

Read Command

```
AT+CIURC?
```

Response(s)

```
+CIURC:<mode>  
OK
```

Write Command

```
AT+CIURC=[<mode>]
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<view><sup>(num)</sup>

0	disable URC presentation.
1	enable URC presentation

### Notes

- When module power on and initialization procedure is over.
- URC “Call Ready” will be presented if <mode> is 1.



## 2.16. AT+CLPORT Set Local Port

### Syntax

Test Command

```
AT+CLPORT=?
```

Response(s)

```
+CLPORT: (list of supported <port>s)  
OK
```

Read Command

```
AT+CLPORT?
```

Response(s)

```
TCP: <port>  
UDP: <port>  
OK
```

Write Command

```
AT+CLPORT=<mode>,<port>
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<mode><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the connection type

“TCP”                    TCP local port

“UDP”                    UDP local port

<port><sup>(num)</sup>

0-65535                    a numeric parameter which indicates the local port

0 is default value, it can be dynamically allocated a port.

### Note

- This command will be effective only in single connection mode (+CIPMUX=0) and when module as a Client



## 2.17. AT+CMEE Error Message Format

**AT+CMEE** controls the format of error result codes that indicates errors related to MG21 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 "General "CME ERROR" Codes (GSM 07.07)", Table "General "CME ERROR" Codes (proprietary)", Table "GPRS related "CME ERROR" Codes (GSM 07.07)" and Table "SMS related "CMS ERROR" Codes (GSM 07.05)" (see below).

In multiplex mode (refer **AT+CMUX**) the setting applies only to the logical channel where selected. The setting on the other channels may differ.

### Syntax

Test Command

AT+CMEE=?

Response(s)

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

Read Command

AT+CMEE?

Response(s)

+CMEE: <errMode>  
OK

Write Command

AT+CMEE=<errMode>

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + - -

Reference(s)

GSM 07.07

### Parameter Description

<errMode><sup>(num)(&v)(&v)</sup>

- |                          |   |
|--------------------------|---|
| 0 <sup>(&amp;F)(D)</sup> | Disable result code, i.e. only "ERROR" will be displayed. |
| 1                        | Enable error result code with numeric values.             |
| 2                        | Enable error result code with verbose (string) values.    |



### Example

To obtain enhanced error messages it is recommended to choose `<errMode>=2`.

```
AT+CMEE=2  
OK
```

## 2.17.1. CME/CMS Error Code Overview

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

<err> Code	Text (if <code>AT+CMEE=2</code> )
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
48	PH-SIM PUK (master phone code) required
100	unknown
132	service option not supported
133	requested service option not subscribed
134	service option temporary out of order
256	operation temporary not allowed
257	call barred
258	phone busy
259	user abort
260	invalid dial string
261	SS not executed
262	SIM blocked
263	invalid block

Table: General "CME ERROR" Codes (proprietary)

<err> Code	Text (if <a href="#">AT+CMEE=2</a> )
615	network failure
616	network is down
639	service type not yet available
640	operation of service temporary not allowed
764	missing input value
765	invalid input value
767	operation failed

Table: GPRS related "CME ERROR" Codes (GSM 07.07)

<err> Code	Text (if <a href="#">AT+CMEE=2</a> )
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

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

<err> Code	Text (if <a href="#">AT+CMEE=2</a> )
1	unassigned (unallocated) number
8	operator determined barring
10	call barred
21	short message transfer rejected
27	destination out of service



28	unidentified subscriber
29	facility rejected
30	unknown subscriber
38	network out of order
41	temporary failure
42	congestion
47	resources unavailable, unspecified
50	requested facility not subscribed
69	requested facility not implemented
81	invalid short message transfer reference value
95	invalid message, unspecified
96	invalid mandatory information
97	message type non-existent or not implemented
98	message not compatible with short message protocol state
99	information element non-existent or not implemented
111	protocol error, unspecified
127	interworking, unspecified
128	telematic interworking not supported
129	short message type 0 not supported
130	cannot replace short message
143	unspecified TP-PID error
144	data coding scheme (alphabet) not supported
145	message class not supported
159	unspecified TP-DCS error
160	command cannot be actioned
161	command unsupported
175	unspecified TP-command error
176	TPDU not supported
192	SC busy
193	no SC subscription
194	SC system failure
195	invalid SME address
196	destination SME barred
197	SM rejected-duplicate SM
198	TP-VPF not supported
199	TP-VP not supported
208	do SIM SMS storage full
209	no SMS storage capability in SIM
210	error in MS
211	memory capacity exceeded
212	SIM application toolkit busy
213	SIM data download error
255	unspecified error cause
300	ME failure
301	SMS service of ME reserved
302	operation not allowed



303	operation not supported
304	invalid PDU mode parameter
305	invalid text mode parameter
310	SIM not inserted
311	SIM PIN required
312	PH-SIM PIN required
313	SIM failure
314	SIM busy
315	SIM wrong
316	SIM PUK required
317	SIM PIN2 required
318	SIM PUK2 required
320	memory failure
321	invalid memory index
322	memory full
330	SMSC address unknown
331	no network service
332	network timeout
340	no +CNMA acknowledgement expected
500	unknown error
512	user abort
513	unable to store
514	invalid status
515	invalid character in address string
516	invalid length
517	invalid character in PDU
518	invalid parameter
519	invalid length or character
520	invalid character in text
521	timer expired
522	operation temporary not allowed



## 2.18. AT+CMTE Set Critical Temperature Operating Mode Or Query Temperature

### Syntax

Read Command

AT+ CMTE?

Response(s)

+CMTE: <mode><Temperature>

OK

Write Command

AT+CMTE=[<mode>]

Response(s)

OK

ERROR

PIN ASC0 MUX1 MUX2 MUX3 🔔 Last

+ + + + + - -

### Parameter Description

<mode><sup>(num)</sup>

0                      disable temperature detection

1                      enable temperature detection

<Temperature><sup>(num)</sup>

range of -40 to 90

### Note

- When temperature is extreme high or low, product will power off.
- 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.
- Level "2" or "-2" URCs are followed by immediate shutdown.



## 2.19. AT+CPOWD Power Off

### Syntax

Write Command

AT+CPOWD =<n>

Response(s)

### Parameter Description

<n><sup>(num)</sup>

0	Power off urgently ( Will not send out NORMAL POWER DOWN)
1	Normal power off (Will send out NORMAL POWER DOWN)



## 2.20. AT+CSCLK      Configure Slow Clock

### Syntax

Test Command

```
AT+CSCLK=?
```

Response(s)

```
+CSCLK: (0,1,2)  
OK
```

Read Command

```
AT+CSCLK?
```

Response(s)

```
+CSCLK: <n>  
OK
```

Write Command

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

Response(s)

```
OK  
ERROR
```

### Parameter Description

<n><sup>(num)</sup>

Controls the presentation mode of the URC "^SALS" which indicates the line number used by an incoming call:

- |   |  |
|---|--|
| 0 | Disable slow clock, module will not enter sleep mode.  |
| 1 | Enable slow clock, it is controlled by DTR. When DTR is high, module can enter sleep mode. When DTR changes to low level, module can quit sleep mode.          |
| 2 | The module decides by itself when it enters sleep mode. When there is no data on serial port, module can enter sleep mode. Otherwise, it will quit sleep mode. |



## 2.21. AT+CSDT      Switch On Or Off Detecting SIM Card

### Syntax

Test Command

```
AT+ CSDT =?
```

Response(s)

```
+CSDT: (0-1)  
OK
```

Read Command

```
AT+ CSDT?
```

Response(s)

```
+CSDT: <mode>  
OK
```

Write Command

```
AT+CSDT=[<mode>]
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<mode><sup>(num)</sup>

0	switch off detecting SIM card (default)
1	switch on detecting SIM card

### Note

- It is not supported temporarily.



## 2.22. AT+CSMINS SIM Inserted Status Reporting

### Syntax

Test Command

AT+CSMINS=?

Response(s)

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

Read Command

AT+CSMINS?

Response(s)

+CSMINS: <n>,<SIM inserted>  
OK

Write Command

AT+CSMINS=<n>

Response(s)

OK  
ERROR  
If error is related to ME functionality:  
+CME ERROR: <err>

### Parameter Description

<n><sup>(num)</sup>

a numeric parameter which indicates whether to show an unsolicited event code indicating whether the SIM has just been inserted or removed.

0	disable
1	enable

<SIM inserted><sup>(num)</sup>

a numeric parameter which indicates whether SIM card has been inserted.

0	not inserted
1	inserted



## 2.23. AT+EXUNSOL Enable /Disable Proprietary Unsolicited Indications

### Syntax

Test Command

```
AT+EXUNSOL=?
```

Response(s)

```
+EXUNSOL:(list of supported < exunsol>s)  
OK
```

Write Command

```
AT+EXUNSOL=<exunsol> ,<mode>
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<exunsol><sup>(str)</sup>

string type(string should be included in quotation marks).

values currently reserved by the present document

- |      |   |
|------|---|
| “SQ” | Signal Quality Report<br>Displays signal strength and channel bit error rate (similar To AT+CSQ) in form +CSQN: <rssi>, <ber> when values change.   |
| “FN” | forbidden network available only<br>When returning to a non- registered state this indicates whether All the available PLMNs are forbidden.   |
| “MW” | SMS Message waiting<br>On receiving an SMS (as indicated by the +CMTI indication) the SMS is decoded and checked to see if it contains one or more of the message waiting indications (i.e. voicemail, email, fax etc). If so, an unsolicited indication is shown in the form for each message type:<br>+CMWT: <store>, <index>, <voice>, <fax>, <email>, <other><br>Where <store> is the message store containing the SM, index is the message index and <voice>, <email>, <fax>, <other> contain the number of waiting messages (with '0' defined as clear indication, non-zero for one or more waiting messages) or blank for not specified in this message. |
| “UR” | Unsolicited result code<br>Produces an unsolicited indication following particular call state Transitions. Multiple notifications may occur for the same transition   |



+CGURC: <event>

Where <event> describes the current call state:

<event>

0	Active call terminated, at least one held call remaining
1	Attempt to make an Mobile Originated call
2	Mobile Originated Call has failed for some reason
3	Mobile Originated call is ringing
4	Mobile Terminated call is queued (Call waiting)
5	Mobile Originated Call now connected
6	Mobile Originated or Mobile Terminated call has disconnected
7	Mobile Originated or Mobile Terminated call hung up
8	Mobile Originated call to non-emergency number in emergency mode
9	Mobile Originated call no answer
10	Mobile Originated call remote number busy

“BC”

Battery Charge

Displays battery connection status and battery charge level (similar To AT+CBC) in form +CBCN:<bcs>,<bcl> when values change.

“BM”

Band mode

Displays band mode (similar to AT+CBAND) in form +CBAND:<band> when value changes.

“SM”

Additional SMS Information

Displays additional information about SMS events in the form of Unsolicited messages of the following format

+TSMSINFO: <CMS error info>

where <CMS error info> is a standard CMS error in the format defined by the AT+CMEE command i.e. either a number or a string.

“CC”

Call information

Displays the disconnected call ID and the remain call numbers after one of the call disconnected.

+CCINFO : <Call id Disconnected>,<Remain calls>

<mode><sup>(num)</sup>

0	disable
1	enable



### Note

- Only "SQ" is supported currently.

## 2.24. AT^SCFG Extended Configuration Settings

**AT^SCFG** can be used to query and configure various settings of the MG21.

**AT^SCFG** read command returns a list of all supported parameters and their current values.

**AT^SCFG** write command queries a configuration parameter (if no value is entered) or sets its value(s).

Input of parameter names is always coded in GSM character set, parameter values are expected to be given as specified via **AT+CSCS**.

### Syntax

Test Command

```
AT^SCFG=?
```

Response(s)

```
^SCFG: "Audio/AMR", (list of supported <amr>s)
^SCFG: "Audio/Loop", (list of supported <al>s)
^SCFG: "Call/ECC", (list of supported <ecc>s)
^SCFG: "Call/SpeechVersion1", (list of supported <csv1>s)
^SCFG: "GPRS/ATS0/withAttach", (list of supported <gs0aa>s)
^SCFG: "GPRS/AutoAttach", (list of supported <gaa>s)
^SCFG: "GPRS/RingOnIncomingData", (list of supported <groid>s)
^SCFG: "MEopMode/CregRoam", (list of supported <mrs>s)
^SCFG: "PowerSaver/Mode9/Timeout", (list of supported <psm9to>s)
^SCFG: "Radio/Band/HandOver", (list of supported <HandOverStatus>s)
^SCFG: "Tcp/IRT", (list of supported <tcpIrt>)
^SCFG: "Tcp/MR", (list of supported <tcpMr>)
^SCFG: "Tcp/OT", (list of supported <tcpOt>)
^SCFG: "Tcp/WithURCs", (list of supported <tcpWithUrc>)
^SCFG: "URC/CallStatus/CI EV", (list of supported <succ>s)
^SCFG: "URC/CallStatus/SLCC", (list of supported <sucs>s)
^SCFG: "URC/Datamode/Ringline", (list of supported <udri>s)
^SCFG: "URC/Ringline", (list of supported <uri>s)
^SCFG: "URC/Ringline/ActiveTime", (list of supported <urat>s)
OK
```



Read Command

AT^SCFG=?

Response(s)

^SCFG: "Audio/AMR", <amr>1[, <amr>2[, <amr>3...[<amr>10]]]  
^SCFG: "Audio/Loop", <al>  
^SCFG: "Call/ECC", <ecc>  
^SCFG: "Call/SpeechVersion1", <csv1>  
^SCFG: "GPRS/ATS0/withAttach", <gs0aa>  
^SCFG: "GPRS/AutoAttach", <gaa>  
^SCFG: "GPRS/RingOnIncomingData", <groid>  
^SCFG: "MEopMode/CregRoam", <mrs>  
^SCFG: "PowerSaver/Mode9/Timeout", <psm9to>  
^SCFG: "Radio/Band/HandOver", <HandOverStatus>  
^SCFG: "Tcp/IRT", <tcpIrt>  
^SCFG: "Tcp/MR", <tcpMr>  
^SCFG: "Tcp/OT", <tcpOt>  
^SCFG: "Tcp/WithURCs", <tcpWithUrc>  
^SCFG: "URC/CallStatus/CIEV", <succ>  
^SCFG: "URC/CallStatus/SLCC", <sucs>  
^SCFG: "URC/Datamode/Ringline", <udri>  
^SCFG: "URC/Ringline", <uri>

Read Command

AT^SCFG?

Response(s)

^SCFG: "URC/Ringline/ActiveTime", <urat>  
OK

Write Command

Adaptive Multi Rate (AMR):

AT^SCFG="Audio/AMR"[, <amr>]

Response(s)

^SCFG: "Audio/AMR", <amr>1[, <amr>2[, <amr>3...[<amr>10]]]  
OK  
ERROR  
+CME ERROR: <err>

Write Command

Configure Audio Loop:

AT^SCFG="Audio/Loop"[, <al>]

Response(s)

^SCFG: "Audio/Loop", <al>  
OK  
ERROR  
+CME ERROR: <err>



Write Command

Query/Configure Emergency numbers for SIM without ECC field  
AT^SCFG="Call/ECC"[, <ecc>]

Response(s)

^SCFG: "Call/ECC", <ecc>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

Call/Configure SpeechVersion1  
AT^SCFG="Call/SpeechVersion1"[, <csv1>]

Response(s)

^SCFG: "Call/SpeechVersion1", <csv1>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

GPRS **ATS0** with automatic attach  
AT^SCFG="GPRS/ATS0/withAttach"[, <gs0aa>]

Response(s)

^SCFG: "GPRS/ATS0/withAttach", <gs0aa>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

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

Response(s)

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

Write Command

Ring on incoming GPRS IP data packets  
AT^SCFG="GPRS/RingOnIncomingData"[, <groid>]

Response(s)

^SCFG: "GPRS/RingOnIncomingData", <groid>  
OK  
ERROR  
+CME ERROR: <err>



Write Command

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

Response(s)

^SCFG: "MEopMode/CregRoam", <mrs>

OK

ERROR

+CME ERROR: <err>

Write Command

Query/Set timeout value for power saving mode 9

AT^SCFG="PowerSaver/Mode9/Timeout"[, <psm9to>]

Response(s)

^SCFG: "PowerSaver/Mode9/Timeout", <psm9to>

OK

ERROR

+CME ERROR: <err>

Write Command

Query/Set timeout value for power saving mode 9

AT^SCFG="PowerSaver/Mode9/Timeout"[, <psm9to>]

Response(s)

^SCFG: "PowerSaver/Mode9/Timeout", <psm9to>

OK

ERROR

+CME ERROR: <err>

Write Command

Control Special Call Handover Setting

AT^SCFG="Radio/Band/HandOver"[, <HandOverStatus>]

Response(s)

^SCFG: "Radio/Band/HandOver", <HandOverStatus>

OK

ERROR

+CME ERROR: <err>

Write Command

Automatic GPRS attach

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

Response(s)

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

OK

ERROR

+CME ERROR: <err>



Write Command

Configuration of TCP parameter 'InitialRetransmissionTimeout':  
AT^SCFG="Tcp/IRT"[, <tcpIrt>]

Response(s)

^SCFG: "Tcp/IRT", <tcpIrt>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

Configuration of TCP parameter 'MaxRetransmissions':  
AT^SCFG="Tcp/MR"[, <tcpMr>]

Response(s)

^SCFG: "Tcp/MR", <tcpMr>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

Configuration of TCP parameter 'OverallTimeout':  
AT^SCFG="Tcp/OT"[, <tcpOt>]

Response(s)

^SCFG: "Tcp/OT", <tcpOt>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

Configuration of Internet Service URCS:  
AT^SCFG="Tcp/WithURCs"[, <tcpWithUrc>]

Response(s)

^SCFG: "Tcp/WithURCs", <tcpWithUrc>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

Configuration of URC "+CIEV: call" Call Status Indication  
AT^SCFG="URC/CallStatus/CIEV"[, <succ>]

Response(s)

^SCFG: "URC/CallStatus/CIEV", <succ>  
OK  
ERROR  
+CME ERROR: <err>



Write Command

Configuration of URC "**^SLCC**" Call Status Indication  
AT^SCFG="URC/CallStatus/SLCC"[, <sucs>]

Response(s)

^SCFG: "URC/CallStatus/SLCC", <sucs>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

URC indication in datamode via Ring line:  
AT^SCFG="URC/Datamode/Ringline"[, <udri>]

Response(s)

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

Write Command

URC indication via Ring line:  
AT^SCFG="URC/Ringline"[, <uri>]

Response(s)

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

Write Command

Duration of active RING line for URC indications:  
AT^SCFG="URC/Ringline/ActiveTime"[, <urat>]

Response(s)

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

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -



## Parameter Description

`<arm>`<sup>(str)(+CSCS)</sup>

### Adaptive Multi Rate

This parameter can be used to control the usage of the feature "Adaptive Multi Rate" (AMR). It is possible to enable or disable this feature for all network operators, or to enable it for selected operators (max. 10). If the feature is enabled for all operators, any request to enable it for a specific operator will result in a "+CME ERROR: operation temporary not allowed".

Changes of this parameter become active with the next call.

Parameter is global for all interfaces, volatile and will not be reset by AT&F.

"enabled"<sup>(P)</sup> AMR is used for every operator.

"disabled" AMR is not used for any operator.

00000...999999 Enable AMR for the specified operator (in BCD or IRA format; see AT+COPS).

`<a1>`<sup>(str)</sup>

### Audio Loop Setting

This parameter can be used to configure an audio loop for performing a simple verification of audio connections. The feature is intended for testing only.

Full audio processing will be performed. Audio parameterization capabilities remain nearly unrestricted. Microphone and loudspeaker ports can be selected with random access. Neither a SIM nor a GSM network is necessary to turn the audio loop on.

Turning the audio loop on activates audio mode 0 which cannot be selected during normal operation of the ME. Turning the audio loop off activates audio mode 1. The active audio mode can be verified via [AT^SNFS](#). Audio mode 0 contains linear filters and neither echo canceller nor noise suppression are activated. It is also possible to select any other audio mode. These audio modes use the parameterization set as default during normal operation of the ME.

Activation of the audio loop turns sidetone off, even if sidetone is on in the selected audio mode during normal operation.

Audio mode can be selected via AT command [AT^SNFS](#).

Parameter is global for all interfaces, volatile and will not be reset by [AT&F](#).

"0"<sup>(P)</sup> No audio loop active

"1" Audio loop active



## <ecc><sup>(str)(+CSGS)</sup>

### Emergency call numbers on non-ECC SIM

This parameter specifies emergency call numbers on SIM without ECC field. The parameter has no influence on the commonly used emergency numbers 112 and 911 which are always supported.

Please refer also to [ATD](#) where you can find a list of emergency call numbers supported if no SIM is inserted.

The value range of <ecc> is "0"..."255". To select or deselect an emergency number calculate the sum of the values of all desired numbers and use the resulting value. For example, for "08" (2) and "118" (8) please enter the value (10).

Parameter is global for the ME, non-volatile and will not be reset by [AT&F](#).

"0" <sup>(D)</sup>	No additional emergency numbers
"1"	000
"2"	08
"4"	110
"8"	118
"16"	119
"32"	999
"64"	Reserved
"128"	Reserved
"255"	All additional emergency call numbers are supported

## <csv1><sup>(str)(+CSGS)</sup>

### Call Speech Version1

This parameter can be used to query or configure the speech version 1 indication in the bearer capabilities in case of voice calls (see GSM 04.08).

If you try to change this parameter as long as a circuit switched call is active, the command returns the new value and "OK", but the changes will not take effect before next call setup.

Parameter is global for the ME, volatile and will not be reset by [AT&F](#).

"0" <sup>(P)</sup>	Full rate (FR) and half rate (HR) codecs are enabled for speech calls - full rate
"1"	Full rate (FR) and half rate (HR) codecs are enabled for speech calls - half rate (HR) codec is preferred.
"2"	Half rate (HR) codec is disabled and full rate (FR) codec is enabled for speech calls.



## <gs0aa><sup>(str)(+CSGS)</sup>

### GPRS ATSO with Attach

This parameter can be used to control the behaviour of [ATSO](#).

Parameter is global for all interfaces, volatile and will not be reset by [AT&F](#).

- |                     |  |
|---------------------|--|
| “on” <sup>(P)</sup> | When the <a href="#">ATSO=&lt;n&gt;</a> (<n>>0) command is received, the MT will attempt to perform a GPRS attach.     |
| “off”               | When the <a href="#">ATSO=&lt;n&gt;</a> (<n>>0) command is received, the MT will not attempt to perform a GPRS attach. |

## <gaa><sup>(str)(+CSGS)</sup>

### 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 power-up and registration to the network. Parameter is global for all interfaces, non-volatile and will not be reset by [AT&F](#)

- |                           |                               |
|---------------------------|-------------------------------|
| “disabled” <sup>(D)</sup> | GPRS auto attach is disabled. |
| “enabled”                 | GPRS auto attach is enabled.  |

## <groid><sup>(str)(+CSGS)</sup>

### Ring on incoming GPRS IP data packets

This parameter can be used to control the behaviour of the RING line for incoming IP packets in GPRS online mode. Parameter is local for the interface, volatile and will not be reset by [AT&F](#).

- |                      |  |
|----------------------|--|
| “on”                 | If the ME is in power saving mode 7 or 8 or 9 (see <a href="#">AT+CFUN</a> ) and hardware flow control is in use ( <a href="#">AT+Q3</a> ) and the RTS line is inactive and there are incoming IP packets for a GPRS context which is online, then the RING line will be activated once, for a time which is configured by the parameter "URC/Ringline/ActiveTime" (<urat>). The RING line to be used can be configured with the parameter "URC/Ringline" (<uri>). |
| “off” <sup>(P)</sup> | RING line is not activated for incoming IP packets.  |



### <psm9to><sup>(str)(+CSCS)</sup>

#### Power saving mode 9 timeout

This parameter can be used to query or configure the wake up time for power saving mode 9 (see AT+CFUN with parameter <fun>=9).

Parameter is global for the ME, volatile and will not be reset by AT&F..

5...20<sup>(P)</sup>...36000                      The granularity of the timeout value is 100ms (i.e. a value of 10 equal 1 second). The minimum timeout value that can be applied is 5, but accuracy is only guaranteed for timeout values greater than 20.

### <HandOverStatus><sup>(str)(+CSCS)</sup>

#### Call Handover Status

This parameter offers a workaround to prevent problems during call handover into the 1900 MHz band, caused by non-conforming configurations of the 1900 MHz GSM network.

“0”<sup>(P)</sup>                                      Disable workaround.  
“1”                                        Enable workaround. This value should be selected when handover into a 1900 MHz GSM network fails. If required for permanent use the value needs to be set each time the ME is restarted.

### <tcpIrt><sup>(str)(+CSCS)</sup>

#### Initial Retransmission Timeout (IRT)

1...3<sup>(D)</sup>...60                              This parameter determines the time (in seconds) the TCP/IP stack will wait before starting the first retransmission of packets during the initial connection establishment phase.

The TCP protocol ensures the retransmission of packets several times at increasing intervals until some upper limit is reached. This mechanism prevents packet loss and serious congestion problems. In addition, the parameters <tcpMr> and <tcpOt> can be set to further optimize this mechanism for special conditions depending on the mobile network.

Parameter is global for the ME and non-volatile. Use of default value is recommended. If changed the new value takes effect the next time you start an Internet service with AT^SISO.



## <tcpMr><sup>(str)(+CSCS)</sup>

### Maximum Number of Retransmissions (MR)

1...10<sup>(D)</sup>...30

This parameter determines the maximum number of times to retransmit TCP packets.

The value set with <tcpMr> will be assumed as default for the <srvParmTag> "tcpMR" when a new service profile is created with AT<sup>^</sup>SISS. In each service profile, you can set another "tcpMR" value which has precedence over the global value set with AT<sup>^</sup>SCFG. Existing service profiles are not affected when you change the global value via AT<sup>^</sup>SCFG.

Parameter is global for the ME and non-volatile. Use of default value is recommended.

## <tcpWithUrc><sup>(str)(+CSCS)</sup>

### URC mode or polling mode for Internet service commands

This parameter enables or disables the presentation of the following URCs related to Internet service commands: "<sup>^</sup>SISR" URC, "<sup>^</sup>SISW" URC and "<sup>^</sup>SIS" URC for parameter <urcCause>=0 (Internet service events). "<sup>^</sup>SIS" URCs with <urcCause>=1 or 2 used to indicate incoming Socket connections are always enabled.

Parameter is global for the ME and non-volatile.

"on"<sup>(D)</sup>

Enable URCs related to Internet service commands.

Throughout the Chapter "Internet Service AT Commands" the mode is also referred to as URC mode.

"off"

Disable URCs related to Internet service commands.

This requires the TE to employ polling techniques when using the Internet service AT commands: The TE is responsible to retrieve all status information needed to control an Internet session. The method is referred to as polling mode.



`<SUCC>`<sup>(str)(+CSCS)</sup>

#### CIEV Call Status Indication

This parameter can be used to control the behaviour of URC "+CIEV: call". See also [AT+CIND](#), [AT+CMER](#). Parameter is global for all interfaces and will not be reset by [AT&F](#).

"restricted" <sup>(P)</sup>	URC "+CIEV: call" will be issued only when a Call Status transition ends in state "active" or "unknown" for a call in the list of active calls.
"verbose"	URC "+CIEV: call" will be issued when any state transition (including transitions beginning or ending in state "unknown") occurs in the list of active calls, or when a traffic channel is established.

`<SUCS>`<sup>(str)(+CSCS)</sup>

#### SLCC Call Status Indication

This parameter can be used to control the behaviour of URC "^SLCC". See also [AT^SLCC](#). Parameter is global for all interfaces and will not be reset by [AT&F](#).

"restricted"	URC "+CIEV: call" will be issued only when a Call Status transition ends in state "active" or "unknown" for a call in the list of active calls.
"verbose" <sup>(D)</sup>	URC "^SLCC" will be issued when any state transition (including transitions beginning or ending in state "unknown") occurs in the list of active calls, or when a traffic channel is established.

`<uri>`<sup>(str)(+CSCS)</sup>

#### URC RING line

This parameter can be used to control the behaviour of the RING line to indicate URCs (both for idle interfaces and, if configured by the parameter "URC/Datamode/Ringline", if link is reserved) and, if configured, the indicator for incoming IP packets (see parameter "GPRS/RingOnIncomingData" ([<groid>](#))). Parameter is local for the interface, volatile and will not be reset by [AT&F](#).

"off"	URC is not indicated by RING.
"local" <sup>(P)</sup>	URC will be indicated by an activated RING line of the interface on which the URC appears
"asc0"	URC is indicated by an activated RING0 line.



#### <udri><sup>(str)(+CSCS)</sup>

##### URC Datamode RING line

This parameter specifies whether RING or BREAK is used for the signaling of URCs when the ME-TE link is reserved (e.g. during circuit-switched data calls, fax connections, in GPRS data mode, in transparent TCP access mode opened with [AT^SIST](#) or during the execution of an AT command).

Parameter is global for all interfaces, volatile and will not be reset by [AT&F](#).

- |                      |  |
|----------------------|--|
| “off” <sup>(P)</sup> | URC will be indicated by BREAK   |
| “on”                 | URC is indicated by an active RING line for a time which is configured by the parameter "URC/Ringline/ActiveTime" (<urat>). The RING line which will be used, can be configured by the parameter "URC/Ringline" (<uri>). |

#### <urat><sup>(str)(+CSCS)</sup>

##### URC RING line Active Time

This parameter can be used to control how long the RING line is activated to indicate URCs (both for idle interfaces and, if configured by the parameter "URC/Datamode/Ringline" (<udri>), if link is reserved) and, if configured by the parameter "GPRS/RingOnIncomingData", to indicate incoming GPRS IP data packets (<groid>).

Parameter is global for all interfaces, volatile and will not be reset by [AT&F](#).

- |                    |  |
|--------------------|--|
| “0”                | RING line will be activated for a time between 4.6 and 9.2 ms. |
| “1”                | RING line will be activated for about 100ms.                   |
| “2” <sup>(P)</sup> | RING line will be activated for about 1s.                      |

#### <mrs><sup>(str)(+CSCS)</sup>

##### Modified Roaming Status

This parameter enables or disables the modified roaming status displayed by [AT+CREG](#). If it is enabled, the registration status is "registered to home network" instead of "registered, roaming", when the registered PLMN and the Home PLMN from SIM Elementary File EFIMSI are mapped to the same network name in the MG21 internal operator list.

Parameter is global for all interfaces, non-volatile and will not be reset by [AT&F](#).

- |                    |  |
|--------------------|--|
| “0” <sup>(D)</sup> | Disable the Modified Roaming Status Display. |
| “1”                | Enable the Modified Roaming Status Display.  |



### Note

- Parameters "GPRS/ATSO/withAttach" (<gs0aa>) and "GPRS/RingOnIncomingData" (<groid>) are available only if ME supports GPRS.

### Examples

#### EXAMPLE 1

Usage of "Audio/AMR":

```
AT+CSCS="UCS2"           Switch to UCS2 character set.
OK
AT^SCFG?                 You receive a notification that you have an incoming call on line 2
...
^SCFG:"Audio/AMR","0065006E00610062006C00650064"
...
OK
AT+CSCS="GSM"
OK
AT^SCFG?
...
^SCFG:"Audio/AMR","enabled"   AMR will be used for any operator.
...
OK
AT^SCFG="Audio/AMR","disabled"
^SCFG:"Audio/AMR","disabled"  AMR is disabled for any operator.
OK
AT^SCFG="Audio/AMR","23405"
^SCFG:"Audio/AMR","23405"    AMR is disabled for any operator, but enabled for operator "23405".

OK
AT^SCFG="Audio/AMR","23203"
^SCFG:"Audio/AMR","23405","23203"  AMR is disabled for any operator, but enabled for operators "23405" and
"23203".

OK
AT^SCFG="Audio/AMR"
^SCFG:"Audio/AMR","23405","23203"  Query parameter "Audio/AMR"
OK
```



## EXAMPLE 2

Usage of "URC/Ringline" and "URC/Datamode/Ringline":

C	Switch to GSM character set.
OK	
AT^SCFG?	Query all parameters.
...	
^SCFG:"URC/Datamode/Ringline","off"	While the ME-TE link is reserved URCs will be indicated by BREAK.
^SCFG:"URC/Ringline","local"	URCs on this interface will be indicated by Ring line associated to the interface (e.g. RING0 for ASC0).
...	
OK	
AT^SCFG="URC/Datamode/Ringline","on"	
^SCFG:"URC/Datamode/Ringline","on"	While the ME-TE link is reserved URCs will be indicated by an activated "local" Ring line.
OK	
AT^SCFG="URC/Ringline","asc0"	
^SCFG:"URC/Ringline","asc0"	URCs on this interface will be indicated by an activated RING0 no matter whether or not the ME-TE link is reserved.
OK	
AT^SCFG="URC/Datamode/Ringline","off"	
^SCFG:"URC/Datamode/Ringline","off"	URCs on this interface will be indicated by an activated RING0 if the ME-TE link is not reserved and by BREAK if the ME-TE link is reserved.
OK	
AT^SCFG="URC/Ringline"	Disable any Ring line indication for URCs on this interface.
^SCFG:"URC/Ringline","off"	
OK	



## 2.25. AT^SM20 Set M20 compatibility mode

M20 is an earlier, widely used GSM engine. The `AT^SM20` command selects different modes of responses returned upon execution of the commands `ATD` and sms commands like e.g. `AT+CMGW`. Please note that the `AT^SM20` command has no effect on any other features and is not intended to adjust other differences between M20 and MG21.

### Syntax

Test Command

```
AT^SM20=?
```

Response(s)

```
OK
```

Read Command

```
AT^SM20=?
```

Response(s)

```
^SM20:<CallMode>, <CmgwMode>
```

```
OK
```

Write Command

```
AT^SM20=<CallMode>[, <CmgwMode>]
```

Response(s)

```
OK
```

```
PIN ASC0 MUX1 MUX2 MUX3  Last
```

```
- + + + + - -
```

### Parameter Description

<CallMode><sup>(num)</sup>

Call setup response mode

Applies only to voice calls.

0

Set compatibility to iRZ Wireless Modules. ME will return "OK" immediately after attempting a call with the `ATD` command. In case of failure, additional call release indications, such as "NO DIALTONE", "NO CARRIER", "BUSY" will follow.

1(&F)

Default call setup mode, compatible to M20. ME will return "OK" in case of a successful connection, otherwise one of the call release indications "NO DIALTONE", "NO CARRIER", "BUSY" are indicated.



<CmgwMode><sup>(num)</sup>

Response mode for sending and writing short messages

Applies to the sms commands like e.g. [AT+CMGS](#) and [AT+CMGW](#) command.

- |                       |  |
|-----------------------|--|
| 0                     | Set compatibility to IRZ Wireless Modules. ME will return +CMS ERROR: <a href="#">&lt;err&gt;</a> when writing or sending of short mes-sages fails.          |
| 1 <sup>(&amp;F)</sup> | Default mode for sending and writing short messages, compatible to M2Q. ME will return "OK", no matter whether or not sms command was successfully executed. |



## 2.26. AT^SMSO Switch Off MG21

**AT^SMSO** initiates MG21's power-off procedure. Do not send any other AT command after this.

Low level of the ME's V180/V285 pins notifies that the procedure has completed and the ME has entered the POWER DOWN mode. Therefore, be sure not to disconnect the operating voltage until the V180/V285 pins are low or until the URC "**^SHUTDOWN**" is displayed. Otherwise, you run the risk of losing data. Particular attention should be paid to the sections dealing with an external power indication circuit and back powering.

### Syntax

Test Command

```
AT^SMSO=?
```

Response(s)

```
OK
```

Exec Command

```
AT^SMSO
```

Response(s)

```
^SMSO: MS OFF
```

```
OK
```

```
ERROR
```

PIN	ASC0	MUX1	MUX2	MUX3	🔊	Last
-	+	+	+	+	+	+

### Unsolicited Result Code

```
^SHUTDOWN
```

Indicates that the power-off procedure is finished and the module will be switched off in less than 1 second.

### Note

- If **AT^SMSO** is entered on one of the Multiplexer channels the ME closes the Multiplexer channels, terminates the Multiplexer and deactivates all other functions. Then, the URC "**^SHUTDOWN**" will be issued on the physical serial interface (ASC0). The URC will be transmitted at the bit rate last activated on ASC0 for use with the Multiplex driver.



## 2.27. AT\Q Flow Control

AT\Q allows to configure flow control on the MG21's asynchronous serial interface ASC0. It is strongly recommended to always use RTS/CTS hardware flow control.

### Syntax

Exec Command

AT\Q[<value>]

Response(s)

OK

If RTS/CTS flow control is not supported by interface and <n> is 2 or 3:

ERROR

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	±	±	±	-	-

Reference(s)

V.250

### Parameter Description

<value><sup>(num)(&w)(&v)</sup>

[0] <sup>(&amp;F)</sup>	Disable flow control
1	XON/XOFF software flow control
2	Only CTS flow control by ME
3	RTS/CTS hardware flow control

### Notes

- When using XON/XOFF flow control (AT\Q1) in online mode, +++ should not be used while the data transmission is paused with XOFF. Before entering the command mode with +++ the paused transmission should be resumed using the XON character.
- For compatibility reasons, the AT\Q command can be used in Multiplex mode, though the settings will not take effect. However, be aware that whenever you use the AT\Q write command in Multiplex mode and then save the current configuration to the user profile with AT&W, the changed AT\Q setting will become active after restart.



## 2.28. AT&C Set Data Carrier Detect (DCD) Line Mode

The **AT&C** command controls the behavior of the ME's DCD line.

### Syntax

Exec Command						
AT&C[<value>]						
Response(s)						
OK						
PIN	ASC0	MUX1	MUX2	MUX3	↺	Last
-	+	±	±	±	-	-
Reference(s)						V.250

### Parameter Description

<value> <sup>(num){&amp;V}{&amp;V}</sup>	Description
[0]	DCD line shall always be on.
1 <sup>(&amp;F)</sup>	DCD line shall be on only when data carrier signal is present.
2	DCD line shall be on when one or more Internet services defined on the related serial channel are in state "Connecting" or "Up" as described below. For details on the various service states refer to <b>AT^SISI</b> , parameter <srvState> or <b>AT^SISO</b> , parameter <srvState>. Transparent TCP service, SOCKET, HTTP, SMTP, POP3: DCD shall be on when <srvState>="Connecting" or "Up" FTP: DCD shall be on when data channel is connected, i.e. <srvState>="Up"



## 2.29. AT&D Set Data Terminal Ready (DTR) Line Mode

**AT&D** determines how the ME responds if the DTR line is changed from ON to OFF state during data connection

(CSD or PPP or active Internet service opened with **AT^SIST**).

### Syntax

Exec Command		AT&D[<value>]					
Response(s)		OK					
PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last	Reference(s)
-	+	±	±	±	-	-	V.250

### Parameter Description

<value>	<small>(num)(&amp;W)(&amp;V)</small>
[0]	ME ignores status of the DTR line.
1	ON->OFF on DTR: Change to command mode while retaining the data connection.
2 <sup>(&amp;F)</sup>	ON->OFF on DTR: Disconnect the data connection (only for CSD and PPP) and change to command mode. For internet service the behaviour is like AT&D1. During OFF state of the DTR line auto-answer is disabled.



## 2.30. AT&S Set Data Set Ready (DSR) Line Mode

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

### Syntax

Exec Command

AT&S[<value>]

Response(s)

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	±	±	±	-	-

Reference(s)

V.250

### Parameter Description

<value> <sup>(num){&W}{&V}</sup>

[0]<sup>(&F)</sup> DSR line is always ON

1 ME in command mode: DSR is OFF.  
ME in data mode: DSR is ON.



## 2.31. ATE AT Command Echo

ATE controls if the MG21 echoes characters received from TE during AT command state.

### Syntax

Exec Command

ATE[<value>]

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

Reference(s)

V.250

### Parameter Description

<value> <sup>(num)(&V)(&V)</sup>

[0] Echo mode off

1<sup>(&F)</sup> Echo mode on



## 2.32. AT+CMUX      Multiplex mode

Multiplex mode according to GSM 07.10 and 3G TS 27.010 enables the use of virtual channels set up over one single serial interface. Every channel is used as an independent serial link. This way, up to three simultaneous AT command sessions can be handled at a time. For example, the first channel can be used to send or receive data, while two channels are available to control the module with AT commands or to establish a dedicated channel to receive Unsolicited Result Codes (URC), e.g. "+CIEV:" or "RING".

All information provided in this section applies only to the ASC0 interface. [AT+CMUX](#) write command is used to enter Multiplex mode. Setup of the logical channels is initiated by the TE, i.e. the TE acts as initiator. This means that the TE shall ensure that logical channels are established before any further actions on the channels can be started. There is a timeout of five seconds, if the multiplexer protocol is enabled but no multiplexer control channel is established. Afterwards MG21 returns to AT command mode. The parameter maximum frame size (N1) according to GSM 07.10 is implemented as 98 bytes by default. All other parameters are not available. Refer to Multiplexer User's Guide for further details regarding frame size.



## Syntax

Test Command

AT+CMUX=?

Response(s)

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

Read Command

AT+CMUX?

Response(s)

+CMUX: <mode>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

AT+CMUX=<mode>

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	-	-	-	-	+

Reference(s)

GSM 07.07, GSM 07.10,  
3GPP TS 27.010

## Parameter Description

<view><sup>(num)</sup>

Enable Multiplex mode.

0                      Basic option

### 2.32.1. Restrictions on Multiplex mode

In Multiplex mode, data and fax calls can only be set up on logical channel 1. Due to this restriction, AT commands have a different behavior on channels 2+3 compared to channel 1. Several commands are not available, others return different responses. This section summarizes the concerned commands.



Table: Availability of AT Commands on Virtual Channels

Command	Behavior on channel 1	Behavior on channel 2+3
+++	not usable, but see note 1)	not usable, but see note 1)
AT+CBST	as described	not usable
AT+CRLP	as described	not usable
AT+CG... (GPRS commands)	as described	see note 2)
AT+F... (Fax commands)	as described	not usable
AT&C	as described	not usable
AT&D	as described	not usable
AT&S	as described	not usable
ATA	as described	no Data Calls
ATD	as described	no Data Calls
ATDI	as described	not usable
ATO	as described	not usable
ATS10	as described	not usable
ATS18	as described	not usable

1) The applicability of the +++ escape sequence depends on the customer's external application based on the Multiplexer Protocol.

Recommendations for implementing an appropriate modem status command (MSC) are provided in Multiplexer User's Guide.

2) PDP contexts can be defined on any channel, but are visible and usable only on the channel on which they are defined (thus it is not possible to define a context on channel 2 and activate it on channel 3). GPRS connections can be established on two channels at a time.



Table: Summary of AT commands with Different Behavior in Multiplex mode

Command	Description
<a href="#">ATQ</a>	It is recommended to use hardware flow control ( <a href="#">ATQ3</a> ). XON/XOFF flow control ( <a href="#">ATQ1</a> ) is not supported in Multiplex mode. See note regarding <a href="#">ATQn</a> settings stored with <a href="#">AT&amp;W</a> if Multiplex mode is active.
<a href="#">AT&amp;V</a>	Different default configurations on channels 1, 2 and 3.
<a href="#">AT&amp;W</a>	Different user profiles can be stored on each channel.
<a href="#">AT+IPR</a>	Before starting Multiplex mode, ensure that the bit rate set with <a href="#">AT+IPR</a> is not lower than 57600 bps. For using data services in Multiplex mode it is recommended to set at least 115200 bps. In Multiplex mode, the write command <a href="#">AT+IPR=&lt;rate&gt;</a> will not change the bit rate currently used, but the new bit rate will be stored and becomes active, when the module is restarted.
<a href="#">AT+IPR=0</a>	Multiplex mode cannot be activated while Autobaud mode is enabled.
<a href="#">AT+CALA</a>	An alarm set on one of the interfaces overwrites the the alarm setting on all remain-ing interfaces. When the alarm is timed out and executed the ME sends the URC only on the channel where the most recent alarm setting was made. The alarm time will be reset to "00/01/01,00:00:00" on all channels.
<a href="#">AT+CMEE</a>	Presentation mode can be separately configured for each channel.
<a href="#">AT+CNMA</a>	If Multiplex mode is activated the +CNMI parameter will be set to zero on all chan-nels, if one channel fails to acknowledge an incoming message within the required time.
<a href="#">AT+CNMI</a>	Phase 2+ parameters can only be used on one channel. The parameter for <a href="#">&lt;mt&gt;</a> and <a href="#">&lt;ds&gt;</a> on the other channels have to be set to zero. If either a SM or a Status Report is not acknowledged, all +CNMI parameter will be set to zero on all chan-nels.
<a href="#">AT+CFUN</a>	If the ME is in Multiplex mode, it is not recommended to activate SLEEP mode with <a href="#">AT+CFUN=&lt;fun&gt;</a> . The best approach to properly control SLEEP mode in this case is to issue the PSC messages described in Multiplexer User's Guide.
<a href="#">AT+CPMS</a>	Parameter <a href="#">&lt;mem3&gt;</a> will be the same on all instances, but the settings of <a href="#">&lt;mem1&gt;</a> and <a href="#">&lt;mem2&gt;</a> may vary on each instance.
<a href="#">AT^SSDA</a>	If one instance is set to <a href="#">&lt;da&gt;=1</a> and <a href="#">&lt;mt&gt;=1</a> , then all other instances must be con-figured for <a href="#">&lt;mt&gt;=0</a> .



## 2.33. AT+ICF Set TE-TA Control Character Framing

### Syntax

Test Command

AT+ICF=?

Response(s)

+ICF: (list of supported <format>s), (list of supported <parity>s)  
OK

Read Command

AT+ICF?

Response(s)

+ICF: <format>,<parity>  
OK

Write Command

AT+ICF=[<format>,<parity>]

Response(s)

This parameter setting determines the serial interface character framing format and parity received by TA from TE.  
OK

Reference(s)

V.25ter

### Parameter Description

<format>

1	8 data 0 parity 2 stop
2	8 data 1 parity 1 stop
3	8 data 0 parity 1 stop
4	7 data 0 parity 2 stop
5	7 data 1 parity 1 stop
6	7 data 0 parity 1 stop

<parity>

0	odd
1	even
3	space (0)



### **Notes**

- The Command is applied for Command state;
- In `<format>` parameter, "0 parity" means no parity;
- The `<parity>` field is ignored if the `<format>` field specifies no parity and string "+ICF: `<format>`,255" will be response to AT+ICF? Command.



## 2.34. AT+IFC TE-TA local flow control

### Syntax

Test Command

AT+IFC=?

Response(s)

+IFC: (list of supported <dce\_by\_dte>s), (list of supported <dte\_by\_dce>s)  
OK

Read Command

AT+IFC?

Response(s)

+IFC: <dce\_by\_dte>, <dte\_by\_dce>  
OK

Write Command

AT+IFC=[<dce\_by\_dte>[, <dte\_by\_dce>]]

Response(s)

This parameter setting determines the data flow control on the serial interface for data mode.  
OK

PIN ASC0 MUX1 MUX2 MUX3 🔔 Last

+ + + + + - -

Reference(s)

V.25ter

### Parameter Description

<dce\_by\_dte><sup>(num)</sup>

specifies the method will be used by TE at receive of data from TA

- |          |                           |
|----------|---------------------------|
| <u>0</u> | No flow control (default) |
| 1        | Software flow control     |
| 2        | Hardware flow control     |

<dte\_by\_dce><sup>(num)</sup>

specifies the method will be used by TA at receive of data from TE

- |          |                                 |
|----------|---------------------------------|
| 0        | No flow control                 |
| 1        | Software flow control           |
| <u>2</u> | Hardware flow control (default) |



## 2.35. AT+ILRR Bit Rate Reporting

**AT+ILRR** controls whether or not the intermediate result code "+ILRR" is transmitted from the MG21 to the TE when a connection is being set up. The result code indicates the current bit rate. It is issued before the final result code of the connection, e.g. CONNECT, is transmitted to the TE.

### Syntax

<p>Test Command</p> <p>AT+ILRR=?</p> <p>Response(s)</p> <p>+ILRR: (list of supported &lt;value&gt;s)</p> <p>OK</p>													
<p>Read Command</p> <p>AT+ILRR?</p> <p>Response(s)</p> <p>+ILRR: &lt;value&gt;</p> <p>OK</p>													
<p>Write Command</p> <p>AT+ILRR=&lt;value&gt;</p> <p>Response(s)</p> <p>OK</p> <p>ERROR</p> <p>+CME ERROR: &lt;err&gt;</p>													
<table border="1"> <thead> <tr> <th>PIN</th> <th>ASC0</th> <th>MUX1</th> <th>MUX2</th> <th>MUX3</th> <th>☞ Last</th> </tr> </thead> <tbody> <tr> <td>+</td> <td>+</td> <td>+</td> <td>-</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	PIN	ASC0	MUX1	MUX2	MUX3	☞ Last	+	+	+	-	-	-	<p>Reference(s)</p> <p>V.250</p>
PIN	ASC0	MUX1	MUX2	MUX3	☞ Last								
+	+	+	-	-	-								

### Intermediate Result Code

+ILRR: <rate>

Indicates current bit rate setting upon connection setup.

### Parameter Description

<value>	(num)(&W)(&V)
0(&F)	Disables bit rate reporting.
1	Enables bit rate reporting.



<rate><sup>(num)</sup>

Bit rate setting upon connection setup (bps)

0                      Autobauding.

300

600

1200

2400

4800

9600

14400

19200

28800

38400

57600

115200

230400



## 2.36. AT+IPR Bit Rate

**AT+IPR** allows to query and set the bit rate of the MG21's asynchronous serial interfaces (UART). The test command returns the values of supported automatically detectable bit rates and the values of the supported fixed bit rates.

The read command returns the current bit rate of the interface.

The write command specifies the bit rate to be used for the interface. Delivery bit rate value (<rate>) is Auto-baud mode enabled (**AT+IPR=0**) on ASC0. This setting will not be restored with **AT&F**.

If using a fixed bit rate, make sure that both MG21 and TE are configured to the same rate. A selected bit rate takes effect after the write command returns OK and is stored in non-volatile memory. It is not recommended to set bit rates lower than 9600 bps in order to avoid timing problems.

In case of Autobaud mode (**AT+IPR=0**) the detected TE bit rate will not be saved and, therefore, needs to be resynchronized after any restart of the ME. If Autobaud mode is activated, the ME will automatically recognize bit rate currently used by the TE.

In Multiplex mode the write command will not change the bit rate currently used, but the new bit rate will be stored and becomes active, when the ME is restarted.

The current setting of **AT+IPR** will be preserved when you download firmware (i.e. a firmware update does not restore the factory setting) or in the event of power failure.

### Syntax

Test Command

**AT+IPR=?**

Response(s)

+IPR: (list of supported auto-detectable <rate>s) , (list of supported fixed-only <rate>s)

OK

Read Command

**AT+IPR?**

Response(s)

+IPR: <rate>

OK

Write Command

**AT+IPR=<rate>**

Response(s)

OK

ERROR

+CME ERROR: <err>



- + ± ± + - -

V.250

### ***Parameter Description***

<rate><sup>(num)</sup>

Bit rate setting upon connection setup (bps)

0                      Autobauding.

300

600

1200

2400

4800

9600

14400

19200

28800

38400

57600

115200

230400



### Note

- Generally, **AT+IPR** should be used as a standalone command. If nevertheless combinations with other commands on the same command line cannot be avoided, there are several constraints to be considered:
  - Avoid combinations with the AT commands listed in Section “Concatenating AT Commands”.
  - Keep in mind that there shall be a minimum pause between two AT commands.
  - If **AT+IPR=0** is entered, Autobaud mode will be activated after the response to the last command is received.
  - If local echo is active (**ATE1**) and **AT+IPR=x** is entered with other commands you may encounter the following problem: If switching to the new bit rate takes effect while a response is being transmitted, the last bytes may be sent with the new bit rate and thus, not properly transmitted. The following commands will be correctly sent at the new bit rate.

### 2.36.1. Autobauding

To take advantage of Autobaud mode specific attention must be paid to the following requirements:

- Synchronization between TE and ME:

Ensure that TE and ME are correctly synchronized and the bit rate used by the TE is detected by the ME. To allow the bit rate to be synchronized simply use an "AT" or "at" string. This is necessary

- after you have activated Autobaud mode
- when you start up the ME while Autobaud mode is enabled. It is recommended to wait 3 to 5 seconds before sending the first AT character. Otherwise undefined characters might be returned.

If you want to use Autobaud mode and auto-answer at the same time, you can easily enable the TE-ME synchronization, when you activate Autobaud mode first and then configure the auto-answer mode (**ATS0** ≠ 0).

- Restrictions on Autobaud mode operation:

- The serial interface shall be used with 8 data bits, no parity and 1 stop bit (factory setting), e.g. 2 stop bits are not supported for Autobaud mode.
- **A/** cannot be used.
- Only the strings "AT" or "at" can be detected (neither "At" nor "aT").
- URCs that may be issued before the ME detects a new bit rate (by receiving the first AT character) will be sent at the previously detected bit rate or, after ME restart, at 57600 bps.
- It is not recommended to switch to Autobaud mode from a bit rate that cannot be detected by the Autobaud mode mechanism (e.g. 300 bps). Responses to **AT+IPR=0** and any commands on the same line might be corrupted.

- Autobaud mode and bit rate after restart:

Unless the bit rate is determined, the following constraints apply:



- An incoming CSD call or a network initiated GPRS request cannot be accepted. This must be taken into account when Autobaud mode and auto-answer mode ([ATS0](#) ≠ 0) are enabled at the same time, especially if SIM PIN 1 authentication is done automatically and the setting [ATS0](#) ≠ 0 is stored to the user profile with [AT&W](#).
- Until the bit rate is found, URCs generated after restart will be output at 57600 bps. This applies only to user defined URCs, such as "+CREG", "CCWA", "^SCKS" etc. The URCs "^SYSSTART" and "^SYSSTART ALARM MODE" will not be indicated when Autobaud mode is enabled.

Note: To avoid any problems caused by undetermined bit rates in the direction from ME to TE we strongly recommend to configure a fixed bit rate rather than Autobaud mode.

■ Autobaud mode and Multiplex mode:

If Autobaud mode is active you cannot switch to Multiplex mode (see [AT+CMUX](#)).



### 3. Status Control and Identification Commands



The AT Commands described in this chapter used to control status of MG21 and get various identification information.

Status Control	Identification
AT+CMER	ATI
AT+CPAS	AT+AUTEST
AT+WS46	AT+CDEVICE
AT+CIND	AT+CGMI
AT^SIND	AT+GMI
AT+CEER	AT+CGMM
ATS18	AT+GMM
	AT+CGMR
	AT+GMR
	AT+CGSN
	AT+GSN
	AT+GOI
	AT+GSV
	AT+CCID
	AT+CIMI
	AT+CLTS



### 3.1. AT+CMER Common Event Reporting Configuration

**AT+CMER** controls details of the "+CIEV" URC presentation related to **AT^SIND** and **AT+CIND**. If registered via those commands the URCs are sent whenever a value of the related indicator changes.

In addition, **AT+CMER** controls "+SLCC" URCs related to **AT^SLCC**. For details refer to Call Status Information, **AT^SLCC** and **AT^SCFG**, parameter **<sucs>**.

The read command returns the URC presentation mode **<mode>** and among others, the indicator event reporting status **<ind>**.

The write command enables and disables the presentation of "+CIEV: **<indDescr>**, **<indValue>**1[, **<indValue>**2]" URCs. **<indDescr>** refers to the name of a "+CIEV" indicator and **<indValue>** is the new value of this indicator.

After **AT+CMER** has been switched on, initial URCs for all registered indicators will be issued.

**AT+CNMI** is a similar command to control SMS related URCs.

#### Syntax

Test Command

AT+CMER=?

Response(s)

+CMER: (list of supported **<mode>**s), (list of supported **<keyp>**s), (list of supported **<disp>**s), (list of supported **<ind>**s), (list of supported **<bfr>**s)  
OK

Read Command

AT+CMER?

Response(s)

+CMER: **<mode>**, **<keyp>**, **<disp>**, **<ind>**, **<bfr>**  
OK

Write Command

AT+CMER=[**<mode>**[, **<keyp>**[, **<disp>**[, **<ind>**[, **<bfr>**]]]]]

Response(s)

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

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

Reference(s)

GSM 07.07

#### Unsolicited Result Code

+CIEV: **<indDescr>**, **<indValue>**1[, **<indValue>**2]

A value of an indicator has changed.



## Parameter Description

**<mode>**<sup>(num)</sup>

- |                       |   |
|-----------------------|---|
| 0 <sup>(&amp;F)</sup> | Always discard "+CIEV" and "^SLCC" URCs.  |
| 1                     | "+CIEV" and "^SLCC" URCs are forwarded directly to the TE. However, if this is not possible because ME-TE link is reserved, e.g. during a data call, these URCs are discarded.  |
| 2                     | "+CIEV" and "^SLCC" URCs are forwarded directly to the TE. However, if this is not possible because ME-TE link is reserved these URCs are buffered and flushed to the TE afterwards.  |
| 3                     | "+CIEV" and "^SLCC" URCs are forwarded directly to the TE. However, if this is not possible because ME-TE link is reserved these URCs are buffered and flushed to the TE afterwards.<br>Additionally, while ME-TE link is reserved, buffered URCs are signaled to the TE via sending a BREAK or activating the RING line, according to <a href="#">AT^SCFG</a> parameters <a href="#">&lt;uri&gt;</a> , <a href="#">&lt;udri&gt;</a> and <a href="#">&lt;urat&gt;</a> . |

**<keyp>**<sup>(num)</sup>

- |                       |  |
|-----------------------|--|
| 0 <sup>(&amp;F)</sup> | Keypad event reporting is not supported by MG21. |
|-----------------------|--|

**<disp>**<sup>(num)</sup>

- |                       |   |
|-----------------------|---|
| 0 <sup>(&amp;F)</sup> | Display event reporting is not supported by MG21. |
|-----------------------|---|

**<ind>**<sup>(num)</sup>

- |                       |                                    |
|-----------------------|------------------------------------|
| 0 <sup>(&amp;F)</sup> | Disable indicator event reporting. |
| 2                     | Enable indicator event reporting.  |

**<bfr>**<sup>(num)</sup>

- |                          |  |
|--------------------------|--|
| 0 <sup>(&amp;F)(D)</sup> | ME's buffer of "+CIEV" and "^SLCC" URCs is cleared when <a href="#">&lt;mode&gt;</a> 1, 2 or 3 is entered. |
|--------------------------|--|

**<indDescr>**<sup>(str)</sup>

Name of indicator; for a list of all supported indicators please refer to [AT+CIND](#) and [AT^SIND](#).

**<indValue>**<sup>(num)</sup>



Value of indicator; for a list of all values for the supported indicators please refer to [AT+CIND](#) and [AT^SIND](#).

### **Note**

- If ME operates on different instances (Multiplex mode channels 1, 2, 3 or ASC0) avoid different settings for routing and indicating SMS. For example, if messages shall be routed directly to one instance of the TE (set with [AT+CNMI](#), [AT^SSDA](#)), it is not possible to activate the presentation of URCs with [AT+CMER](#) or [AT+CNMI](#) on another instance. Any attempt to activate settings that conflict with existing settings on another interface, will result in "+CME ERROR", or accordingly "+CMS ERROR".



### 3.2. AT+CPAS Activity Status

AT+CPAS execute command queries MG21's activity status.

#### Syntax

Test Command

AT+CPAS=?

Response(s)

+CPAS: (list of supported<pas>s)

OK

Exec Command

AT+CPAS

Response(s)

+CPAS: <pas>

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

Reference(s)

GSM 07.07

#### Parameter Description

<pas><sup>(num)</sup>

0	Ready
3	Incoming call (ringing)
4	Call in progress or call hold



### 3.3. AT+WS46 Select wireless network

#### 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: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

Reference(s)

GSM 07.07

#### Parameter Description

<n><sup>(num)</sup>

12

GSM digital cellular



### 3.4. AT+CIND Indicator control

The **AT+CIND** command controls the presentation of Indicator Event Reports related to various functions such as signal quality, service availability, sound generation, indication of unread short messages, full SMS storage, call in progress or roaming activities.

Use of **AT+CIND** has become outdated. Rather we recommend the more powerful **AT^SIND** command which is easier to use and provides additional indicators. All indicators provided by **AT+CIND** can be handled with **AT^SIND** as well.

**AT+CIND** supports two ways to get the values related to indicators:

- One approach is to query the current status of each indicator by using the read command **AT+CIND?**. It returns the status no matter whether the indicator has been registered with the write command **AT+CIND=[<mode>[,<mode>[,...]]]**.
- The other way is an event-driven notification based on the "+CIEV" URCs. In this case, the ME will automatically send a message to the application, whenever the value of an indicator changes. The application should be designed to react adequately when receiving a URC.

The presentation of these URCs depends on two settings:

- The indicators must be registered with the write command **AT+CIND=[<mode>[,<mode>[,...]]]**. When the ME is switched on all of them are in registered mode. Any indicator can be excluded if deregistered with **<mode>=0**. To register or deregister an indicator the **AT+CIND** write command requires to type the value **<mode>=1** or **0** exactly at the position where the indicator is located in the list. This is not necessary with **AT^SIND** which allows to specify indicators by name. See examples below.
- The presentation of the registered indicators must be enabled with **AT+CMER**.

#### Syntax

Test Command

```
AT+CIND=?
```

Response(s)

```
+CIND: (<indDescr>, list of supported <indValue>s)[, (<indDescr>, list of supported <indValue>s)[, ...]]  
OK
```

Read Command

```
AT+CIND?
```

Response(s)

```
+CIND: <indValue>[, <indValue>[, ...]]  
OK  
ERROR  
+CME ERROR: <err>
```



Write Command  
AT+CIND=<mode>[, <mode>[, ...]]

Response(s)  
OK  
ERROR  
+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	🔊	Last
-	+	+	+	+	-	-

Reference(s)  
GSM 07.07

### Parameter Description

<indValue><sup>(num)</sup>

Integer type value, which shall be in range of corresponding <indDescr>

<indDescr><sup>(num)</sup>

String values and their <indValue> ranges.

More indications are available via [AT^SIND](#). Therefore use of [AT^SIND](#) for control of all indications is recommended.

The following indications are accessible via [AT+CIND](#):

- |           |   |
|-----------|---|
| “battchg” | Battery charge level always equals 5, i.e. value is not relevant for MG21   |
| “signal”  | Signal quality (0..7) or (99) if not measurable<br>The indicated value is the bit error rate of the signal received. Bit errors are estimated values. See also <a href="#">AT+CSQ</a> .   |
| “service” | Service availability (0-1)<br>0: Not registered to any network<br>1: Registered to home network or, if "roam"=1 then registered to another network  |
| “sounder” | Sounder activity (0-1)<br>Reports every event that causes the ME to generate a tone.<br>Value 1 means for example:<br>Incoming call - ME is ringing. Note that the URC " <a href="#">+CIEV: sounder</a> " will be out-put only if ringing tones are activated with <a href="#">AT^SRTC</a> .<br>Waiting call - ME generates waiting call tone (if call waiting is enabled).<br>Outgoing call - ME generates Call Progress tone.<br>Outgoing call - ME generates BUSY tone.<br>The value changes to 0 when the tone stops. |



"message"	Unread received short message (0-1)
"call"	<p>Call in progress (0-1). Indicator value is "1" if at least one call is in state "active" or "held".</p> <p>Depending on the parameter <code>&lt;succ&gt;</code> selected with <code>AT^SCFG</code> the indicator "call" will be issued</p> <p>when a state transition ends in state "active" or state "unknown", if <code>&lt;succ&gt;="restricted"</code>, when any state transition (including transitions beginning or ending in state "unknown") occurs in the list of active calls or when a traffic channel is established, if <code>&lt;succ&gt;="verbose"</code>.</p>
"roam"	<p>Roaming indicator (0-1)</p> <p>0: Registered to home network or not registered</p> <p>1: Registered to other network</p>
"smsfull"	A short message memory storage in the MT has become full (1) or memory locations are available (0), i.e. range is (0-1)
"rsi"	<p>Received signal (field) strength (0..5) or (99) if not measurable</p> <p>0: signal strength <math>\leq -112</math> dBm</p> <p>1-4: signal strength in 15 dB steps</p> <p>5: signal strength <math>\geq -51</math> dBm</p> <p>99: not known or not detectable</p> <p>Received signal (field) strength can also be obtained with <code>AT+CSQ</code>. However, the signal strength is scaled to value range 0..31 by this command.</p>

<code>&lt;mode&gt;</code> <sup>(num)</sup>	
0	Indicator is deregistered. The indicator will not be presented as "+CIEV" URC, but can be queried with <code>AT+CIND?</code> .
[1] <sup>(&amp;F)(P)</sup>	Indicator is registered, indicator event report allowed.

**Notes**

- Due to its restrictive value range, indicator "call" does not clearly reflect specific call states (such as alerting, active, held etc.), but rather serves to trigger the application to retrieve the new call status from the list of current calls with the AT commands `AT^SLCC`, `AT+CLCC` or `AT^SCNI`.
- If `AT^SCFG` setting `<succ>="verbose"`, indicator "call" will be issued also when a traffic channel is established, or when a call enters states "terminating" or "dropped" (see Call Status Information). In these cases, the relevant information about the cause of the display is available only from AT command `AT^SLCC`.



## Examples

### EXAMPLE 1

<code>^SYSSTART</code>	
<code>AT+CPIN=9999</code>	
<code>OK</code>	
<code>AT+CIND?</code>	
<code>+CIND: 5,99,1,0,0,0,0</code>	The battery is either full or no battery is connected to the ME. The bit error rate of the signal quality is not available (since there is no call in progress). The ME is registered to its home network.
<code>OK</code>	
<code>AT+CMER=2,0,0,2</code>	Now activate the Indicator Event Report with <a href="#">AT+CMER</a> .
<code>OK</code>	
<code>+CIEV: battchg,5</code>	
<code>+CIEV: signal,0</code>	
<code>+CIEV: service,1</code>	
<code>+CIEV: sounder,0</code>	
<code>+CIEV: message,0</code>	
<code>+CIEV: call,0</code>	
<code>+CIEV: roam,0</code>	
<code>+CIEV: smsfull,0</code>	
<code>+CIEV: rssi,5</code>	Full receive signal strength.
<code>ATD0123456;</code>	Make a call.
<code>OK</code>	
<code>+CIEV: sounder,1</code>	A set of "+CIEV" URCs is received.
<code>+CIEV: call,1</code>	
<code>+CIEV: sounder,0</code>	
<code>+CIEV: call,0</code>	Called party hangs up.
<code>NO CARRIER</code>	
<code>AT+CIND=,,,0,,0</code>	Deregister the indicators "sounder" and "call".
<code>OK</code>	
<code>ATD0123456;</code>	Dial the same call.
<code>OK</code>	This time, no URCs are displayed.
<code>NO CARRIER</code>	Called party hangs up.

### EXAMPLE 2

Deactivation of indicator "sounder" via [AT+CIND](#)

<code>AT+CIND?</code>	Query the current status of indicators.
<code>+CIND: 5,99,1,0,1,0,0,0,4</code>	
<code>OK</code>	
<code>AT+CIND=,,,0</code>	To deactivate indicator "sounder" (= fourth item in list of indicators).
<code>OK</code>	



### EXAMPLE 3

Deactivation of indicator "sounder" via AT^SIND

```
AT^SIND="sounder",0           To deactivate indicator "sounder".
^SIND: sounder,0,0
OK
```

## 3.5. AT^SIND Extended Indicator Control

Designed for extended event indicator control [AT^SIND](#)

- offers greater flexibility than the standard command [AT+CIND](#),
- offers several extra indicators,
- can show the current status of all indicators supported by [AT+CIND](#) and [AT^SIND](#),
- can be used to register or deregister the indicators of both commands,
- displays all indicator event reports via "+CIEV" URCs.
- Presentation mode of the generated URCs is controlled via [AT+CMER](#).

[AT^SIND](#) read command provides a list of all indicators supported by [AT+CIND](#) and [AT^SIND](#). Each indicator is represented with its registration mode and current value.

[AT^SIND](#) write command can be used to select a single indicator in order to modify its registration and to view the current value.

### Syntax

Test Command

AT^SIND=?

Response(s)

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

Read Command

AT^SIND?

Response(s)

```
^SIND: <indDescr>, <mode>[, <indValue>]
[^SIND: <indDescr>, <mode>[, <indValue>]]
...
In case of <indDescr>="eons"
^SIND: "eons", <mode>, <eonsOperator>, <servProvider>
In case of <indDescr>="nitz"
^SIND: "nitz", <mode>, <nitzUT>, <nitzTZ>, <nitzDST>
OK
ERROR
+CME ERROR: <err>
```



Write Command

```
AT^SIND=<indDescr>, <mode>
```

Responses(s)

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

In case of: <indDescr>="eons" and <mode>=2

```
^SIND: "eons", <mode>, <indValue>, <eonsOperator>, <servProvider>
```

In case of: <indDescr>="nitz" and <mode>=2

```
^SIND: "nitz", <mode>, <nitzUT>, <nitzTZ>, <nitzDST>
```

```
OK
```

```
ERROR
```

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

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

### ***Unsolicited Result Codes***

URC 1

Format of the standard indicator:

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

Indicator related event has occurred, e.g. value has changed.

URC 2

Format of the "simdata" indicator follows [AT^SSTGI](#) response:

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

This URC is issued if MG21 is in Remote-SAT Autoresponse mode ([AT^SSTA](#)) and the SIM sent a [SAT REFRESH](#) command (i.e. <cmdType>=1) indicating that the content of one or more Elementary Files has been changed.

The ME holds a limited storage available to keep numerous "simdata" events received while [AT^SIND](#) setting was not enabled or ME-TE link was reserved, e.g. in online data mode. In case of storage overflow a special URC "+CIEV: simdata,1,254" is issued.

URC 3

Format of the Voice Message indicator, if the number of waiting messages is delivered by the network:

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

If the number of waiting messages is not delivered the standard indicator applies.



#### URC 4

Format of the "eons" indicator:

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

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

#### URC 5

Format of the "nitz" indicator:

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

### Parameter Description

<indDescr><sup>(str)</sup>

String values and their <indValue> ranges.

All indicators supported by [AT+CIND](#) are accessible with this command, too. A detailed description of these indicators can be found there.

The following indicators are accessible via [AT^SIND](#) only:

“audio“	<p>Activity of the built-in audio unit.</p> <p>0 Audio unit not active.</p> <p>1 Audio unit is active, for example:</p> <p>MO voice call: Indicator is output with value 1 when dialing starts.</p> <p>MT voice call: Indicator is output with value 1 when call is ringing.</p>
“simdata“	<p>SIM notifies of changed Elementary File data.</p> <p>All data provided by the SIM is stored in one of many of its so-called Elementary Files. This data can be queried by the TE directly via <a href="#">AT+CRSM</a> and <a href="#">AT+CSIM</a>, or implicitly via many AT commands presented by this document. For instance the SIM's identification number (IMSI) can be queried via <a href="#">AT+CIMI</a>, but actually is stored in EFIMSI, as defined in 3GPP TS 51.011 (GSM11.11) [21]. However, be aware that this Elementary File data can be changed at any time by the network provider or an application running on the SIM. For details refer to <a href="#">SAT</a> feature "Data Download to SIM" in 3GPP TS 11.14 (GSM 11.14) [22]. If this happens the TE urgently needs to refresh its internal representation (i.e. copy) of the changed data to ensure its safe and consistent use! Therefore, a "+CIEV: "simdata"" URC is issued if MG21 is in <a href="#">Remote-SAT</a> Autoresponse mode (<a href="#">AT^SSTA</a>) and the SIM sent a SAT REFRESH command indicating that the content of one or more Elementary Files has been changed.</p>



“simtray“

Indication of SIM tray status as indicated by CCIN line. Result does not depend on whether the tray holds a SIM or not.

Generating a URC on status change is not supported.

- 1 SIM tray empty
- 0 SIM tray plugged in

“vmwait1“

Voice Message Waiting Indication for line 1

- 0 The value 0 notifies that no new voice message is available, and is provided by the service center to clear the voice message indication after the subscriber has retrieved all voice messages.
- 1 The value 1 notifies the subscriber that the mailbox contains one or several messages.

"vmwait1" and "vmwait2" indicate the receipt of a special short message with a Voice Message Waiting Indicator. The service must be provisioned by the operator. The numbers 1 or 2 in "vmwait1" and "vmwait2" are related to the two lines of the Alternate Line Service (ALS), also defined in CPHS Phase 2 standard. For further details refer to the [AT^SALS](#) command. The presentation mode of the indicator varies with the operator: If more than one message are waiting, some operators only indicate the first one, others deliver the indicator each time a new voice message is put into the mailbox. After the subscriber has retrieved all voice messages the service center automatically sends another message indication which provides the value 0. Some operators may also send the number of waiting voice messages along with the indication. In this case, the number will be displayed by the MG21 as part of the URC. For example, "+CIEV: vmwait1,1,5" notifies that five new voice messages are waiting. However, it should be noted that neither the read command [AT^SIND?](#) nor the write command [AT^SIND=<mode>,2](#) display the number of waiting messages. The "vmwait" indicators do not apply if a network provider signals new voice mail(s) via standard SMS. In this case the indicator "message" will be displayed (see [AT+CIND](#)).

“vmwait2“

Voice Message Waiting Indication for line 2

- 0 See description of "vmwait1".
- 1 See description of "vmwait1".

“ciphcall“

Ciphering Status Change Indication

- 0 Current call or SMS is not ciphered.
- 1 Current call or SMS is ciphered.



As stated in GSM specifications 02.07 and 02.09 the ciphering indicator feature allows the MG21 to detect that ciphering is not switched on and to indicate this to the user. The ciphering indicator feature may be disabled by the home network operator setting data in the "administrative data" field (EFAD) in the SIM, as defined in 3GPP TS 51.011 (GSM 11.11). If this feature is not disabled by the SIM, then whenever a connection is in place, which is, or becomes unencrypted, an indication shall be given to the user. This enables the user's decision how to proceed. Read command returns valid ciphering status only if a call is in progress or active. If EFAD setting disables the ciphering indicator feature read command always indicates a ciphered link and no URC presentation will take place.

The following restrictions apply if the same serial channel is used for `AT^SIND` "ciphcall" indication and for the action triggering this URC. In general, the recommended solution is to use a dedicated channel for all status signalling via URCs.

- If an unciphered mobile originated SMS is performed, `AT^SIND` "ciphcall" URCs on the same serial channel will be issued after the related "OK" and indicate the ciphering state at this time. Because the SMS is already sent at this time, two URCs will be issued on this channel, but both are indicating that ciphering is enabled.
- If an unciphered mobile originated data call is performed, `AT^SIND` "ciph-call" URCs on the same serial channel will be issued after the interface is no longer blocked by the call (call is released or temporarily stopped) and indicate the ciphering state at this time.



“eons“

### Enhanced Operator Name String (EONS) Indication

The Enhanced Operator Name String indicator feature allows the MG21 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 on the SIM 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:

EFS<sub>ST</sub> (SIM Service Table) - describes which features are active.

EF<sub>OPL</sub> (Operator PLMN List) - contains the PLMN identification and location ID together with the index of the corresponding PNN record

EF<sub>PNN</sub> (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<sub>ONString</sub> (Operator Name String) - contains the name of the PLMN operator who issued the SIM.

EF<sub>OPShort</sub> (Operator Name Short form) - contains a short form of the name of the PLMN operator who issued the SIM.



“steerroam“

Steering-of-roaming Indication.

The "steerroam" Indication supports so called "steering-of-roaming" ("SOR") techniques of some providers.

If a ME roaming within a certain country tries to register to a VPLMN (visited PLMN), the VPLMN will ask the HLR of the subscribers home operator for authorization credentials of the subscriber. Steering-of-roaming means that instead of sending those credentials, the HLR sends back an error message which will make the VPLMN send back a location update reject to the ME. This location updating procedure is described in 3GPP TS 24.008 chapter 4.4.4.9. When ME is attempting to register into a PLMN and get updating rejected with reject cause 17 then ME stays in limited service on the configured network, ME may reattempt network registration four times, and after that ME will inform the TE via Steering-of-roaming Indication URC "steerroam" that the registration attempt has failed.

When the ME is in manual PLMN selection mode (see [AT+COPS](#)) the TE has to start a new manual PLMN search to select a different network or switch to automatic PLMN selection mode.

When ME is in automatic PLMN selection mode (see [AT+COPS](#)) ME itself attempts a PLMN search to select a different network.

“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 despite 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 ME detaches from network. Also when a manual network selection fails and the ME 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.

<indValue><sup>(num)</sup>

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

Notes specific to EONS feature:

If indicator is "eons", <indValue> is a type associated to the operator name according to GSM 22.101 [23]. 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 <sub>OPL</sub> and EF <sub>PNN</sub> (alphanumeric format, can contain up to 24 characters.)  |
| 2 | Operator Name String in long and short format according to Common PCN Handset Specification (CPHS) [24] (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 <sub>OPShort</sub> 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><sup>(num)</sup>

- 0 Indicator is deregistered, i.e. no such indicator event report (URC) will be issued. <mode>=0 is power-up and factory default of indicators defined by [AT^SIND](#) only.
- 1 Indicator is registered.
- Indicator event reports are controlled via [AT+CMER](#).
  - All indicators can be registered or deregistered via [AT^SIND](#), but different default settings apply: Power-up and factory default of the indicators supported by [AT+CIND](#) is <mode>=1, while, as stated above, indicators defined by [AT^SIND](#) only are set to <mode>=0.
- 2 Query the registration status and the current value of a single indicator type.

#### <vmCounter>

If delivered by the network: Number of new voice messages sent as part of the Voice Message Waiting Indicator. Refer to [<indDescr>](#).

#### <eonsOperator>

Operator in format which depends on the type associated to the operator name. Refer to [<indValue>](#).

#### <servProvider><sup>(str)</sup>

Service Provider Name according to the status settings (SIM Service No. 17) in the SIM Service Table (SST) of the SIM.

#### <nitzUT>

Universal Time delivered as part of the "nitz" Indicator. Refer to [<indDescr>](#).

#### <nitzTZ>

Time Zone delivered as part of the "nitz" Indicator. Refer to [<indDescr>](#).

#### <nitzDST>

Adjustment for Daylight Saving Time as part of the "nitz" Indicator. Refer to [<indDescr>](#).



### Example

Activation and use of indicator "audio":

AT^SIND="audio",1	You register the indicator "audio".
^SIND: audio,1,0	
OK	
AT+CMER=2,,2	You activate the Indicator Event Report with <a href="#">AT+CMER</a> .
OK	A set of all registered URCs is presented. (Please note that the example includes the indicators registered due to the power-up default settings of <a href="#">AT+CIND</a> .)
+CIEV: battchg,5	
+CIEV: signal,0	
+CIEV: service,1	
+CIEV: sounder,0	
+CIEV: message,1	
+CIEV: call,0	
+CIEV: roam,0	
+CIEV: smsfull,0	
+CIEV: rssi,4	
+CIEV: audio,0	
ATD030123456;	You make a call
OK	
+CIEV: audio,1	
+CIEV: sounder,1	
+CIEV: call,1	
+CIEV: signal,0	
+CIEV: sounder,0	
ATH	You hang up
OK +CIEV: call,0	
+CIEV: rssi,3	
+CIEV: audio,0	
+CIEV: signal,0	
+CIEV: rssi,4	



### 3.6. 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 is presented in numeric format. Default output in case of a none-error-situation is +CEER: 0,0,0. A description associated with each number can be found in the tables given in the following sub-clauses and the relevant GSM specifications.

The first parameter `<locationID>` serves to locate the other two parameters. Depending on the failure or release cause either `<reason>` or `<ssRelease>` are applicable, i.e. if `<reason> ≠ 0`, then `<ssRelease> = 0`. Vice versa, if `<reason> = 0`, then `<ssRelease>` may be `≠ 0`.

In addition to **AT+CEER**, the command **ATS18** can be used to check especially the status of fax and data calls.

When losing network coverage the MG21 will disconnect the call. In this case, no network release cause is available, and **AT+CEER** returns only the default values +CEER: 0,0,0.

#### Syntax

<p>Test Command</p> <p><b>AT+CEER=?</b></p> <p>Response(s)</p> <p>OK ERROR +CME ERROR: &lt;err&gt;</p>															
<p>Exec Command</p> <p><b>AT+CEER</b></p> <p>Response(s)</p> <p>+CEER: &lt;locationID&gt;, &lt;reason&gt;, &lt;ssRelease&gt; OK ERROR +CME ERROR: &lt;err&gt;</p>															
<table border="1"> <thead> <tr> <th>PIN</th> <th>ASC0</th> <th>MUX1</th> <th>MUX2</th> <th>MUX3</th> <th>🔔</th> <th>Last</th> </tr> </thead> <tbody> <tr> <td>+</td> <td>+</td> <td>+</td> <td>+</td> <td>+</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last	+	+	+	+	+	-	-	<p>Reference(s)</p> <p>GSM 07.07</p>
PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last									
+	+	+	+	+	-	-									



## Parameter Description

<locationID><sup>(num)</sup>

Location ID as number code. Location IDs are listed in Section "Cause Location ID for the extended error report". Most IDs are connected to another table that contains a list of <reason>s or <ssRelease>s.

<reason><sup>(num)</sup>

Reason for last call release as number code. The number codes are listed in several tables, sorted by different categories in the following subclauses. The tables can be found proceeding from the Location ID given in Section "Cause Location ID for the extended error report".

<ssRelease><sup>(num)</sup>

Release cause for last Supplementary Service call or last call related use of a Supplementary Service or release cause for supplementary services entity or manager.

## Examples

### EXAMPLE 1

```
ATD"01751223344";  
NO CARRIER  
AT+CEER  
+CEER: 8,21,0  
OK
```

A mobile originated call is rejected by the remote party.  
Call setup is terminated with NO CARRIER.  
To check the cause, the caller enters AT+CEER.  
The Location ID 8 in Section 3.6.1 points to Section 3.6.7, where 21 = "call rejected". 0 = "no error" refers to parameter <ssRelease> that is not applicable.

### EXAMPLE 2

The user attempts to activate call barring, but uses a wrong password.

```
AT+clck=oi,1,"0000",3  
+CME ERROR: incorrect password  
AT+CEER  
+CEER: 35,0,38  
OK
```

The Location ID 35 in Section 3.6.1 points to Section 3.6.10, where 38 = "negative PW check" may mean that a wrong password was tried for the first time. 0 = "no error" refers to parameter <reason> that is not applicable.



### 3.6.1. Cause Location ID for the extended error report

ID	Description	Causes
0	no error (default)	--
1	Proprietary L2 cause	Section 3.6.2
2	GSM cause for L3 radio resource sublayer (GSM 04.08 annex F)	Section 3.6.3
3	Proprietary cause for L3 radio resource sublayer	Section 3.6.4
4	GSM cause for L3 mobility management (GSM 04.08 annex G)	Section 3.6.5
5	Proprietary cause for L3 mobility management	Section 3.6.6
6	GSM cause for L3 mobility management via MMR-SAP (GSM 04.08 annex G)	--
7	Proprietary cause for L3 mobility management via MMR-SAP	--
8	GSM cause for L3 call control (GSM 04.08 10.5.4.11 and annex H)	Section 3.6.7
9	Proprietary cause for L3 call control	Section 3.6.8
11	Proprietary cause for L3 advice of charge entity	Section 3.6.9
12	GSM cause for L3 SMS CP entity	--
13	Proprietary cause for L3 SMS CP entity	--
14	GSM cause for L3 SMS RL entity	--
15	Proprietary cause for L3 SMS RL entity	--
16	GSM cause for L3 SMS TL entity	--
17	Proprietary cause for L3 SMS TL entity	--
18	Proprietary cause for DSM entity	--
21	GSM cause for L3 call-related supplementary services	Section 3.6.10
22	Proprietary cause for L3 call-related supplementary services	Section 3.6.11
32	Proprietary cause for supplementary services entity	Section 3.6.12
33	Proprietary cause for supplementary services manager	Section 3.6.13
34	network cause for supplementary services (GSM 04.08 10.5.4.11 and annex H)	--
35	supplementary services network error (GSM 04.80 3.6.6)	--
48	GSM cause for GPRS mobility management (GSM 04.08 annex G.6)	--
49	Proprietary cause for GPRS mobility management	Section 3.6.14
50	GSM cause for session management (GSM 04.08 annex I)	--
51	Proprietary cause for session management	Section 3.6.15
127	GSM cause for protocol module or other local cause	Section 3.6.16
128	supplementary services general problem (GSM 04.80 3.6.7)	--
129	supplementary services invoke problem (GSM 04.80 3.6.7)	--
130	supplementary services result problem (GSM 04.80 3.6.7)	--
131	supplementary services error problem (GSM 04.80 3.6.7)	--
241	Proprietary cause for GPRS API	Section 3.6.17
242	Proprietary cause for link management	Section 3.6.18
243	Proprietary cause for PPP/IP-stack	Section 3.6.19



### 3.6.2. Proprietary L2 cause

Number	Description
249	no network response received, e.g. due to low signal quality

### 3.6.3. GSM release cause for L3 Radio Resource (RR)

Number	Description
0	normal event
1	abnormal release, unspecified
2	abnormal release, channel unacceptable
3	abnormal release, timer expired
4	abnormal release, no activity on the radio path
5	pre-emptive release
8	handover impossible, timing advance out of range
9	channel mode unacceptable
10	frequency not implemented
65	call already cleared
95	semantically incorrect message
96	invalid mandatory information
97	message type non-existent or not implemented
98	message type not compatible with protocol state
100	conditional information element error
101	no cell allocation available
111	protocol error unspecified

### 3.6.4. Proprietary release cause for L3 Radio Resource (RR)

Number	Description
1	RACCHs not answered
2	RACCHs rejected
3	access class of the SIM is barred by the network provider
4	SABM failure
5	radio link counter expiry or perform abnormal release
6	confirm ABORT of the MM
7	respond to DEACT REQ
8	loss of coverage
9	reestablishment not possible
10	T3122 still running
11	cell selection in progress
12	responding to paging
13	location area code has changed
14	circuit switched not available



### 3.6.5. GSM release cause for Mobility Management (MM) or Session Management (SM)

Number	Description
causes related to MS identification	
2	IMSI unknown in HLR
3	illegal MS
4	IMSI unknown in VLR
5	IMEI not accepted
6	illegal ME
cause related to subscription options	
11	PLMN not allowed
12	location area not allowed
13	roaming not allowed in this location area
causes related to PLMN specific network failures and congestion	
17	network failure
22	congestion
causes related to nature of request	
32	service option not supported
33	requested service option not subscribed
34	service option temporary out of order
38	call cannot be identified
causes related to invalid messages	
95	semantically incorrect message
96	invalid mandatory information
97	message type non-existent or not implemented
98	message not compatible with protocol state
99	information element non-existent or not implemented
100	conditional information element error
101	messages not compatible with protocol state
111	protocol error, unspecified
causes related to GPRS	
7	GPRS services not allowed
8	GPRS services not allowed in combination with non-GPRS services
9	MS identity cannot be identified by the network
10	implicitly detached
14	GPRS services not allowed in current PLMN
15	no suitable cells in location area
16	MSC temporary unreachable
36	regular PDP context deactivation
37	QoS not accepted
40	No PDP context activated



### 3.6.6. Proprietary release cause for L3 Mobility Management (MM)

Number	Description
1	no SIM available
8	no MM connection
9	authentication failure
11	MM performs detach
17	registration failed and will be re-attempted in a short term
18	CM connection establishment failed
19	registration failed and will be re-attempted in a long term
20	RR connection is released
21	MS tries to register
22	SPLMN is not available
23	an MTC is in progress
24	a PLMN scan is in progress
25	the MM is detached, the MS is in MS class C GPRS only

### 3.6.7. GSM release cause for L3 Call Control (CC)

Number	Description
0	no error
Normal class (all other values in the range 0 to 31 shall be treated as cause 31)	
1	unassigned (unallocated) number
2	service not available
3	no route to destination
6	channel unacceptable
8	operator determined barring
9	FDN mismatch
16	normal call clearing
17	user busy
18	no user responding
19	user alerting, no answer
21	call rejected
22	number changed
25	pre-emption
26	non-selected user clearing
27	destination out of order
28	invalid number format (incomplete number)
29	facility rejected
30	response to STATUS ENQUIRY
31	normal, unspecified
Resource unavailable class (all other values in the range 32 to 47 shall be treated as cause 47)	
34	no circuit/channel available
38	network out of order
41	temporary failure



42	switching equipment congestion
43	access information discarded
44	requested circuit/channel not available
47	resource unavailable, unspecified
Service or option not available class (all other values in the range 48 to 63 shall be treated as cause 63)	
49	quality of service unavailable
50	requested facility not subscribed
55	incoming calls barred within the CUG
57	bearer capability not authorized
58	bearer capability not presently available
63	service or option not available, unspecified
Service or option not implemented (all other values in the range 64 to 79 shall be treated as cause 79)	
65	bearer service not implemented
68	ACM equal or greater than ACM max
69	requested facility not implemented
70	only restricted digital information bearer capability is available
79	service or option not implemented, unspecified
Invalid message (e.g. parameter out of range) class (all other values in the range 80 to 95 shall be treated as cause 95)	
81	invalid transaction identifier value
87	user not member of CUG
88	incompatible destination
91	invalid transit network selection
95	semantically incorrect message
Protocol error (e.g. unknown message) class (all other values in the range 96 to 111 shall be treated as cause 111)	
96	invalid mandatory information
97	message type non-existent or not implemented
98	message type not compatible with protocol state
99	information element non-existent or not implemented
100	conditional information element error
101	message not compatible with protocol
102	recovery on timer expiry
111	protocol error, unspecified
Interworking class (all other values in the range 112 to 127 shall be treated as cause 127)	
127	interworking, unspecified



### 3.6.8. Proprietary release cause for L3 Call Control (CC)

Number	Description
1	call dropped
2	service not available
3	hold procedure not available
4	temporary no service, previous procedure not yet finished
5	no speech service available
6	call reestablishment procedure active
7	mobile received a release (complete) message during a modify procedure (modify reject)
8	call clearing, because loss of radio connection, if no reestablishment is allowed (call not active)
10	number not included in FDN list
11	zero length called party number
12	no more CC transactions available
13	outgoing calls barred
14	number is blacklisted in auto-call retry list
15	auto-call number is not in list and list is full
16	auto-call redial before minimum time elapsed
17	requesting entity is not in control of CC
notifications	
300	called party barred incoming call

### 3.6.9. Proprietary release cause for L3 Advice of Charge (AOC)

Number	Description
1	SIM data not available
2	SIM does not support AOC
3	SIM data access error
4	ACM limit almost reached ACM range overflow
5	ACM range overflow

### 3.6.10. GSM Release cause for Supplementary Service Call

Number	Description
0	no error (default)
1	unknown subscriber
9	illegal subscriber
10	bearer service not provisioned
11	teleservice not provisioned
12	illegal equipment



13	call barred
15	CUG reject
16	illegal SS operation
17	SS error status
18	SS not available
19	SS subscription violation
20	SS incompatibility
21	facility not supported
27	absent subscriber
29	short term denial
30	long term denial
34	system failure
35	data missing
36	unexpected data value
37	PW registration failure
38	negative PW check
43	number of PW attempts violation
71	unknown alphabet
72	USSD busy
126	max nums of MPTY calls exceeded
127	resources not available
general problem codes	
300	unrecognized component
301	mistyped component
302	badly structured component
invoke problem codes	
303	duplicate invoke ID
304	unrecognized operation
305	mistyped parameter
306	resource limitation
307	initiating release
308	unrecognized linked ID
309	linked response unexpected
310	unexpected linked operation
return result problem codes	
311	unrecognize invoke ID
312	return result unexpected
313	mistyped parameter
return error problem codes	
314	unrecognized invoke ID
315	return error unexpected
316	unrecognized error
317	unexpected error
318	mistyped parameter



### 3.6.11. Proprietary release cause for Call-related Supplementary Services (CRSS)

Number	Description
0	ECT procedure failed (timer expired)
1	call has been cleared without receiving an answer to ECT request
2	initial conditions not fulfilled (one active, one held call)
3	received "return error"
4	call has been cleared without receiving an answer to CCBS request
5	initial conditions for CCBS not fulfilled (Idle CRSS)
causes related to nature of request	
25	LLC or SNDCP failure
26	insufficient resources
27	unknown or missing access point name
28	unknown PDP address or PDP type
29	user authentication failed
30	activation rejected by GGSN
31	activation rejected, unspecified
32	service option not supported
33	requested service option not subscribed
34	service option temporary out of order
35	NSAPI already used
36	regular PDP context deactivation
37	QoS not accepted
38	network failure
39	reactivation requested
40	feature not supported
causes related to invalid messages	
81	invalid transaction identifier value
95	semantically incorrect message
96	invalid mandatory information
97	message type non-existent or not implemented
98	message type not compatible with protocol state
99	information element non-existent or not implemented
100	conditional information element error
101	message not compatible with protocol
111	protocol error, unspecified



### 3.6.12. Proprietary release cause for Supplementary Services Entity

Number	Description
1	Normal
2	MM (Mobility Management) error
3	MM (Mobility Management) release
4	SIM or power off
5	ASN (Abstract Syntax Notation) error
6	Unexpected release
7	MTC (Mobile Terminated Core) collision
8	Out of memory
9	RX erroneous message
10	RX registration on activating transaction identifier

### 3.6.13. Proprietary release cause for Supplementary Services Manager

Number	Description
0	Out of memory
1	Missing parameter
2	Unexpected parameter
3	Activate not allowed
4	Deactivate not allowed
5	Registrate not allowed
6	Erase not allowed
7	Interrogate not allowed
8	Illegal request
9	Null request
10	Busy
11	Rx unexpected facility information element
12	Rx release complete return error
13	Rx release complete return reject
14	Rx release complete without facility information element
15	Rx release complete with erroneous facility information element
16	Rx facility with erroneous information element
17	Rx return result with unexpected operator code
18	Rx return result with illegal operator code
19	Rx return result with unexpected empty result
20	Rx request barred
21	No error multiple TA (only internal)
22	Modified (used for SS AL)
23	Alphabet not IA5 compatible (the USSD string requested for transmission could not be converted into the IA5 alphabet when trying to re-transmit the string according to phase 1. The transmission was not successful)
24	No fallback in application mode (the USSD string transmission according to phase 2 was rejected by the network but the MS is not allowed to re-transmit the string when using USSD application mode)



25	No TI available (there are no transaction identifiers left to fulfill the request)
26	No peer response

### 3.6.14. Proprietary release cause for GPRS Mobility Management

Number	Description
0	Unknown
1	Authentication and ciphering reject
17	Internal error (not used)
19	Power off
20	SIM invalid
21	SIM out
22	GMM (GPRS Mobility Management) is in deactivation (not used)
23	Virtual detach
32	Successful update
33	Fifth attempt
34	VLR (Visitor Location Register) failure
35	Local detach
36	Attempt counter increment
48	GAPI initiated detach
49	Network initiated detach with reattach
50	Network initiated detach no reattach no cause
51	Paging with IMSI
64	MS not GPRS attached
65	RAT (Radio Access Technology) is GSM/GPRS
66	GPRS temporary not available (includes no coverage)
80	T3317 expiry
81	PS connection already released



### 3.6.15. Proprietary release cause for Session Management (SM)

Number	Description
1	The MS has not got any answer to the activate (secondary) PDP context request message sent five times to the network
2	The MS has not got any answer to the MODIFY PDP CONTEXT REQUEST message sent five times to the network
3	A MT PDP context which is active or in the activation process is deactivated because another MT PDP context with the same TI is requested by the network to be activated
4	A MT PDP context which is active or in the activation process is deactivated because another MT PDP context with the same TI is requested by the network to be activated. The activation request is rejected by the SM sending the cause 'insufficient resources' to the network because the SM was not able to perform the necessary comparisons for a static PDP address collision detection.
5	A MT PDP context which is active or in the activation process is deactivated because another MT PDP context with the same TI is requested by the network to be activated. As a static PDP address collision with an MO activating PDP context has been detected by the SM the SM dis-cards the activation request
6	A MT PDP context request has been indicated but could not be processed in time. The activation request is rejected by the SM sending the cause 'insufficient resources' to the network.
7	GAPI rejected a PDP context activation request or rejected of a activation request for a secondary PDP context.
8	As the consequence of a handover from a release 1999 to a GPRS release 1997/98 network all PDP contexts with the same PDP address and APN are deactivated except the one with the highest QoS.
9	deactivation of a PDP context initiated by the RABM.
10	The GAPI has requested either a secondary PDP context activation or a MS initiated PDP context modification in a release 1997/98 network. As these features both are not supported by in Release 1997/98, the SM rejects the request.
11	rejection of a PDP context modification request because of missing a new QoS or a new TFT.
12	The network requests to activate a PDP context with the same combination of APN and PDP address as an already activated PDP context. The MS has to deactivate the already activated PDP context and all linked PDP contexts (matching the combination of APN and PDP address) locally.
13	The network indicates that a PDP context which is regarded as not inactive by the MS is regarded as inactive by the network. The MS has to deactivate this PDP context locally.

### 3.6.16. GSM cause for L3 Protocol module or other local cause

Number	Description
2	no detailed cause



### 3.6.17. Proprietary release cause for GPRS API

Number	Description
0	regular deactivation of the call
1	action temporary not allowed
2	wrong connection type
3	specified data service profile invalid
4	PDP type or address is unknown
5	FDN check was not successful; GPRS attach and PDP context activation blocked
9	GPRS service not available
255	undefined

### 3.6.18. Proprietary release cause for Link Management

Number	Description
1	ActionTempNotAllowed (Mobile temporary busy due to previous conflicting action)
2	Invalid bearer setting
3	Data service profile not valid or complete
4	GPRS Data service profile not valid or complete
5	CSD Data service profile not valid or complete
6	CSD Service not allowed due to MS Class setting CG
17	CSD Modem Instance in already in use (e.g. Data cable is connected when WAP CSD connection shall be established)
18	CSD Modem is not responding
19	Modem returned ERROR
20	CSD Modem doesn't answered not within specified time
21	CSD Modem answered call request NO CARRIER (call establishment failed)
22	CSD Modem answered call request with NO DIALTONE (no call possible at the moment e.g. no network available)
23	CSD Modem answered call request with BUSY (called subscriber is busy)
24	CSD Modem call establishment timed out (e.g. called subscriber modem doesn't answer)
25	CSD Modem established call lost (e.g. called subscriber hang up, network lost)

### 3.6.19. Proprietary release cause for PPP/IP-Stack

Number	Description
0	regular call deactivation
1	LCP stopped
255	undefined



### 3.7. AT518 Extended call release report

**AT518** controls the presentation of extended call release reports for circuit switched fax and data calls. Extended call release reports related to voice calls are controlled via **AT+CEER**.

The call release report is presented in numeric format and shows as follows:

+CAUSE: <locationID>:<reason>

If enabled the message will be reported every time a fax or data call is released or fails to be established.

#### Syntax

Read Command																	
AT518?																	
Response(s)																	
<n>																	
OK																	
Write Command																	
AT518=<n>																	
Response(s)																	
OK																	
ERROR																	
<table border="1"> <tr> <td>PIN</td> <td>ASC0</td> <td>MUX1</td> <td>MUX2</td> <td>MUX3</td> <td>🔔</td> <td>Last</td> </tr> <tr> <td>-</td> <td>+</td> <td>+</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> </table>	PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last	-	+	+	-	-	-	-	<table border="1"> <tr> <td>Reference(s)</td> </tr> <tr> <td>V.250</td> </tr> </table>	Reference(s)	V.250
PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last											
-	+	+	-	-	-	-											
Reference(s)																	
V.250																	

#### Parameter Description

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

An odd number enables the presentation of the extended call release report. Any even number disables this feature.

0<sup>(&F)</sup>...255                      Number of tenths of seconds to wait before disconnecting after ME has indicated the absence of received line signal

<locationID><sup>(num)</sup>

Location ID as number code, see also <locationID> of **AT+CEER**.

Location IDs are listed in Section “Cause Location ID for the extended error report” (AT+CEER command chapter). Each ID is related to another table that contains a list of <reason>s.



`<reason>`<sup>(num)</sup>

Reason for last call release as number code (see also `<reason>` of [AT+CEER](#)).

`<reason>` numbers and the associated descriptions are listed in several tables, sorted by different categories at AT+CEER. The tables can be found proceeding from the Location IDs listed in Section “Cause Location ID for the extended error report” (AT+CEER command chapter).



### 3.8. 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 yyy of software release.

#### Syntax

Exec Command	ATI	Response(s)	iRZ MG21 REVISION xx.yyy OK				
Exec Command	ATI[<value>]	Response(s)	OK				
Exec Command	ATI1	Response(s)	iRZ MG21 REVISION xx.yyy A-REVISION aa.bbb.cc OK				
PIN	ASC0	MUX1	MUX2	MUX3	☞ Last	Reference(s)	V.250
-	+	+	+	+	-	-	

#### Parameter Description

<view><sup>(num)</sup>

Values are not supported and only return OK.

#### Note

- "A-REVISION aa.bbb.cc" information consists of the following parts:
  - Application Revision Number 'aa' as an indication of the supported application ('01' ... no dedicated application is present, ATC is the default application).
  - Application Revision Version 'bbb' as an assignment to changes in customer application. 'cc' as an additional number, e.g. defined by customer.



### 3.9. AT+AUTEST      Audio Channel Loopback Test

#### **Syntax**

Test Command

```
AT+AUTEST=?
```

Response(s)

```
+AUTEST: (0-1), (0-1)  
OK
```

Write Command

```
AT+AUTEST= <state>[,<type>]
```

Response(s)

```
OK  
ERROR
```

#### **Parameter Description**

<state><sup>(num)</sup>

0	test is off
1	test is on

<type><sup>(num)</sup>

0	Normal audio channel
1	AUX audio channel



### 3.10. AT+CDEVICE View Current Flash Device Type

#### **Syntax**

Read Command

AT+CDEVICE?

Response(s)

Device Name: (Current flash device type)

OK

Reference(s)

V.25ter



### 3.11. 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)

iRZ

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

Reference(s)

GSM 07.07



### 3.12. 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)	iRZ OK					
PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last	Reference(s)	V.250
-	+	+	+	+	-	-		



### 3.13. 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)

MG21

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

Reference(s)

GSM 07.07



### 3.14. 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

Read Command

AT+GMM

Response(s)

MG21

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

Reference(s)

V.250



### 3.15. 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 <number>

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

Reference(s)

GSM 07.07

#### **Parameter Description**

<number><sup>(str)</sup>

Version xx and variant yyy of software release.



### 3.16. 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

Read Command

AT+GMR

Response(s)

REVISION <number>

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

Reference(s)

V.250

#### **Parameter Description**

<number><sup>(text)</sup>

Version xx and variant yyy of software release.



### 3.17. 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

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

Reference(s)

GSM 07.07

#### **Parameter Description**

<sn><sup>(str)</sup>

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



### 3.18. 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

Read Command

AT+GSN

Response(s)

<sn>

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

Reference(s)

V.250

#### Parameter Description

<sn><sup>(str)</sup>

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



### 3.19. AT+GOI Request Global Object Identification

#### **Syntax**

Test Command

AT+GOI=?

Response(s)

OK

Exec Command

AT+GOI

Response(s)

TA reports one or more lines of information text which permit the user to identify the device, based on the ISO system for registering unique object identifiers.

<Object Id>

SIM900

OK

Reference(s)

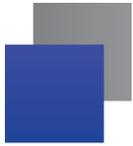
V.25ter

#### **Parameter Description**

<Object Id>

identifier of device type

see X.208, 209 for the format of <Object Id>



### 3.20. AT+GSV Display Product Identification Information

#### **Syntax**

Exec Command

AT+GSV

Response(s)

TA issues product information text

Example:

```
SIMCOM_Ltd  
SIMCOM_  
Revision: 1137B01V01SIM900M32_ST  
OK
```



### 3.21. AT+CCID Show ICCID

#### ***Syntax***

Test Command

AT+CCID =?

Response(s)

OK

Exec Command

AT+ CCID

Response(s)

Ccid data [ex. 898600810906F8048812]

OK



### 3.22. 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>

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + + + - -

Reference(s)

GSM 07.07

#### **Parameter Description**

<imsi><sup>(str)</sup>

International Mobile Subscriber Identity (string without quotes).



### 3.23. AT+CLTS      Get Local Timestamp

#### **Syntax**

Test Command

```
AT+CLTS=?
```

Response(s)

```
+CLTS: the format of <timestamp>  
OK
```

Exec Command

```
AT+CLTS
```

Response(s)

```
+CLTS: <timestamp>  
OK
```

#### **Parameter Description**

<timestamp><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the local timestamp. The format of timestamp is "yy/MM/dd,hh:mm:ss+/-zz"

yy	year
MM	month
dd	day
hh	hour
mm	minute
ss	second
zz	time zone

#### **Note**

- Support for this Command will be network dependant



## 4. Call related Commands



The AT Commands described in this chapter used to control or configure Mobile Originated (outgoing) Calls and Mobile Terminated (incoming) Calls.

Display call information	Working with calls
AT+CLCC	ATA
AT^SLCC	ATD
AT^SCNI	ATDI
AT^SLCD	ATDL
AT^STCD	ATH
	AT+CHUP
	AT^SHUP
	+++
	ATO
	ATS0
	ATS6
	ATS7
	ATS8
	ATS10
	AT+CCALR
	AT+CCPD
	AT+CCWE
	AT+CLDTMF
	AT+CMOD
	AT+CBST
	AT+CRLP
	AT+CR
	AT+CRC
	AT+CSNS
	AT+CSTA
	AT+HVOIC
	AT+MORING
	ATP
	ATT
	ATS2



## 4.1. AT+CLCC List of current calls

The execute command lists all current calls. If the 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: <err>

PIN	ASC0	MUX1	MUX2	MUX3	📞	Last
+	+	+	+	+	-	-

Reference(s)

GSM 07.07

### Parameter Description

<idx><sup>(num)</sup>

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

<dir><sup>(num)</sup>

0 Mobile originated call (MOC)

1 Mobile terminated call (MTC)



**<stat><sup>(num)</sup>**

State of the call

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

**<mode><sup>(num)</sup>**

Bearer/teleservice

0	Voice
1	Data
2	Fax
3	Voice followed by data, voice mode (only in connection with single numbering scheme <a href="#">AT+CSNS</a> )
4	Alternating voice/data, voice mode (only in connection with single numbering scheme <a href="#">AT+CSNS</a> )
5	Alternating voice/fax, voice mode (only in connection with single numbering scheme <a href="#">AT+CSNS</a> )
6	Voice followed by data, data mode (only in connection with single numbering scheme <a href="#">AT+CSNS</a> )
7	Alternating voice/data, data mode (only in connection with single numbering scheme <a href="#">AT+CSNS</a> )
8	Alternating voice/fax, fax mode (only in connection with single numbering scheme <a href="#">AT+CSNS</a> )
9	Unknown

**<mode><sup>(num)</sup>**

0	Call is not one of multiparty (conference) call parties
1	Call is one of multiparty (conference) call parties



**<number><sup>(str)</sup>**

Phone number in format specified by **<type>**

**<type><sup>(num)</sup>**

Type of address octect

145	Dialing string <b>&lt;number&gt;</b> includes international access code character '+'
128	Number is restricted
129	Otherwise

**<alpha><sup>(num)</sup>**

Alphanumeric representation of **<number>** corresponding to the entry found in phonebook (see for example **AT+CPBW**, parameter **<text>**).

Due to time constraints on the necessary evaluation of the phonebook, this parameter may show a default value in early call phases (e.g. for **<stat>**= "dialing", "incoming" or "alerting"), even if a phonebook entry is present for the number concerned.

### **Note**

- Teleservices other than voice, data, fax are not fully supported by ME. They are used only in connection with the handling for **AT+CSNS**, and may therefore occur in parameter **<mode>** for mobile terminated calls.



## 4.2. AT^SLCC Extended list of current calls

[AT^SLCC](#) covers essentially the same information as GSM 07.07 command [AT+CLCC](#), with the following extensions:

- The execute command response contains the additional parameter [<traffic channel assigned>](#) which indicates whether the call has been assigned a traffic channel by the network and transmission of DTMF tones, data or inband information is possible.
- The additional write command allows to activate event reporting for the list of current calls. If event reporting is active for an interface, a call status transition (cf. [Call Status Information](#)) and (if desired) the assignment of a traffic channel will generate an event report indication to this interface. In order to receive this event report as an URC, the URC presentation mode for this interface has to be configured with [AT+CMER](#). Interface settings are saved with [AT&W](#) and can be displayed with [AT&V](#). The frequency of event report generation can be configured with AT command [AT^SCFG](#). Refer to [Call Status Information](#) for further detail on the configuration options.
- The additional read command returns an indication whether event reporting is active for the current interface. Mind that the URC will be displayed only if the URC presentation mode for the interface concerned has been configured with [AT+CMER](#).
- The exec command returns, like [AT+CLCC](#), a list of current calls. If the command is successful, but no calls are available, no information response is sent to the TE.

### Syntax

Test Command

```
AT^SLSS=?
```

Response(s)

```
^SLCC: (list of supported<n>s)  
OK
```

Read Command

```
AT^SLCC?
```

Response(s)

```
^SLCC: <n>  
OK
```

Exec Command

```
AT^SLCC
```

Response(s)

```
[^SLCC:<idx>, <dir>, <stat>, <mode>, <mpty>, <traffic channel assigned>[, <number>, <type>[, <alpha>]]]  
[^SLCC:<idx>, <dir>, <stat>, <mode>, <mpty>, <traffic channel assigned>[, <number>, <type>[, <alpha>]]]  
[^SLCC:...]  
OK  
ERROR  
+CME ERROR: <err>
```



Write Command

AT^SLCC=[<n>]

---

Response(s)

OK  
ERROR  
+CME ERROR: <err>

---

PIN	ASC0	MUX1	MUX2	MUX3	🔇	Last
+	+	+	+	+	-	-

### Unsolicited Result Code

Unsolicited Call Status information if the list of current calls is empty:

^SLCC:

if one or more calls are currently in the list:

^SLCC: <idx>, <dir>, <stat>, <mode>, <empty>, <traffic channel assigned>[,<number>, <type>[, <alpha>]]

[^SLCC: <idx>, <dir>, <stat>, <mode>, <empty>, <traffic channel assigned>[,<number>, <type>[, <alpha>]]]

[... ]

^SLCC:

URC "[^SLCC](#)" displays the list of current calls as displayed with the execute command [AT^SLCC](#). The list is displayed in the state it has at the time of display, not in the state it had when the signal was generated.

The URC's occurrence indicates call status changes for any of the calls in the list of current calls.

Please refer to [Call Status Information](#) and [AT^SCFG](#) for further information about the configuration of this URC.

Event reporting can be enabled separately for each interface. Interface settings are saved with [AT+W](#) and can be displayed with [AT+V](#). Additionally, The URC presentation mode for the interface must be configured with [AT+CMER](#).

Depending on the value of [AT^SCFG](#) setting <sucs>, Indicator "[^SLCC](#)" will be issued (if configured with write command [AT^SLCC](#) and [AT+CMER](#))

- when a state transition ends in state "active" or in state "unknown" (if [AT^SCFG](#) setting <sucs>="restricted")
- when any state transition (including transitions beginning or ending in state "unknown") occurs in the list of active calls, or when a traffic channel is established (if [AT^SCFG](#) setting <sucs>="verbose").

If multiple displays of identical list configurations occur, this happens because of short intermediate states of the list, that have already been overridden by new transitions and states. Thus, it is guaranteed that the configuration displayed is always the current configuration at the time of the last display.

The list of active calls displayed with this URC will always be terminated with an empty line preceded by prefix "[^SLCC:](#) ", in order to indicate the end of the list.



### Parameter Description

`<n>`<sup>(num){&W){&V}</sup>

0 <sup>(&amp;F)</sup>	Presentation of URC " <a href="#">^SLCC</a> " disabled
1	Presentation of URC " <a href="#">^SLCC</a> " enabled

`<idx>`<sup>(num)</sup>

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

`<dir>`<sup>(num)</sup>

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

`<stat>`<sup>(num)</sup>

State of the call

0	Active
1	Held
2	Dialing (MOC)
3	Alerting (MOC)
4	Incoming (MTC)
5	Waiting (MTC)
6	Terminating: The call is not active anymore, but inband information is still available.
7	Dropped: The call has been suspended by the network, but may be resumed later.



### <mode><sup>(num)</sup>

#### Bearer/teleservice

0	Voice
1	Data
2	Fax
3	Voice followed by data, voice mode (only in connection with single numbering scheme <a href="#">AT+CSNS</a> )
4	Alternating voice/data, voice mode (only in connection with single numbering scheme <a href="#">AT+CSNS</a> )
5	Alternating voice/fax, voice mode (only in connection with single numbering scheme <a href="#">AT+CSNS</a> )
6	Voice followed by data, data mode (only in connection with single numbering scheme <a href="#">AT+CSNS</a> )
7	Alternating voice/data, data mode (only in connection with single numbering scheme <a href="#">AT+CSNS</a> )
8	Alternating voice/fax, fax mode (only in connection with single numbering scheme <a href="#">AT+CSNS</a> )
9	Unknown

### <mpty><sup>(num)</sup>

0	Call is not one of multiparty (conference) call parties
1	Call is one of multiparty (conference) call parties

### <traffic channel assigned><sup>(num)</sup>

0	No traffic channel assigned. Transmission of DTMF tones not possible.
1	Traffic channel is assigned and the progress indicator IE has been received (call setup) or a voice connection has an active state. The parameter indicates that the audio path is activated. DTMF tones can be sent with <a href="#">AT+VTS</a> .

### <number><sup>(str)</sup>

Phone number in format specified by [<type>](#)



### <type><sup>(num)</sup>

Type of address octect

145	Dialing string <number> includes international access code character '+'
128	Number is restricted
129	Otherwise

### <alpha><sup>(str)(+CSGS)</sup>

Alphanumeric representation of <number> corresponding to the entry found in phonebook (see for example [AT+CPBW](#), parameter <text>).

Due to time constraints on the necessary evaluation of the phonebook, this parameter may show a default value during early call phases (e.g. for <stat>= "dialing", "incoming" or "alerting"), even if a phonebook entry is present for the number concerned.

### Notes

- Teleservices other than voice, data, fax are not fully supported by ME. They are used only in connection with the handling for AT+CSNS, and may therefore occur in parameter <mode> for mobile terminated calls.
- If a URC "^SLCC" in verbose mode (see AT^SCFG) has been buffered while the interface was in dedicated mode (depending on the settings of AT+CMER parameter <bfr>), each buffered event indicator will be output as a separate URC after the interface returns to idle mode. However, the output will deliver the list of current calls in the "current" state (at the time when the output is generated), possibly leading to multiple displays of identical list configurations.
- Some parameters of the AT+CHLD command, as well as some situations where the call status in the network changes very quickly (e.g. the transition between <stat>= "unknown", "dialing" and "alerting" for a call to a reachable subscriber within the registered network) may lead to quasi-simultaneous changes to the states of one or several calls in the list, possibly leading to multiple displays of identical list configurations.
- If multiple displays of identical list configurations occur, this happens because of intermediate states of the list, that have already been overridden by new transitions and states. Thus, it is guaranteed that the configuration displayed in such cases is the current configuration at the time of the last display.
- It is advisable to receive URC "^SLCC" on an interface that is not used for call initiation, if verbose output is configured. If only voice calls are expected, a setting of AT^SM20= 0 may be used alternatively in order to keep the call from blocking the interface.



## Examples

### EXAMPLE 1

<pre>^SYSSTART at+cpin=9999 OK  +CREG: 2  +CREG: 1,"0145","0016" at^sm20=0  OK atd"1234567"; OK  ^SLCC: 1,0,2,0,0,0,"1234567",129,"Called Party" ^SLCC: ^SLCC: 1,0,2,0,0,1,"1234567",129,"Called Party"  ^SLCC: ^SLCC: 1,0,3,0,0,1,"1234567",129,"Called Party" ^SLCC: ^SLCC: 1,0,0,0,0,1,"1234567",129,"Called Party" ^SLCC: atd23456; OK  ^SLCC: 1,0,1,0,0,0,"1234567",129,"Called Party" ^SLCC: 2,0,2,0,0,1,"23456",129  ^SLCC: ^SLCC: 1,0,1,0,0,0,"1234567",129,"Called Party" ^SLCC: 2,0,2,0,0,1,"23456",129  ^SLCC: ^SLCC: 1,0,1,0,0,0,"1234567",129,"Called Party" ^SLCC: 2,0,3,0,0,1,"23456",129 ^SLCC: ^SLCC: 1,0,0,0,0,1,"1234567",129,"Called Party" ^SLCC:  NO CARRIER ^SLCC: NO CARRIER</pre>	<p>We are now registered. Command ATD for an outgoing voice call will terminate immediately with response "OK".</p> <p>We start a voice call. "OK" response is issued immediately because of setting AT^SM20="0". MO voice call starts, paging B-party. End of current list Traffic channel established, network may now transmit network announcements, ME may now transmit DTMF tones. End of current list Call is now ringing at B-Party. End of current list B-Party has accepted the call, connection established. End of current list. We start a second voice call. "OK" response is issued immediately because another call is already active (cf. ATD). The active call is automatically put on hold, triggering the display of the list. The second call has already started before the indication for the held call could be displayed End of current list. The identical list is displayed again, triggered by the start of the second voice call. The status of the second list entry has already been displayed with the previous URC. End of current list. The held call doesn't change status right now. The second call is now alerting the B-Party. End of current list. The held call doesn't change status right now. End of current list: the B-Party of the second call has not accepted the call in time, the second call has ended. The second call has ended. list is now empty: B-Party has ended the first call. The first call has ended.</p>
--	---



## EXAMPLE 2

<code>^SLCC: 1,1,4,0,0,1,"1234567",129</code>	Incoming voice call is signalled. Display is triggered by the incoming call, but the current status of the call at the time of display already comprises an active traffic channel.
<code>^SLCC:</code>	End of current list.
<code>RING</code>	Incoming call is signalled.
<code>Incoming call is signalled.</code>	The incoming call had a traffic channel assigned from the start. This second identical display is triggered by the traffic channel assignment. Since the traffic channel was already indicated in the previous URC, both instances of the URC contain identical information.
<code>^SLCC:</code>	End of current list
<code>RING</code>	Incoming call is signalled.
<code>ata</code>	Incoming call is accepted.
<code>OK</code>	call is established.
<code>^SLCC: 1,1,0,0,0,1,"1234567",129</code>	The call is now active.
<code>^SLCC:</code>	End of current list.
<code>ath</code>	Hang up the call.
<code>OK</code>	hang up complete.
<code>^SLCC:</code>	The list of current calls is empty again.



### 4.3. AT^SCNI List Call Number Information

#### Syntax

Test Command

AT^SCNI =?

Response(s)

OK

Exec Command

AT^SCNI

Response(s)

^SCNI: <id>1[,<cs>[,<number>,<type>]]

^SCNI: <id>2[,<cs>[,<number>,<type>]]

[...]

OK

ERROR

+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
+	+	+	+	+	-	-

#### Command Description

TA returns a list of current calls of ME.

#### Parameter Description

<id><sup>(num)</sup>

call identification number as described in GSM 02.30[19] subclause 4.5.5.1; this number can be used in [AT+CHLD](#) command operations

1...7

<CS><sup>(num)</sup>

Call status of respective call number (first parameter)

- |   |                  |
|---|------------------|
| 0 | call hold        |
| 1 | call in progress |
| 2 | waiting call     |



`<number>`<sup>(str)</sup>

string type phone number in format specified by `<type>`

`<type>`<sup>(num)</sup>

type of address octet in integer format; 145 when dialling string includes international access code character "+", 128 when number is restricted otherwise 129

**Note**

- See also GSM 07.07: [AT+CLCC](#)



## 4.4. AT^SLCD Display Last Call Duration

### Syntax

Test Command

```
AT^SLCD=?
```

Response(s)

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

Exec Command

```
AT^SLCD?
```

Response(s)

```
^SLCD: <time>  
OK  
ERROR  
+CME ERROR: <err>
```

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
+	+	+	+	+	-	-

### Command Description

TA returns last call duration or current call duration.

### Parameter Description

<time><sup>(str)</sup>

Format is "hh:mm:ss", where characters indicate hours, minutes, seconds; E.g. 22:10:00 "22:10:00" Max value is 9999:59:59

### Note

- The proper working of that command is network dependant.



## 4.5. AT^STCD Display Total Call Duration

### Syntax

Test Command

```
AT^STCD=?
```

Response(s)

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

Exec Command

```
AT^STCD
```

Response(s)

```
^STCD: <time>  
OK  
ERROR  
+CME ERROR: <err>
```

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
+	+	+	+	+	-	-

### Command Description

TA returns total call duration (accumulated duration of all calls).

### Parameter Description

<view><sup>(num)</sup>

Format is "hh:mm:ss", where characters indicate hours, minutes, seconds; E.g. 22:10:00 "22:10:00" Max value is 9999:59:59

### Notes

- The Total Call Duration will not be reset by power off or other means.
- The proper working of that command is network dependant and only for MO calls.



## 4.6. ATA Connect to Incoming Call

**ATA** connects the MG21 to an incoming voice or data call, which is indicated by a "RING" URC. **AT+CRC** allows to customize the format of the incoming call URC.

**ATA** may also be used to accept a network request for a PDP context activation (see **ATA**).

### Syntax

Test Command

ATA

Response(s)

In case of incoming data call, if successfully connected (ME switches to data mode):

CONNECT <text>

In case of voice call, if successfully connected:

OK

When ME returns to command mode after call release:

OK

If incoming call is not available, i.e. already disconnected or hanged up:

NO CARRIER

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + + + - -

Reference(s)

V.250

### Parameter Description

<text><sup>(str)</sup>

Connection speed

Presented only if **ATX** parameter setting is greater 0.

Possible connection speed values:

"300"

"1200"

"2400"

"4800"

"9600"

"14400"



### **Notes**

- Additional AT commands on the same command line are ignored.
- **ATA** may be aborted if receiving a character during execution. It can't be aborted in some connection setup states, such as handshaking.
- If **AT+FCLASS** setting is 1 or 2, all incoming calls will be answered as fax calls, when ATA is issued on multi-plexer channel 1 resp. ASC0. For calls explicitly signalled as voice or data calls, this procedure will fail with result code "NO CARRIER", but the call in question will continue to ring.

It is possible to change the setting for **AT+FCLASS** to 0 while the call is ringing, and accept the call normally afterwards with **ATA**.



## 4.7. ATD Mobile originated call to specified number

### Syntax

Exec Command																	
ATD<n>[<mgsms>][:]																	
Response(s)																	
If no dialtone (parameter setting <a href="#">ATX2</a> or <a href="#">ATX4</a> ): NO DIALTONE																	
If busy (parameter setting <a href="#">ATX3</a> or <a href="#">ATX4</a> ): BUSY																	
If a connection cannot be set up: NO CARRIER NO DIALTONE																	
If successfully connected and non-voice call (TA switches to online data mode): CONNECT <text>																	
When TA returns to command mode after call release: OK																	
If successfully connected and voice call: OK																	
<table border="1"> <tr> <td>PIN</td> <td>ASC0</td> <td>MUX1</td> <td>MUX2</td> <td>MUX3</td> <td></td> <td>Last</td> </tr> <tr> <td>±</td> <td>+</td> <td>+</td> <td>±</td> <td>±</td> <td>-</td> <td>-</td> </tr> </table>	PIN	ASC0	MUX1	MUX2	MUX3		Last	±	+	+	±	±	-	-	<table border="1"> <tr> <td>Reference(s)</td> </tr> <tr> <td>V.250</td> </tr> </table>	Reference(s)	V.250
PIN	ASC0	MUX1	MUX2	MUX3		Last											
±	+	+	±	±	-	-											
Reference(s)																	
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 voice calls, you have the choice of two different response modes that can be selected with AT^SM20:
    - AT^SM20=1 (factory default) causes the ME to respond once the call setup is completed either successfully ("OK") or unsuccessfully ("NO CARRIER", "NO DIALTONE", "BUSY").
    - AT^SM20=0 causes the ME to return "OK" immediately after dialing was completed (i.e. before call setup terminates successfully or unsuccessfully).
  - 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"). The settings of AT^SM20 do not apply.
- Different call release indications:
- Upon termination, an outgoing fax or data call may show a different result code than a voice call would show under identical conditions. In order to track down the actual reason for call termination, AT+CEER or ATS18 should be used for all applicable connections.
- Using ATD during an active call:



- When a user originates a second voice call while there is already an active voice call, the first call will automatically put on hold. The second call attempt is acknowledged with "OK" immediately after dialing with ATD has completed, without relation to a successful call setup. In case of failure, the additional result codes "NO CARRIER", "NO DIALTONE", "BUSY" will be presented afterwards (see example below).

### Parameter Description

`<n>`<sup>(text)</sup>

String of dialing digits and optional V.250 modifiers: 0-9, \*, #, +, A, B, C, D and p

The following V.250 modifiers are ignored: ,(comma), T, !, W, @

`<mgsm>`<sup>(str)</sup>

String of GSM modifiers:

l	Activates CLIR (disables presentation of own phone number to called party, if no *#31#-code is within the dial string)
i	Deactivates CLIR (enables presentation of own phone number to called party, if no *#31#-code is within the dial string)
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.
- `<mgsm>` is not supported for data calls.
- `<n>` is default for last number that can be dialled by ATDL.
- See also ATX for `<text>`.
- If ATD is used with a USSD command (e.g. ATD\*100#;) an AT+CUSD=1 is executed implicitly (see AT+CUSD).
- Parameter 'G' or 'g' will be ignored if Closed User Group was already activated, respectively deactivated with AT+CCUG command before. Call by call invocation of CUG uses the settings provisioned by the provider or, if available, the settings of the parameters `<index>` and `<info>` made with AT+CCUG.
- The ME is equipped with a "Blacklist" function according to GSM02.07 Annex A. The handling of failed call attempts follows the timing restrictions specified there. When the maximum number of failed call attempts is reached the number will be blacklisted. Call attempts to blacklisted numbers will be barred by the ME and not signalled to the network.  
An attempt to start a voice call to a barred phone number is denied with a "+CME ERROR: call barred".  
An attempt to start a data or fax call to a barred phone number is denied with "NO CARRIER".



According to GSM02.07 Annex A, the barred numbers will be removed from the blacklist after a call attempt was successful or after module restart.

■ Emergency calls:

If no SIM is inserted, call numbers 000, 08, 110, 112, 118,119, 911 and 999 cause an emergency call setup.

If a SIM with ECC file is inserted, 112 and 911 and all additional call numbers stored in the ECC file cause an emergency call setup.

If a SIM without or empty ECC file is inserted, call numbers 112 and 911 and in addition all call numbers specified with `AT^SCFG`, "Call/ECC", parameter `<ecc>` will cause an emergency call setup.

■ DTMF transmission:

If a dial string contains the call modifier "p" the digits after this call modifier till the end are handled as DTMF tones, which are transmitted at connect state for voice calls. When encountering the DTMF separator subsequently, the module will insert a pause.

### **Example**

The following example shows the call setup procedure when a call is already active and a second call attempt fails because the line of the called party is busy:

ATD03012345678;	Dialing out the first party's number.
OK	The first call is established.
ATD03022222222;	The number of the second party is dialed.
OK	The response "OK" is issued immediately though no call is established (same behavior as is you had chosen <code>AT^SM20=0</code> .)
BUSY	Line of the second called party is busy.



#### 4.7.1. ATD<mem><n> Mobile originated call using specific memory and index number

##### Syntax

Exec Command

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

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

NO DIALTONE

When TA returns to command mode after call release:

OK

If successfully connected:

OK

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + ± ± - -

Reference(s)

V.250

##### Command Description

TA attempts to set up an outgoing call to the specified number. The termination character ";" is mandatory since dialing from a phonebook is only supported for voice calls and for sending \*# codes of Supplementary Services or other functions.

##### Parameter Description

<mem><sup>(str)</sup>

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
“VM“	CPHS voice mailbox phonebook

<n><sup>(num)</sup>

Integer type memory location in the range of locations available in the selected memory, i.e. the index number returned by [AT+CPBR](#).

<mgsms><sup>(str)</sup>

String of GSM modifiers:

- |   |   |
|---|---|
| l | Activates CLIR (disables presentation of own phone number to called party, if no *#31#-code is within the dial string)  |
| i | Deactivates CLIR (enables presentation of own phone number to called party, if no *#31#-code is within the dial string) |

### 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.
- There is no [<mem>](#) for emergency call ("EN").
- The command is not applicable to data calls. Any attempt to dial a data call number from [<mem>](#) causes the result code "NO CARRIER" to appear.
- Parameter [<mgsms>](#) only if no \*# code is within the dialing string.
- 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>"SM"15;  
OK
```



### EXAMPLE 3

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

```
ATD>"LD"9;  
OK
```

## 4.7.2. ATD><n> Mobile originated call from active memory using index number

### Syntax

Exec Command

```
ATD><n>[<mgsms>];
```

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

NO DIALTONE

When TA returns to command mode after call release:

OK

If successfully connected:

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	±	±	-	-

Reference(s)

V.250

### Command Description

TA attempts to set up an outgoing call to the specified number. The termination character ";" is mandatory since dialing from a phonebook is only supported for voice calls and for sending \*# codes of Supplementary Services or other functions.

### Parameter Description

<n><sup>(num)</sup>

Integer type memory location in the range of locations available in the selected memory, i.e. the index number returned by [AT+CPBR](#).



<mgsm><sup>(str)</sup>

String of GSM modifiers:

- l Activates CLIR (disables presentation of own phone number to called party)
- i Deactivates CLIR (enables presentation of own phone number to called party)

### 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.
- The command is not applicable to data calls. Any attempt to dial a data call number from <n> causes the result code "NO CARRIER" to appear.
- Parameter <mgsm> only if no \*# code is within the dialing string.

### 4.7.3. ATD<str> Mobile originated call from active memory using cor-responding field

#### Syntax

Exec Command

ATD<str>[<mgsm>];

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

NO DIALTONE

When TA returns to command mode after call release:

OK

If successfully connected:

OK

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + ± ± - -

Reference(s)

V.250



## Command Description

This command searches the active phonebook for a given string `<str>` and dials the assigned phone number. The termination character ";" is mandatory since dialing from a phonebook is only supported for voice calls and for sending \*# codes of Supplementary Services or other functions.

## Parameter Description

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

String type value ("x") that 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.

`<str>` must be wrapped in quotation marks (""), if escape sequences or parameter `<mgsm>` are used or if the alphanumeric strings contains a blank. If not, quotation marks are optional. If `AT+CSCS` is set to "UCS2", with respect to the coding of UCS2-characters only phonebook entries that contain an alphanumeric string with a size less than the half of the parameter `<tlength>` from `AT+CPBW` can be dialed.

`<mgsm>`<sup>(str)</sup>

String of GSM modifiers:

- |   |   |
|---|---|
| l | Activates CLIR (disables presentation of own phone number to called party, if no *#31#-code is within the dial string)  |
| i | Deactivates CLIR (enables presentation of own phone number to called party, if no *#31#-code is within the dial string) |

## 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.
- The command is not applicable to data calls. Any attempt to dial `<str>` without semicolon ";" causes the result code "NO CARRIER" to appear.
- Parameter `<mgsm>` only if no \*# code is within the dialing string.



#### 4.7.4. 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.

Table: Star-Hash (\*#) Command Overview

Star-Hash Code	Functionality	Response
<b>Phone Security</b>		
*#06#	Query IMEI	<IMEI> OK
**04[2]*oldPin[2]*newPin[2]*newPin[2]#	Change SIM pwd	+CME ERROR: <err> / OK
**05[2]*unblKey[2]*newPin[2]*newPin[2]#	Change/Unblocking SIM pwd	+CME ERROR: <err> / OK
*#0003*MasterPhoneCode#	Unlock "PS" lock with Master Phone Code	+CME ERROR: <err> / OK
*[*]03*[ZZ]*oldPw*newPw*newPw#	Registration of net password	+CME ERROR: <err> / OK
<b>Phone number presentation</b>		
*#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 : <n>,<m> OK (see: AT+COLP)
*#77#	Check status of COLR (Connected Line Identification Restriction)	+COLR : 0,<m> OK (where <m> = active or not active)
<b>Call forwarding</b>		
(choice of *,#,*,**,##)21*DN*BS#	Act/deact/int/reg/eras CFU	^SCCFC : <reason>, <status>, <class> [...] like +CCFC *) (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
<b>Call waiting</b>		
(choice of *,#,*)43*BS#	Activation/deactivation/int WAIT	+CCWA : <status>, <class> [...] like +CCWA *) (see: AT+CCWA)



Star-Hash Code	Functionality	Response
Call barring		
(choice of *,#, #)33*Pw*BS#	Act/deact/int BAOC	^SCLCK : <fac>, <status>, <class> [, ...] like +CLCK *) (Refer to <a href="#">AT+CLCK</a> )
(choice of *,#, #)331*Pw*BS#	Act/deact/int BAOIC	see above
(choice of *,#, #)332*Pw*BS#	Act/deact/int BAOIC exc.home	see above
(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

\*) Notes on ^SCCFC, +CCWA, ^SCLCK: The output depends on the affected basic service of the Star-Hash code. One line will be output for every tele- or bearer service coded in basic service code BS. ^SCCFC and ^SCLCK are modified by giving an additional <reason> or <fac> in front of the regular output string generated by the standard commands +CCFC and +CLCK.

Table: Abbreviations of Codes and Parameters

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 asynchrony 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 12 16 12 25 24 27 26 21 22 20 --
T	Time in seconds	In contrast to <a href="#">AT+CCFC</a> , 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. asterisk, hash or digit in case of USSD, or digits in case of held calls or multiparty calls)	--



Table: 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 <a href="#">AT+CCFC</a> , <a href="#">AT+CLCK</a>
<fac>	Facility lock, refer to <a href="#">AT+CLCK</a>
<reason>	Call forwarding reason

For exact specification of format and parameters for Star-Hash commands refer to GSM 02.04 and GSM 02.30, Annex C.

Table: Star-Hash Commands for Supplementary Services

Star-Hash Code	Abbreviations	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

#### 4.7.5. 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).

We recommend to take advantage of the "[^ASSIM READY](#)" URC. If enabled with [AT^SSET](#), this URC acknowledges to the user that SIM data is accessible after SIM PIN authentication. It will be delivered once the ME has completed reading data from the SIM card

- ∅ ... 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	+	-	∅	+
AT^SMGL	+	-	∅	+
AT+CMGR	∅	-	∅	+
AT^SMGR	∅	-	∅	+
AT+CSCA	∅	-	+	-
AT^SSTGI	∅	+	+	+
AT^SSTR	∅	+	+	+
AT+CPBR	∅	+	∅	+
AT+CPBW	∅	+	∅	+
AT+CPBS	∅	+	+	+
AT^SDLD	+	+	∅	∅
AT^SPBC	∅	+	∅	+
AT^SPBD	∅	+	∅	+
AT^SPBG	∅	+	∅	+
AT^SPBS	∅	+	∅	+
ATD><mem><n>	+	∅	∅	∅

#### 4.7.6. Remote-SAT Command Types

The Command Type value (cmdType) identifies the type of command or associated response passed between the TE and the ME.

cmdType is the parameter that comes first in AT commands, in responses to [AT^SSTGI](#) and [AT^SSTR](#) commands, and in the "[^SSTN](#)" URC. Also, the cmdType values may be used as Next Action Indicator for the SETUP MENU and for SELECT ITEM.

The SAT implementation supports SAT class 3 (GSM 11.14 Release 99, letter class "c").



Table: Command Type Table

Proactive Toolkit commands vs. Terminal Responses			
Proactive Toolkit command (AT^SSTR=<cmdType>)	Terminal Response in Automatic Response Mode (see AT^SSTA=0)	Terminal Response user choices in Explicit Response Mode (see AT^SSTR=<cmdType>,<status>)	Terminal Response after user timeout in Explicit Response Mode (see URC ^SSTN: <cmdTerminateValue>)
REFRESH (1)	0	0	0
SET UP EVENT LIST (5)	0	0, 32, 48, 132	132
SET UP CALL (16)	48	0, 4, 16, 20, 32, 34, 35, 48, 132	132
SEND SS (17)	48	0, 4, 20, 32, 48, 132	132
SEND USSD (18)	48	0, 4, 20, 32, 48, 132	132
SEND SHORT MESSAGE (19)	48	0, 4, 32, 48, 132	132
SEND DTMF (20)	48	0, 4, 16, 32, 48, 132	132
LAUNCH BROWSER (21)	48	0, 4, 32, 34, 38, 48, 132, 138, 238, 239	132
PLAY TONE (32)	48	0, 4, 16, 32, 48, 132	132
DISPLAY TEXT (33)	0	0, 4, 16, 17, 18, 32, 48, 132	132
GET INKEY (34)	48	0, 4, 16, 17, 18, 32, 48, 132	18
GET INPUT (35)	48	0, 4, 16, 17, 18, 32, 48, 132	18
SELECT ITEM (36)	48	0, 4, 16, 17, 18, 32, 48, 132	18
SET UP MENU (37)	0	0, 4, 32, 48, 132	132
SET UP IDLE MODE TEXT (40)	48	0, 4, 32, 48, 132	132
LANGUAGE NOTIFICATION (53)	0	0	0



## 4.8. ATDI Mobile originated data call to ISDN number

### Syntax

Exec Command

ATDI<n>

Response(s)

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

NO DIALTONE

All other error reasons:

+CME ERROR: <err>

If successfully connected :

CONNECT <text>

When TA returns to command mode after call release:

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + - - - -

Reference(s)

V.250

### Command Description

TA attempts to set up an outgoing data call to ISDN number.

### Parameter Description

<n><sup>(str)</sup>

ISDN number

String with maximum length of 20 characters. Allowed characters: +, 0-9, A, B, C.

### 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.



## 4.9. ATDL Redial last number used

### Syntax

Exec Command

ATDI<n>

Response(s)

If there is no last number or number is not valid:

+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

NO DIALTONE

If successfully connected and non-voice call (TA switches to online data mode):

CONNECT <text>

When TA returns to command mode after call release:

OK

If successfully connected and voice call:

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	±	±	-	-

Reference(s)

V.250

### Command Description

This command redials the last voice and data call number used in the ATD command. If terminated with semicolon ";" ATDL dials the last voice call number stored in the "LD" phonebook. Otherwise, the last dialed data or fax number will be used (not contained in the "LD" phonebook).

### 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.
- Parameter "I" and "i" only if no \*#-code is within the dial string.



## 4.10. ATH Disconnect existing connection

### Syntax

Exec Command

```
ATH[<n>]
```

Response(s)

```
OK
```

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

Reference(s)

V.250

### Command Description

Disconnect existing call from command line by local TE and terminate call.

### Parameter Description

<n><sup>(num)</sup>

[0] disconnect from line and terminate call

### Notes

- OK is issued after circuit 109 (DCD) is turned off, if it was previously on.
- ATH terminates every circuit switched call (voice, data or fax), even if it is issued via another interface. This behavior is in accordance with ITU-T V.250; (07/97, "Hook control": "ATH is terminating any call in progress.").
- ATH clears any active PDP context or terminates any existing PPP connection, but only if issued on the same interface where GPRS is used and if there is no pending network request for PDP context activation. It does not affect PDP contexts and PPP connections on other interfaces.



## 4.11. AT+CHUP Hang up call

### Syntax

Test Command

AT+CHUP=?

Response(s)

OK  
ERROR  
+CME ERROR: <err>

Exec Command

AT+CHUP

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

Reference(s)

GSM 07.07

### Command Description

Cancels all active and held calls.

### Note

- [AT+CHUP](#) implements the same function as [ATH](#).



## 4.12. AT^SHUP Hang up call(s) indicating a specific GSM04.08 release cause

The **AT^SHUP** write command terminates calls known to the ME and indicates a specific GSM04.08 release cause specified by the user. The command can be used for voice, Fax and data calls. Calls will be terminated regardless of their current call status, which may be any of the states listed with **AT+CLCC**.

### Syntax

Test Command

AT^SHUP=?

Response(s)

OK

Write Command

AT^SHOM

Response(s)

OK

ERROR

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + + + - -

### Parameter Description

<cause><sup>(num)</sup>

Release cause

GSM04.08 release cause to be indicated to the network.

The MG21 will release the selected connection(s) with release cause indication "cause" and location "user" (0) in the "disconnect" protocol message to the network. It depends on the network whether or not the release cause will be forwarded to the remote party.

1	Send GSM04.08 release cause "unassigned (unallocated) number"
16	Send GSM04.08 release cause "normal call clearing"
17	Send GSM04.08 release cause "user busy"
18	Send GSM04.08 release cause "no user responding"
27	Send GSM04.08 release cause "destination out of order"
31	Send GSM04.08 release cause "normal, unspecified"





### 4.13. +++ Escape from Data Mode to AT Command Mode

+++ escape sequence is only available during a CSD call or a GPRS connection. The +++ character sequence causes the MG21 to pause data mode and return to AT command mode. This allows to enter AT commands while maintaining the data connection to the remote device or, accordingly, the GPRS connection. By the way the same task can be performed by toggling the DTR line if [AT&D](#) is set to 1. [ATO](#) is used to resume data or PPP online mode.

To prevent the +++ character 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.

#### Syntax

Exec Command						
+++						
Response(s)						
OK						
PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	-	-	-	-	-
Reference(s)						
V.250						

#### Notes

- In Multiplex mode the +++ sequence does not work. Therefore, if required in Multiplex mode, the escape sequence needs to be implemented in the Customer Application. Design solutions, for example using the DTR signal or a modem status command (MSC), can be found in Multiplexer User's Guide. Also refer to [AT+CMUX](#).
- When using XON/XOFF flow control ([AT\Q1](#)) in online mode, +++ should not be used while the data transmission is paused with XOFF. Before entering the command mode with +++ the paused transmission should be resumed using the XON character.



## 4.14. ATO Switch from command mode to data mode / PPP online 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.

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	-	-	-	-

Reference(s)

V.250

### Command Description

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

### Parameter Description

<n><sup>(num)</sup>

[0] Switch from command mode to data mode



## 4.15. ATSO Set number of rings before automatically answering a call

### Syntax

Read Command ATSO? Response(s) <n> OK ERROR	
Write Command ATSO=<n> Response(s) OK ERROR	
PIN ASC0 MUX1 MUX2 MUX3  Last ± + + + + - -	Reference(s) V.250

### Parameter Description

<n> <sup>(num)(&amp;W)(&amp;V)</sup>	
000 <sup>(&amp;F)</sup>	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.
- Autoanswering of CSD data and fax calls is supported on ASC0 /Mux1 only.
- A CSD call will not be automatically answered when the module is in GPRS online mode, but it is possible in GPRS command mode. The application can detect a call by evaluating the RING line and determine whether to change into GPRS command mode or stay in GPRS online mode until GPRS is available again. To answer, to reject or to wait for automatically answering the incoming call the application has to switch into GPRS command mode.
- If <n> is set to higher values, the calling party may hang up before the call is automatically answered.
- The correlation between ATSO and ATSO7 is important.  
Example: Call setup may fail if ATSO7=30 and ATSO=20.
- Setting is local to the interface. It is allowed to have different settings on different interfaces. In such cases the interface 'wins', which is idle and uses the smallest <n> value.
- The ATSO write command is PIN protected.



- According to "3GPP TS 27.007 (GSM 07.07): AT command set for User Equipment (UE)", ATSO is also used as GPRS compatibility command to answer automatically to a network request for PDP context activation (see Section 11.21). Therefore, when the ATSO write command is issued with <n> greater than 0, the ME will attempt to perform a GPRS attach if not yet attached and if configured to do so (due to the setting AT^SCFG="GPRS/ATSO/withAttach","on").

If the automatic GPRS attach fails the ME keeps trying to attach for approx. 5 minutes, before ATSO ends up with "ERROR" or "+CME ERROR: unknown", though the new <n> value takes effect. To avoid the risk of long response times to ATSO in such case take care that the parameter AT^SCFG=<gs0aa> is off, if autoanswer mode is not needed for GPRS or if the mobile works in non-GPRS networks.

The GPRS attach will not be performed on recalling a stored user profile with ATZ or on powerup, even though a value <n> greater than 0 was stored in the user profile with AT&W.



## 4.16. ATS6 Set pause before blind dialing

ATS6 is implemented for compatibility reasons only, and has no effect.

### Syntax

Read Command

ATS6?

Response(s)

<n>

OK

Write Command

ATS6=<n>

Response(s)

OK

ERROR

PIN	ASC0	MUX1	MUX2	MUX3		Last
-	+	+	-	-	-	-

Reference(s)

V.250

### Parameter Description

<n><sup>(num)(&w)(&v)</sup>



#### 4.17. **ATS7**                      **Set number of seconds to wait for connection completion**

**ATS7** specifies the number of seconds the ME 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 ME hangs up.

##### **Syntax**

Read Command	
ATS7?	
Response(s)	
<n>	
OK	
Write Command	
ATS7=<n>	
Response(s)	
OK	
ERROR	
PIN   ASC0   MUX1   MUX2   MUX3      Last	Reference(s)
-   +   +   -   -   -   -	V.250

##### **Parameter Description**

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

Number of seconds to wait for connection completion

000...060<sup>(&F)</sup>

##### **Notes**

- Command **ATS7** is only applicable to data calls.
- Values greater than 60 cause no error, but <n> will be restored to the maximum value of 60.
- 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**.



## 4.18. AT58 Comma Dial Pause Time

AT58 is implemented for compatibility reasons only, and has no effect.

### Syntax

Read Command

AT58?

Response(s)

<n>

OK

Write Command

AT58=<n>

Response(s)

OK

PIN	ASC0	MUX1	MUX2	MUX3	☎	Last
-	+	+	-	-	-	-

Reference(s)

V.250

### Parameter Description

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



#### 4.19. ATS10 Set disconnect delay after indicating the absence of data carrier

**ATS10** determines the amount of time, that the ME remains connected in absence of a data carrier. If the data carrier is detected before disconnect, the ME remains connected.

##### **Syntax**

Read Command <b>ATS10?</b> Response(s) <n> OK	
Write Command <b>ATS10=&lt;n&gt;</b> Response(s) OK ERROR	
PIN ASC0 MUX1 MUX2 MUX3  Last - + + - - - -	Reference(s) V.250

##### **Parameter Description**

<n> <sup>(num)(&amp;W)(&amp;V)</sup>	
001...2 <sup>(&amp;F)</sup> ...254	Number of tenths of seconds to wait before disconnecting after ME has indicated the absence of received line signal



## 4.20. AT+CCALR Call Ready Query

### Syntax

Test Command

```
AT+CCALR=?
```

Response(s)

```
+CCALR: (list of supported <mode>s)  
OK
```

Read Command

```
AT+CCALR=?
```

Response(s)

ME returns the status of result code presentation and an integer **<n>** which shows whether the module is currently ready for phone call.

```
+CCALR: <n>  
OK
```

### Parameter Description

**<mode>**<sup>(num)</sup>

a numeric parameter which indicates whether the module is ready for phone call.

- |   |                                    |
|---|------------------------------------|
| 0 | module is not ready for phone call |
| 1 | module is ready for phone call     |

### Note

- URC “Call Ready” will be presented after power on and initialize.



## 4.21. AT+CCPD Connected Line Identification Presentation Without Alpha String

### Syntax

Read Command

AT+ CCPD?

Response(s)

+CCPD: <mode>

OK

Write Command

AT+CCPD=[<mode>]

Response(s)

OK

ERROR

### Parameter Description

<mode><sup>(num)</sup>

- |   |                                 |
|---|---------------------------------|
| 0 | Disable to present alpha string |
| 1 | Enable to present alpha string  |



## 4.22. AT+CCWE Call Meter Maximum Event

### Syntax

Test Command

AT+CCWE=?

Response(s)

+CCWE: (list of supported <mode>s)

OK

+CME ERROR: <err>

Read Command

AT+CCWE?

Response(s)

+CCWE: <mode>

OK

+CME ERROR: <err>

Write Command

AT+CCWE=[<mode>]

Response(s)

OK

+CME ERROR: <err>

Reference(s)

GSM 07.07

### ***Unsolicited result codes supported***

+CCWV

Shortly before the ACM (Accumulated Call Meter) maximum value is reached, an unsolicited result code +CCWV will be

Approximately when 5 seconds call time remains. It is also issued when starting a call if less than 5 s call time remains.

### ***Parameter Description***

<mode><sup>(num)</sup>

0	Disable call meter warning event
1	Enable call meter warning event



**Note**

- GSM 07.07 specifies 30 seconds, so SIMCOM deviates from the specification.



## 4.23. AT+CLDTMF Local DTMF Tone Generation

### Syntax

Test Command

```
AT+CLDTMF=?
```

Response(s)

```
+CLDTMF: (0-1000),(0-9,A,B,C,D,*,#)  
OK
```

Exec Command

```
AT+CLDTMF
```

Response(s)

```
OK  
Aborts any DTMF tone currently being generated and any DTMF tone sequence.
```

Write Command

```
AT+CLDTMF=<n>[,<DTMF string>]
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<n><sup>(num)</sup>

a numeric parameter (1-1000) which indicates the duration of all DTMF tones in <DTMF -string> in 1/10 secs

<DTMF -string><sup>(str)</sup>

a string parameter (string should be included in quotation marks) which has a max length of 20 chars of form <DTMF >, separated by commas.

<DTMF><sup>(str)</sup>

A single ASCII chars in the set 0-9,#,\*,A-D.



## 4.24. AT+CMOD      Configure Alternating Mode Calls

### **Syntax**

Test Command

```
AT+CMOD=?
```

Response(s)

```
+CMOD: (0)  
OK
```

Read Command

```
AT+CMOD?
```

Response(s)

```
+CMOD: <mode>  
OK
```

Write Command

```
AT+CMOD=<mode>
```

Response(s)

```
OK  
ERROR
```

### **Parameter Description**

<mode><sup>(num)</sup>

0                      Only single mode is supported



## 4.25. AT+CBST      Select Bearer Service Type

**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, especially when single numbering scheme calls or calls from analog devices are received (see **AT+CSNS**). See GSM 02.02 for a list of allowed combinations of subparameters.

### 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

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + - - - -

Reference(s)

GSM 07.07



### **Parameter Description**

**<speed>**<sup>(num)(&W)(&V)</sup>

0	Automatic Speed Selection
4	2400 bps (V.22bis)
6	4800 bps (V.32)
[7] <sup>(&amp;F)</sup>	9600 bps (V.32)
14	14400 bps (V.34)
68	2400 bps (V.110)
70	4800 bps (V.110)
71	9600 bps (V.110)
75	14400 bps (V.110)

**<name>**<sup>(num)(&W)</sup>

0	Asynchronous Modem
---	--------------------

**<ce>**<sup>(num)(&W)</sup>

Transparent mode is not supported

0	Non-transparent
---	-----------------



## 4.26. AT+CRLP      Configure RLP Parameters for Outgoing 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.

### 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)  
OK

Read Command

AT+CRLP?

Response(s)

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

Write Command

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

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	-	-	-	-

Reference(s)

GSM 07.07

### Parameter Description

<iws><sup>(num)(&V)(&V)</sup>

Interworking window size (IWF to MS)

0...61<sup>(&F)</sup>

<mws><sup>(num)(&V)(&V)</sup>

Mobile window size (MS to IWF)

0...61<sup>(&F)</sup>



<T1><sup>(num)(&W)(&V)</sup>

Acknowledgement timer (T1 in 10 ms units)

48...[78]<sup>(&F)</sup>...255

<N2><sup>(num)(&W)(&V)</sup>

Re-transmission attempts N2

1...6<sup>(&F)</sup>...255



## 4.27. 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

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + + + - -

Reference(s)

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>**<sup>(num)(&W)(&V)</sup>

0 <sup>(&amp;F)</sup>	Disable
1	Enable

**<serv>**<sup>(str)</sup>

“REL ASYNC“	Asynchronous non-transparent
“GPRS“	GPRS



## 4.28. AT+CRC Incoming Call Indication Format

**AT+CRC** controls the format of the incoming call indication.

### 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

Write Command

AT+CRC=[<mode>]

Response(s)

OK

ERROR

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-----	------	------	------	------	---	------

-	+	+	+	+	-	-
---	---	---	---	---	---	---

Reference(s)

GSM 07.07

### Unsolicited Result Codes

URC 1

RING

Incoming call indication if <mode>=0.

URC 2

+CRING: <type>

Incoming call indication if <mode>=1.



### **Parameter Description**

**<mode>**<sup>(num)(&W)(&V)</sup>

[0](&F)	Disable extended format.
1	Enable extended format. Using this mode may lead to connection failures, if the Customer Application (e.g. running WinFax) expects default formatted URCs.

**<type>**<sup>(str)</sup>

“REL ASYNC“	Asynchronous non-transparent
“FAX“	Facsimile
“VOICE“	Voice
“GPRS“	<a href="#">&lt;PDP_type&gt;</a> , <a href="#">&lt;PDP_addr&gt;</a> [, [ <a href="#">&lt;L2P&gt;</a> ][, [ <a href="#">&lt;APN&gt;</a> ]] GPRS network request for PDP context activation



## 4.29. AT+CSNS Single Numbering Scheme

The **AT+CSNS** command enables the ME to accept incoming calls when no bearer capability information is provided with the call, e.g. single numbering scheme calls or calls originating from analog devices.

### Syntax

Test Command

AT+CSNS=?

Response(s)

+CSNS: (list of supported<mode>s)

OK

Read Command

AT+CSNS?

Response(s)

+CSNS: <mode>

OK

Write Command

AT+CSNS=[<mode>]

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 ☺ Last

- + + + + - -

Reference(s)

GSM 07.07

### Parameter Description

<mode><sup>(num)</sup>

- [0]<sup>(D)</sup> Voice: Each call received without bearer element is assumed to be speech
- 2 Fax: Each call received without bearer element is assumed to be an incoming fax.
- 4 Data: Each call received without bearer element is assumed to be a data call. Please take into account that the bearer service parameters set with **AT+CBST** apply to all data calls including those received without bearer capability.



### **Notes**

- The command must be set before the call comes. By default, when you do not modify the settings, all calls received without bearer element are assumed to be voice.
- The setting will be saved when you power down the ME with `AT^SMSO`, provided that PIN authentication has been done. The saved value will be restored when the same SIM card is inserted and PIN authentication done again. If no SIM card or a different SIM card is inserted the default value 0 takes effect.



## 4.30. AT+CSTA      Select Type Of Address

### Syntax

Test Command

AT+CSTA=?

Response(s)

+CSTA: (list of supported <type>s)  
OK

Read Command

AT+CSTA?

Response(s)

+CSTA: <type>  
OK

Parameter

< type > Current address type setting.

Write Command

AT+CSTA=<type>

Response(s)

OK

If <type> is not in the parameter range:  
ERROR

Reference(s)

GSM 07.07 [13]

### Parameter Description

<type>

type of address octet in integer format;

129	Unknown type(ISDN format number)
161	National number type(ISDN format)
145	International number type(ISDN format)
177	Network specific number(ISDN format)

### Note

- The ATD Command overrides this setting when a number is dialed.



## 4.31. AT+HVOIC      Disconnect Voice Call Only

### **Syntax**

Exec Command

AT+HVOIC

Response(s)

Disconnect existing voice call by local TE from Command line and terminate call with existing PPP or CSD connection on.

OK

Reference(s)

V.25ter



## 4.32. AT+MORING Show State of Mobile Originated Call

### Syntax

Test Command

```
AT+MORING=?
```

Response(s)

```
+MORING: (0,1)  
OK
```

Read Command

```
AT+MORING?
```

Response(s)

```
+MORING: <mode>  
OK
```

Write Command

```
AT+MORING=[<mode>]
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<mode><sup>(num)</sup>

- |   |   |
|---|---|
| 0 | not show call state of mobile originated call   |
| 1 | show call state of mobile originated call. After dialing call numbers, the URC strings of MO RING will be sent if the other call side is alerted and the URC strings of MO CONNECTED will be sent if the call is established. |



### 4.33. ATP      Select pulse dialing

#### **Syntax**

Exec Command							
ATP							
Response(s)							
OK							
PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last	Reference(s)
-	+	+	-	-	-	-	V.250

#### **Note**

- No effect for GSM.

### 4.34. ATT      Select tone dialing

#### **Syntax**

Exec Command							
ATT							
Response(s)							
OK							
PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last	Reference(s)
-	+	+	-	-	-	-	V.250

#### **Note**

- No effect for GSM.



### 4.35. ATS2 Set escape sequence character

The `ATS2=43` is implemented for V.250ter compatibility reasons only, and has no effect.

#### Syntax

Read Command

ATS2?

Response(s)

<n>

OK

Write Command

ATS2=<n>

Response(s)

OK

ERROR

PIN ASC0 MUX1 MUX2 MUX3 🔔 Last

- + + + + - -

Reference(s)

V.250

#### Parameter Description

<n><sup>(num)</sup>

43

The data value



## 5. Network Service Commands



The AT Commands described in this chapter used to operate with various services in GSM Network.

Main	Supplementary
AT+COPN	AT+CACM
AT+COPS	AT^SACM
AT+CPOL	AT+CAMM
AT+CREG	AT+CAOC
AT+CSQ	AT+CCFC
AT^MONI	AT+CCUG
AT^MONP	AT+CCWA
AT^SALS	AT+CHLD
AT^SHOM	AT+CLIP
AT^SMONC	AT+CLIR
AT^SMOND	AT+COLP
AT^SMONG	AT+CPUC
AT^SOPS	AT+CSSN
AT^SPCL	AT+CUSD
AT^SPLM	
AT^SPLR	
AT^SPLW	
AT^SRPN	



## 5.1. AT+CBAND Get And Set Mobile Operation Band

### Syntax

Read Command

AT+CBAND?

Response

+CBAND:<op\_band>[,<ALL\_BAND>]  
OK

Test Command

AT+CBAND=?

Response

+CBAND: (list of supported <op\_band>)  
OK

Test Command

AT+CBAND=?

Response

+CBAND: (list of supported <op\_band>)  
OK

### Parameter Description

<op\_band>

PGSM\_MODE

DCS\_MODE

PCS\_MODE

EGSM\_DCS\_MODE

GSM850\_PCS\_MODE

ALL\_BAND

A string parameter which indicate the operation band.

And the following strings should be included in quotation marks.

### Note

- Radio settings following updates are stored in non-volatile memory



## 5.2. AT+CDSCB

## Reset Cell Broadcast

### ***Syntax***

Read Command

AT+CDSCB

Response(s)

OK

### ***Note***

- Please also refer to AT+CSCB.



### 5.3. AT+COPN Read operator names

The **AT+COPN** command returns the list of operator names from the ME. Each operator code **<numeric>** that has an alphanumeric equivalent **<alphan>** in the ME memory is returned. See also: **AT^SPLM**.

#### Syntax

Test Command

AT+COPN=?

Response(s)

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

Exec Command

AT+COPN

Response(s)

+COPN: **<numeric>**, **<alphan>**  
[+COPN: ...]  
OK  
ERROR  
+CME ERROR: **<err>**

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	+	+	-	-

Reference(s)

GSM 07.07

#### Parameter Description

**<numeric>**<sup>(str)</sup>

Operator in numeric format; GSM location area identification number.

**<alphan>**<sup>(str)</sup>

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



## 5.4. AT+COPS Operator Selection

**AT+COPS** queries the present status of the MG21's network registration and allows to determine whether auto-matic or manual network selection shall be used. Additional service is available with **AT^SOPS**.

Three operator selection modes are available:

### ■ Automatic

MG21 searches for the home operator automatically. If successful the MG21 registers to the home network. If the home network is not found, MG21 goes on searching. If a permitted operator is found, MG21 registers to this operator.

If no operator is found the MG21 remains unregistered.

### ■ Manual

Desired operator can be determined using the **AT+COPS** write command. If the operator is found, MG21 registers to it immediately. If the selected operator is forbidden, the MG21 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 consists of several parameter sets, each representing an operator present in the network.

Each set contains the following information:

- an integer indicating the availability of the operator,
- long alphanumeric format of the operator's name and
- 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.

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.

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 **<opName>** 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.

Command settings are effective over all serial interfaces of the MG21.



## Syntax

Test Command

AT+COPS=?

Response(s)

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

Read Command

AT+COPS?

Response(s)

+COPS:<mode>[, <format>[, <opName>]]  
OK  
ERROR  
+CME ERROR: <err>

Write Command

AT+COPS=<mode>[, <format>[, <opName>]]

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 🔔 Last

± + + + + - -

Reference(s)

GSM 07.07

## Parameter Description

<opStatus><sup>(num)</sup>

Operator Status

0	Unknown
1	Operator available
2	Current operator
3	Operator forbidden

<opName><sup>(str)&(V)</sup>

Operator Name

If test command: Operator name in long alphanumeric format and numeric format.

If read command: Operator name as per <format>.

If write command: Operator name in numeric format.



## <mode><sup>(num)&V</sup>

Parameter values 0 and 1 are stored non-volatile in the MG21.

- |                  |  |
|------------------|--|
| 0 <sup>(D)</sup> | Automatic mode; <opName> field is ignored.   |
| 1                | Manual operator selection<br>Write command requires <opName> in numeric format, i.e. <format> shall be 2.<br>Read command returns the current <mode> and the currently selected <opName>. If no operator is selected, <format> and <opName> 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 (<opName> field will be present).  |

## <view><sup>(num)</sup>

- |                       |  |
|-----------------------|--|
| 0 <sup>(&amp;F)</sup> | Long alphanumeric format of <opName>. Can be up to 16 characters long.   |
| 2                     | Numeric format of <opName>. 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). |

### Note

- 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 ME 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.



## 5.5. AT+CPOL Preferred Operator List

**AT+CPOL** read command queries the list of the preferred operators.

**AT+CPOL** write command allows to edit the list of the preferred operators.

If **<index>** is given but **<operator>** is left out, the entry is deleted.

### Syntax

Test Command

AT+CPOL=?

Response(s)

+CPOL:(list of supported **<index>**s), (list of supported **<format>**s)

OK

ERROR

+CME ERROR: **<err>**

Read Command

AT+CPOL?

Response(s)

+CPOL: **<index>**, **<format>**, **<operator>**

+CPOL: ...

OK

ERROR

+CME ERROR: **<err>**

Write Command

AT+CPOL=**<index>**[, **<format>**, **<operator>**]

Response(s)

OK

ERROR

+CME ERROR: **<err>**

PIN ASC0 MUX1 MUX2 MUX3 ☺ Last

+ + + + + - -

Reference(s)

GSM 07.07

### Parameter Description

**<index>**<sup>(num)</sup>

The order number of the operator in the SIM preferred operator list.

**<format>**<sup>(num)</sup>

2 Numeric format



<operator><sup>(str)</sup>

Operator in numeric format (GSM Location Area Identification number which consists of a 3-digit country code plus a 2- or 3-digit network code).



## 5.6. 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 location information elements **<lac>** and **<ci>** are returned only when **<n>=2** and ME is registered to the network.

### 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

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + + + - -

Reference(s)

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>**<sup>(num){&W}{&V}</sup>

- |                                |  |
|--------------------------------|--|
| <b>[0]</b> <sup>{&amp;F}</sup> | 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. The optional parameters <lac> and <ci> will not be updated during calls. |

**<stat>**<sup>(num){&V}</sup>

- |   |   |
|---|---|
| 0 | <p>Not registered, ME is currently not searching for new operator</p> <p>There is a technical problem. User intervention is required. Yet, emergency calls can be made if any network is available. Probable causes:</p> <ul style="list-style-type: none"><li>■ no SIM card available</li><li>■ no PIN entered</li><li>■ no valid Home PLMN entry found on the SIM</li></ul>   |
| 1 | Registered to home network  |
| 2 | <p>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:</p> <ul style="list-style-type: none"><li>■ No network available or insufficient Rx level.</li><li>■ The ME has no access rights to the networks available.</li><li>■ Networks from the SIM list of allowed networks are around, but login fails due to one of the following reasons:<ul style="list-style-type: none"><li>- #11 ... PLMN not allowed</li><li>- #12 ... Location area not allowed</li><li>- #13 ... Roaming not allowed in this location area</li></ul>After this, the search will be resumed (if automatic network search is enabled).</li><li>■ The Home PLMN or an allowed PLMN is available, but login is rejected by the cell (reasons: Access Class or LAC).<br/>If at least one network is available, emergency calls can be made.</li></ul> |
| 3 | <p>Registration denied</p> <ul style="list-style-type: none"><li>■ If automatic network search is enabled:<br/>Authentication or registration fails after Location Update Reject due to one of the following reasons:<ul style="list-style-type: none"><li>- #2 ... IMSI unknown at HLR</li></ul></li></ul>   |



- #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.

■ Only if manual network search is enabled:

Manual registration fails after Location Update Reject due to the following reasons:

- #2 ... IMSI unknown at HLR
- #3 ... Illegal MS
- #6 ... Illegal ME
- #11 ... PLMN not allowed
- #12 ... Location area not allowed
- #13 ... Roaming not allowed in this location area

No further attempt is made to search or log into a network. Emergency calls can be made if any network is available.

4 Unknown (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=2	Activates extended 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,"0145","291A"	URC reports that operator has been found.



## 5.7. AT+CSQ Signal quality

The **AT+CSQ** execute command indicates the received signal strength **<rss>** and the channel bit error rate **<ber>**.

### Syntax

Test Command

AT+CSQ=?

Response(s)

+CSQ: (list of supported<rss>s), (list of supported<ber>s)

OK

Exec Command

AT+CSQ

Response(s)

+CSQ: <rss>,<ber>

OK

PIN	ASC0	MUX1	MUX2	MUX3	☞	Last
-	+	+	+	+	-	-

Reference(s)

GSM 07.07

### Parameter Description

**<rss>**<sup>(num)</sup>

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>**<sup>(num)</sup>

To check the bit error rate there must be a call in progress to obtain realistic values. If no call is set up, there is no BER to be determined. In this case the indicated value may be 0 or 99, depending on the SIM card.

0..7	as RXQUAL values in the table in GSM 05.08 section 8.2.4.
99	not known or not detectable



**Note**

- After using network related commands such as [AT+CCWA](#), [AT+CCFC](#), [AT+CLCK](#), 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.



## 5.8. AT^MONI Monitor idle mode and dedicated mode

The **AT^MONI** command supplies information of the serving/dedicated cell. There are two ways to retrieve the information: once on request by using the execute command or automatically every **<period>** seconds by using the write command. To stop the periodic presentation type "AT" or "at".

### Syntax

Test Command

AT^MONI=?

Response(s)

^MONI:(list of supported **<period>**s)  
OK

Exec Command

AT+MONI=?

Response(s)

OK

Write Command

AT^MONI=**<period>**

Response(s)

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

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### Parameter Description

**<period>**<sup>(num)</sup>

Display period in seconds

1...254



## Notes

- The two header lines are output after every ten data lines.
- The length of following output lines exceeds 80 characters. Therefore a terminal program may draw a carriage return on a screen. However, this is not part of the response.
- The parameters LAC and cell are presented as hexadecimal digits, the remaining parameters are composed of decimal digits.
- If the radio cell changes during a connection, the parameters PWR, RXLev and C1 of the 'Serving Cell' part cannot be updated under certain conditions.
- If the BS supports frequency hopping during a connection, the dedicated channel (parameter chann) is not stable. This mode is indicated by chann = 'h'.
- To some extent, the cell monitoring command [AT^SMONC](#) covers the same parameters. The receiving level, for example, can be queried with both commands. Yet the resulting values may be slightly different, even though obtained over a time period of a few seconds. This is quite normal and nothing to worry about, as the cell information is permanently updated.
- For compatibility with earlier products and to support legacy applications, any input character may be used to stop the output in certain cases (depending on the settings of [AT+IPR](#) and [AT+CMUX](#))

### 5.8.1. AT^MONI responses

ME is not connected:

a) ME is camping on a cell and registered to the network:

```
Serving Cell                                I Dedicated channel
shann rs dVm MCC MNC LAC cell NCC BCC PWR RXLev C1 I chann TS timAdv PWR dBm Q ChMod
1013 21 -71 001 01 1001 0103 7 7 33 -105 33 I No Connection
```

b) ME is camping on a cell but not registered to the network (only emergency call allowed):

```
Serving Cell                                I Dedicated channel
shann rs dVm MCC MNC LAC cell NCC BCC PWR RXLev C1 I chann TS timAdv PWR dBm Q ChMod
1013 21 -71 001 01 1001 0103 7 7 33 -105 33 I Limited Service
```

c) ME camping on a cell, but searching for a better cell (cell reselection):

```
Serving Cell                                I Dedicated channel
shann rs dVm MCC MNC LAC cell NCC BCC PWR RXLev C1 I chann TS timAdv PWR dBm Q ChMod
1013 21 -71 001 01 1001 0103 7 7 33 -105 33 I Cell Reselection
```

d) ME is searching and could not (yet) find a suitable cell:

```
Serving Cell                                I Dedicated channel
shann rs dVm MCC MNC LAC cell NCC BCC PWR RXLev C1 I chann TS timAdv PWR dBm Q ChMod
Searching
```



ME is connected (Call in progress):

Serving Cell													I Dedicated channel						
shann	rs	dVm	MCC	MNC	LAC	cell	NCC	BCC	PWR	RXLev	C1	chann	TS	timAdv	PWR	dBm	Q	ChMod	
1013	19	-76	001	01	1001	0103	7	7	33	-105	33	I	1015	1	0	5	-76	0	S-HR

Columns for Serving Cell:

Column	Description
chann	ARFCN (Absolute Frequency Channel Number) of the BCCH carrier
rs	RSSI value 0 - 63 (RSSI = Received signal strength indication)
dBm	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
cell	Cell ID
NCC	PLMN colour code
BCC	Base station colour code
PWR	Maximal power level used on RACH channel in dBm
RXLev	Minimal receiving level (in dBm) to allow registration
C1	Coefficient for base station selection

Columns for Dedicated channel:

Column	Description
chann	ARFCN (Absolute Frequency Channel Number) of the TCH carrier Note: <chann> = H or H850 or H900 or H18 or H19 indicate frequency hopping.
TS	Timeslot number
timAdv	Timing advance in bits
PWR	Current power level
dBm	Receiving level of the traffic channel carrier in dBm
Q	Receiving quality (0-7)
ChMod	Channel mode (--: Signalling, S_HR: Half rate, S_FR: Full rate, S_EFR: Enhanced Full Rate, A_HR: AMR Half rate, A_FR: AMR Full rate)

### 5.8.2. Service states

Depending on the service state, an additional textual output is generated (refer also to the response examples):

- 'Searching' - The MS is searching, but could not (yet) find a suitable cell. This output appears after restart of the MS or after loss of coverage.
- 'No connection' - The MS is camping on a cell and registered to the network. The service state is 'idle', i.e. there is no connection established or a dedicated channel in use.



- 'Cell Reselection' - The MS has not yet lost coverage but is searching for a better cell, since the cell reselection criterion is fulfilled.
- 'Limited Service' - The MS is camping on a cell but not registered to the network. Only emergency calls are allowed. The MS enters this state, for example, when
  - no SIM card is inserted, or PIN has not been given,
  - neither Home PLMN nor any other allowed PLMN are found,
  - registration request was not answered or denied by the network (use command AT+CREG to query the registration status),
  - authentication failed.



## 5.9. AT^MONP Monitor neighbor cells

The `AT^MONP` supplies information of up to six neighbor cells. There are two ways to retrieve the information: once on request by using the execute command or automatically every `<period>` seconds by using the write command. To stop the periodic presentation type "AT" or "at".

### Syntax

Test Command

`AT^MONP=?`

Response(s)

`^MONP:(list of supported <period>s)`  
OK

Read Command

`AT^MONP`

Response(s)

See: [AT^MONP responses](#) section  
OK

Write Command

`AT^MONP=<period>`

Response(s)

See: [AT^MONP responses](#) section  
OK  
ERROR  
+CME ERROR: `<err>`

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### Parameter Description

`<period>`<sup>(num)</sup>

Display period in seconds

1...254

### Notes

- Due to the fact that not all necessary information of the neighbor cells can be decoded during a connection, there are several constraints to be considered:
  - Only neighbor 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 neighbor 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 "-" will be presented for C1 and C2.



- To some extent, the cell monitoring command AT^SMONC covers the same parameters. The receiving level, for example, can be queried with both commands. Yet the resulting values may be slightly different, even though obtained over a time period of a few seconds. This is quite normal and nothing to worry about, as the cell information is permanently updated.
- For compatibility with earlier products and to support legacy applications, any input character may be used to stop the output in certain cases (depending on the settings of AT+IPR and AT+CMUX).

### 5.9.1. AT^MONP responses

Response of AT^MONP (Example):

chann	rs	dBm	MCC	MNC	BCC	C1	C2
653	26	-84	262	07	0	22	22
660	20	-90	262	07	3	16	16
687	19	-91	262	07	1	15	15
678	14	-96	262	07	3	10	10
671	14	-96	262	07	1	10	10
643	10	-100	262	07	7	6	6

Column	Description
Chann	ARFCN (Absolute Radio Frequency Channel Number) of the BCCH carrier
rs	RSSI value 0 - 63 (RSSI = Received signal strength indication)
dBm	Receiving level in dBm
MCC	Mobile Country Code (first part of the PLMN code)
MNC	Mobile Network Code (second part of the PLMN code)
BCC	Base Station colour code
C1	cell selection criterion
C2	cell reselection criterion



## 5.10. AT^SALS      Alternate Line Service

The **AT^SALS** command is designed to support Alternate Line Service. This allows the subscriber to use two voice numbers on the same SIM card (service requires a dual line SIM card).

The write command enables or disables the presentation of **<view>** and specifies the **<line>** used for outgoing calls. The read command returns the presentation mode of **<view>** and the currently selected **<line>**.

### Syntax

Test Command

AT^SALS=?

Response(s)

^SALS:(list of supported **<view>**s), (list of supported **<line>**s)  
OK

Read Command

AT+ SALS?

Response(s)

^SALS: **<view>**, **<line>**  
OK  
ERROR

Write Command

AT^SALS=**<view>**[, **<line>**]

Response(s)

OK  
ERROR

PIN ASC0 MUX1 MUX2 MUX3 🔔 Last

+ + + + + - -

### Unsolicited Result Code

If switched on with **<view>**=1:

^SALS: **<line>**

Indicates the line used by an incoming call.



### **Parameter Description**

**<view>**<sup>(num)</sup>

Controls the presentation mode of the URC "^SALS" which indicates the line number used by an incoming call:

[0] <sup>(&amp;F)(P)</sup>	Disables indication of the called line
1	Enables indication of the called line

**<line>**<sup>(num)</sup>

Selects the line to be used for outgoing calls. Setting is global for the ME and non volatile:

[0] <sup>(&amp;F)(D)</sup>	ALS Line 1
1	ALS Line 2

### **Note**

- If a non ALS SIM is inserted, the **<line>** will be reset to line 1.

### **Example**

AT^SALS=1,1	Line 1 has been selected for outgoing calls. "^SALS" URC is enabled.
RING	You receive a notification that you have an incoming call on line 2
^SALS:	



## 5.11. AT^SHOM Display Homezone

The **AT^SHOM** returns the homezone state. The result is valid only, if network registration state **<stat>** is 1 (registered) (see **AT+CREG**).

The feature is available only for supported network operators (Viag, One2One, Orange and LCI) and requires a suitable SIM card. If the homezone feature is not supported by the network operator or SIM card, result is always 0.

### Syntax

Test Command

AT^SHOM=?

Response(s)

OK

Exec Command

AT^SHOM

Response(s)

^SHOM: **<homezonestate>**

OK

ERROR

+CME ERROR: **<err>**

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + + + - -

### Parameter Description

**<homezonestate>**<sup>(num)</sup>

0	ME is out of Homezone
1	ME is within the Homezone



## 5.12. AT^SMONC Cell Monitoring

The **AT^SMONC** execute command delivers cell information containing 9 values from a maximum of 7 base stations. The first base station is the serving cell.

### Syntax

Exec Command

AT^SMONC=?

Response(s)

OK  
ERROR  
+CME ERROR: <err>

Exec Command

AT^SMONC

Response(s)

^SMONC:<MCC><sub>1</sub>, <MNC><sub>1</sub>, <LAC><sub>1</sub>, <cell><sub>1</sub>, <BSIC><sub>1</sub>, <chann><sub>1</sub>, <RSSI><sub>1</sub>, <C1><sub>1</sub>, <C2><sub>1</sub>, <MCC><sub>2</sub>, <MNC><sub>2</sub>, <LAC><sub>2</sub>, <cell><sub>2</sub>, <BSIC><sub>2</sub>, <chann><sub>2</sub>, <RSSI><sub>2</sub>, <C1><sub>2</sub>, <C2><sub>2</sub>, ...  
OK  
ERROR  
+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
+	+	+	+	+	-	-

Reference(s)

3GPP TS 05.08

### Parameter Description

<MCC><sup>(num)</sup>

Mobile country code

3 digits, e.g. 232

000                      Not decoded

<MNC><sup>(num)</sup>

Mobile network code

2 digits or 3 digits, e.g. 07 or 003

000                      Not decoded

<LAC><sup>(num)</sup>

Location area code

4 hexadecimal digits, e.g. 4EED

0000                     Not decoded



#### <cell><sup>(num)</sup>

Cell identifier

4 hexadecimal digits, e.g. 4EAF

0000                      Not decoded

#### <BSIC><sup>(num)</sup>

Base station identity code

2 digits, e.g. 32

00                         Not decoded

#### <chann><sup>(num)</sup>

ARFCN (Absolute Frequency Channel Number)

0                         Not decoded. In this case, all remaining parameters related to the same channel are neither decoded. For example, a non-existing cell appears as follows:  
000,000,0000,0000,00,0,0,-,-

#### <RSSI><sup>(num)</sup>

Received signal level of the BCCH carrier (0..63). The indicated value is composed of the measured value in dBm plus an offset. This is in accordance with a formula specified in 3GPP TS 05.08

#### <C1><sup>(num)</sup>

Coefficient for base station reselection, e.g. 30. In dedicated mode, under certain conditions the parameter can-not be updated. In such cases a '-' is presented.

#### <C2><sup>(num)</sup>

Coefficient for base station reselection, e.g. 30. In dedicated mode, under certain conditions the parameter can-not be updated. In such cases a '-' is presented.

### **Note**

- To some extent, the cell monitoring commands [AT^MONI](#), [AT^MONP](#) and [AT^SMONC](#) cover the same parameters. The receiving level, for example, can be queried with all three commands. Yet the resulting values may be slightly different, even though obtained over a time period of a few seconds. This is quite normal and nothing to worry about, as the cell information is permanently updated.



### 5.13. AT^SMOND Cell Monitoring

The AT^SMOND execute command can be used to obtain status information of the service cell and up to six neighbour cells. The advantage over other cell monitoring commands is that AT^SMOND delivers more detailed information about the received signal strength.

#### Syntax

<p>Test Command</p> <p>AT^SMOND=?</p> <p>Response(s)</p> <p>OK ERROR +CME ERROR: &lt;err&gt;</p>	<p>Exec Command</p> <p>AT^SMOND</p> <p>Response(s)</p> <p>^SMOND:[&lt;sci&gt;][, &lt;nci&gt;][, &lt;TA&gt;][, &lt;rssiber&gt;] OK ERROR +CME ERROR: &lt;err&gt;</p>														
<table border="1"> <tr> <td>PIN</td> <td>ASC0</td> <td>MUX1</td> <td>MUX2</td> <td>MUX3</td> <td>🔊</td> <td>Last</td> </tr> <tr> <td>+</td> <td>+</td> <td>+</td> <td>+</td> <td>+</td> <td>-</td> <td>-</td> </tr> </table>	PIN	ASC0	MUX1	MUX2	MUX3	🔊	Last	+	+	+	+	+	-	-	<p>Reference(s)</p> <p>3GPP TS 05.08</p>
PIN	ASC0	MUX1	MUX2	MUX3	🔊	Last									
+	+	+	+	+	-	-									

#### Parameter Description

<sci><sup>(str)</sup>

Serving cell information (comma-separated, no cr/lf included)

<MCC>,<MNC>,<LAC>,<cell>,<BSIC>,<chann>,<RxLev>,<RxLev>Full,<RxLev>Sub,<RxQual>,<RxQual>Full,<RxQual>Sub,<Timeslot>

If no serving cell is found, unavailable values are omitted: " ,,,,,,<RxLev>,,,0,,0"

<nci><sup>(str)</sup>

Neighbour cell information for neighbour cell 1 through 6 (comma-separated, no cr/lf included)

<MCC><sub>1</sub>,<MNC><sub>1</sub>,<LAC><sub>1</sub>,<cell><sub>1</sub>,<BSIC><sub>1</sub>,<chann><sub>1</sub>,<RxLev><sub>1</sub>, (these parameters repeated for neighbour cells 2 through 6 with no CR/LF): ... <MCC><sub>6</sub>, <MNC><sub>6</sub>, <LAC><sub>6</sub>, <cell><sub>6</sub>, <BSIC><sub>6</sub>, <chann><sub>6</sub>, <RxLev><sub>6</sub>

An unavailable cell appears as follows: " ,,,,,,0"



`<rssiber>`<sup>(str)</sup>

Values for RSSI and BER (comma-separated, no cr/lf included)

`<RSSI>`,`<BER>`

`<MCC>`<sup>(num)</sup>

Mobile country code

3 digits, e.g. 232

000                      Not decoded

`<MNC>`<sup>(num)</sup>

Mobile network code

2 digits or 3 digits, e.g. 07 or 003

000                      Not decoded

`<LAC>`<sup>(num)</sup>

Location area code

4 hexadecimal digits, e.g. 4EED

0000                    Not decoded

`<cell>`<sup>(num)</sup>

Cell identifier

4 hexadecimal digits, e.g. 4EAF

0000                    Not decoded

`<BSIC>`<sup>(num)</sup>

Base station identity code

2 digits, e.g. 32

00                        Not decoded

`<chann>`<sup>(num)</sup>

ARFCN (Absolute Frequency Channel Number)



<RxLev><sup>(num)</sup>

Received signal level in dBm

<RxQual><sup>(num)</sup>

Received signal quality as defined in GSM05.08

<Timeslot><sup>(num)</sup>

Assigned timeslot. If mobile is in idle mode, timeslot 0 (BCCH timeslot) will be indicated.

0...8                      Assigned timeslot

<TA><sup>(num)</sup>

Timing advance for the serving cell, in bits.

<RSSI><sup>(num)</sup>

Receive Level, with value 99 indicating "not known or not detectable"

0...31                      Signifies the RSSI range from -113dBm or less ("0") to -51dBm or greater ("31") in steps of -2dBm (e.g. "1" = -111 dBm, "2" = -109 dBm ..., "30" = - 53dBm)

<BER><sup>(num)</sup>

Bit Error rate, with value 99 indicating "not known or not detectable"

0...7                      as RXQUAL values RXQUAL0 to RXQUAL7 in GSM 05.08 section 8.2.4

### Notes

- To some extent, the cell monitoring commands [AT^SMOND](#), [AT^MONI](#), [AT^MONP](#) and [AT^SMONC](#) cover the same parameters. The receiving level, for example, can be queried with all three commands. Yet the resulting values may be slightly different, even though obtained over a time period of a few seconds. This is quite normal and nothing to worry about, as the cell information is permanently updated.
- During a connection, not all of the neighbour cell information can be decoded. The following restrictions apply:
  - Information is updated only for neighbour cells that have already been visible at connection setup, and continue to be included in the list of cells.
  - New neighbour cells added to the list, for example after handover, cannot be displayed until the connection is released.



**Example**

```
at^smond                                Execute command
^SMOND:262,01,3008,6060,32,100,66,,,0,,,0, Line breaks inserted for readability in print
262,01,3008,DDD1,35,92,80,
262,01,3008,,31,96,83,
262,01,3008,BFBE,35,27,86,
262,01,3008,,32,98,88,
262,01,3008,BB44,32,90,89,
262,01,3008,8307,31,22,93,
2,23,99
```



## 5.14. AT^SMONG Packet Data Monitor

The **AT^SMONG** command supplies packet data specific cell information. There are two ways to retrieve the information: once on request by using the execute command or automatically every **<period>** seconds by using the write command. To stop the periodic presentation type "AT" or "at".

### Syntax

Test Command

AT^SMONG=?

Response(s)

^SMONG:(list of supported **<table>**s), (list of supported **<period>**s)

OK

ERROR

+CME ERROR: **<err>**

Read Command

AT^SMONG

Response(s)

GPRS Monitor

Cell Info Table

OK

ERROR

+CME ERROR: **<err>**

Write Command

AT^SMONG=**<table>**[, **<period>**]

Response(s)

^SMONG: GPRS Monitor

Cell Info Table

OK

ERROR

+CME ERROR: **<err>**

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
-----	------	------	------	------	---	------

+	+	+	+	+	-	-
---	---	---	---	---	---	---



### **Parameter Description**

`<table>`<sup>(num)</sup>

1                      Cell Info Table

`<period>`<sup>(num)</sup>

Display period in seconds

If `<period>` is omitted the cell data will be presented only once on a single line (as if Execute command was issued).

If `<period>` is given, the cell data will be listed repeatedly on 10 data lines. Every 10th data line is followed by the header, simply to repeat the column titles.

1...100

#### **Note**

- For compatibility with earlier products and to support legacy applications, often any input character will stop the periodic output of the write command. But since this applies only in certain cases (depending on the settings of [AT+IPR](#) and [AT+CMUX](#)), it is recommended to always use "at" or "AT".



## 5.15. AT^SOPS Extended Operator Selection

**AT^SOPS** queries the present status of the MG21'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.

If the test command is used during an ongoing GPRS transfer, traffic will be interrupted for up to a minute.

### Syntax

Test Command

AT^SOPS=?

Response(s)

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

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + ± ± ± - -

Reference(s)

iRZ

### Parameter Description

**<opStatus>**<sup>(num)</sup>

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>(+CSCS)`

Operator name; format depends on the source of the operator name, specified by `<eonsType>`. Can be up to 24 characters long.

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

Service Provider Name according to setting of Service No. 17 in the SIM Service Table (EF<sub>SST</sub>). Can be up to 16 characters long.

`<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.

### **Note**

- The [AT^SOPS](#) Test command is only accepted by the module after a valid pin has been entered.



## 5.16. AT^SPCL Set Preferred Cell List

**AT^SPCL** can be used to specify a list of cells the ME shall preferably register to. The list may contain up to 8 pairs of location area code and cell ID. The list is stored non-volatile.

If a preferred cell list is available the ME will try to register to one of the listed cells, regardless of signal strength and quality. If more than one of the listed cells is visible on the air interface, the one with the best signal strength and quality is chosen to register to. If none of the listed cells is currently visible on the air interface, the normal cell selection mechanism applies.

Preferred cell registration works only in the home PLMN.

If the list is written with less than 8 elements then all other elements remain unchanged.

### Syntax

Test Command

```
AT^SPCL=?
```

Response(s)

```
OK
```

Read Command

```
AT^SPCL?
```

Response(s)

```
^SPCL: <status>
```

```
OK
```

```
ERROR
```

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

Write Command

To specify the list:

```
AT^SPCL=[<LAC>1, <cell>1 [, <LAC>2, <cell>2 [, <LAC>3, <cell>3 [, <LAC>4, <cell>4 [, <LAC>5, <cell>5 [, <LAC>6, <cell>6 [, <LAC>7, <cell>7 [, <LAC>8, <cell>8]]]]]]]]
```

Response(s)

```
OK
```

```
ERROR
```

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

Write Command

To erase the list:

```
AT^SPCL=0
```

Response(s)

```
OK
```

```
ERROR
```

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



PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### **Unsolicited Result Code**

The following URC is available as long as the preferred cell registration feature is enabled, i.e., as long as a preferred cell list is configured. After erasing the list with `AT^SPCL=0` the URC is no longer generated.

`^SPCL: <status>`

The URC indicates whether the ME has registered to one of the listed cells or has lost registration to a listed cell.

### **Parameter Description**

`<LAC>`<sup>(str)</sup>

Two byte location area code in hexadecimal format (e.g. "3008" equals 12296 in decimal).

`<cell>`<sup>(str)</sup>

Two byte cell ID in hexadecimal format (e.g. "77D5" equals 30677 in decimal).

`<status>`<sup>(num)</sup>

0	Not registered to a listed preferred cell. Normal cell selection applies.
1	Registered to a listed preferred cell.

### **Note**

- URC "`^SPCL: 1`" is only generated as long as the ME is registered to the home network and the current serving cell is recorded in the preferred cell list.



## 5.17. AT^SPLM Read the PLMN list

The **AT^SPLM** execute command returns the list of operators from the ME. Each operator code **<numeric>** that has an alphanumeric equivalent **<alpha>** in the ME memory is returned. The list is sorted by operator codes, but operators newly added by **AT^SRPN** are always listed last. See also GSM 07.07: **AT+COPN**, **AT+COPS**

### Syntax

Test Command

AT^SPLM=?

Response(s)

OK

If error is related to ME functionality:

ERROR

+CME ERROR: **<err>**

Exec Command

AT^SPLM

Response(s)

^SPLM: **<numeric>**,**<alpha>**

[^SPLM: ...]

OK

If error is related to ME functionality:

ERROR

+CME ERROR: **<err>**

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + + + - -

Reference(s)

GSM 07.07

### Parameter Description

**<numeric>**<sup>(str)</sup>

Operator in numeric form; GSM location area identification number

**<alpha>**<sup>(str)</sup>

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



## 5.18. AT^SPLR Read entry from the preferred operators list

The AT^SPLR write command returns used entries from the SIM list of preferred operators with <index> between <index1> and <index2>. If <index2> is not given, only entry at <index1> is returned. The test command returns the whole index range supported by the SIM. See also GSM 07.07: AT+CPOL

### Syntax

Test Command

AT^SPLR=?

Response(s)

^SPLR:(list of supported <index>s)

OK

ERROR

+CME ERROR: <err>

Exec Command

AT^SPLR=<index1>[, <index2>]

Response(s)

^SPLR: <index1>, <oper>

[^SPLR: <index2>, <oper>]

[^SPLR: ...]

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + + + - -

Reference(s)

iRZ

### Parameter Description

<index1><sup>(num)</sup>

Location number to start reading from

<index2><sup>(num)</sup>

Location number where to stop reading

<index><sup>(num)</sup>

Index range supported by the SIM card (between <index1> and <index2>)

<oper><sup>(str)</sup>

Operator in numeric form; GSM location area identification number



## 5.19. AT^SPLW Write an entry to the preferred operators list

The `AT^SPLW` write command writes an entry to the SIM list of preferred operators at location number `<index>`. If `<index>` is given but `<oper>` is left out, the entry is deleted. An operator can be only once in the list. Test command returns the whole index range supported by the SIM. See also GSM 07.07: AT+CPOL

### Syntax

Test Command

```
AT^SPLW=?
```

Response(s)

```
^SPLW:(list of supported) <index>s
```

```
OK
```

```
ERROR
```

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

Write Command

```
AT^SPLW=<index>[, <oper>]
```

Response(s)

```
OK
```

```
ERROR
```

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

PIN	ASC0	MUX1	MUX2	MUX3	☞	Last
-----	------	------	------	------	---	------

+	+	+	+	+	-	-
---	---	---	---	---	---	---

### Parameter Description

`<index>`<sup>(num)</sup>

location number

`<oper>`<sup>(str)</sup>

Operator in numeric format (GSM Location Area Identification number which consists of a 3-digit country code plus a 2- or 3-digit network code).



## 5.20. AT^SRPN      Replace Operator Names

**AT^SRPN** can be used to add or modify entries of the operator list. Changes will be effective for commands like **AT^SPLM**, **AT+COPN**, **AT+COPS** or **AT^SIND** (EONS).

The read command returns only the changed entries of the operator list. The write command allows to add a new operator with short and long name, to set the short and long name for a given operator or to restore the original operator names (delete the changed names). Changes are non-volatile and effective immediately.

### Syntax

Test Command

**AT^SRPN=?**

Response(s)

**^SRPN:(<maxEntries>), (<usedEntries>)**

OK

Read Command

**AT^SRPN?**

Response(s)

**[^SRPN: <operator>, <origShortName>, <origLongName>, <updtShortName>, <updtLongName>]**

**[^SRPN: ...]**

OK

ERROR

**+CME ERROR: <err>**

Write Command

**AT^SRPN=<mode>, <operator>[, <updtShortName>, <updtLongName>]**

Response(s)

OK

ERROR

**+CME ERROR: <err>**

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -



### Parameter Description

**<mode>**<sup>(num)</sup>

- |   |  |
|---|--|
| 0 | Restore the original short and long names of the specified operator or delete an operator previously added with <a href="#">AT^SRPN</a> .<br>The parameter <a href="#">&lt;operator&gt;</a> is mandatory, parameters <a href="#">&lt;updtShortName&gt;</a> and <a href="#">&lt;updtLongName&gt;</a> are ignored. |
| 1 | Set short and long operator names for the specified operator. Creates a new entry if the specified operator was not yet listed. The parameters <a href="#">&lt;operator&gt;</a> , <a href="#">&lt;updtShortName&gt;</a> and <a href="#">&lt;updtLongName&gt;</a> are mandatory. Changes are non-volatile.        |

**<operator>**<sup>(str)</sup>

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).

**<origShortName>**<sup>(str)</sup>

Original short alphanumeric operator name. Can be up to 8 characters long. If the operator is not part of the original provider list, then [<origShortName>](#) is empty.

**<origLongName>**<sup>(str)</sup>

Original long alphanumeric operator name. Can be up to 16 characters long. If the operator is not part of the original provider list, then [<origLongName>](#) is empty.

**<updtShortName>**<sup>(str)</sup>

Updated short alphanumeric operator name. Can be up to 8 characters long.

**<updtLongName>**<sup>(str)</sup>

Updated long alphanumeric operator name. Can be up to 16 characters long.

**<maxEntries>**<sup>(num)</sup>

50	Maximum number of operator list entries which can be added or modified.
----	---

**<mode>**<sup>(num)</sup>

0 <sup>(D)</sup> ...50	Number of currently added or modified operator list entries.
------------------------	--



## 5.21. 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>

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	+	+	-	-

Reference(s)

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 SIM file EF(ACM). ACM contains the total number of home units for both the current and preceding calls.

### Parameter Description

<acm><sup>(str)</sup>

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

<passwd><sup>(str)</sup>

SIM PIN2



## 5.22. AT^SACM Advice of charge and query of ACM and ACMmax

### Syntax

Test Command

```
AT^SACM=?
```

Response(s)

```
^SACM:(list of supported <n>s)  
OK
```

Exec Command

```
AT+ SACM
```

Response(s)

```
^SACM: <n>, <acm>, <acmMax>  
OK  
ERROR  
+CME ERROR: <err>
```

Write Command

```
AT^SACM=<n>
```

Response(s)

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

PIN	ASC0	MUX1	MUX2	MUX3	☀	Last
+	+	+	+	+	-	-

### 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 execute command can be used to query the current mode of the Advice of Charge supplementary service, the SIM values of the accumulated call meter (ACM) and accumulated call meter maximum (ACMmax).

The write command enables or disables the presentation of unsolicited result codes to report the call charges.



### Parameter Description

`<n>`<sup>(num){&W}{&V}</sup>

<code>[0]</code> <sup>(&amp;F)</sup>	Suppress unsolicited result code
1	display unsolicited result code

`<acm>`<sup>(str){&V}</sup>

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

`<acmMax>`<sup>(str){&V}</sup>

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

`<ccm>`<sup>(str)</sup>

Three bytes of the current CCM value in hexadecimal format (e.g. "00001E" indicates decimal value 30);  
bytes are coded in the same way as ACMmax value in the SIM 000000-FFFFFFF

### Notes

- When you power down or reset the ME with [AT+CFUN=1,1](#) the URC presentation mode will be reset to its default. To benefit from the URC it is recommended to have the setting included in the user profile saved with [AT+W](#), or to select `<n>=1` every time you reboot the ME.
- See also GSM07.07: [AT+CACM](#), [AT+CAMM](#), [AT+CAOC](#).



## 5.23. 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>

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + + + - -

Reference(s)

GSM 07.07

### 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><sup>(str)</sup>

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

<passwd><sup>(str)</sup>

SIM PIN2



## 5.24. 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>  
If <mode>=0, TA returns the current call meter value:  
+CAOC: <ccm>  
OK

Write Command

AT+CAOC=[<mode>]

Response(s)

ERROR  
+CME ERROR: <err>  
OK

PIN ASC0 MUX1 MUX2 MUX3 🔔 Last

+ + + + + - -

Reference(s)

GSM 07.07

### Command Description

Execute command returns the current call meter value. The write command sets the Advice of Charge supplementary service function mode.

### Parameter Description

<mode><sup>(num)(&v)</sup>

0                      query CCM value



<ccm><sup>(str)</sup>

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.



## 5.25. 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>[, <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>]

OK

If <mode>= 2, <reason>= 2 and command successful:

+CCFC: <status>, <class>[, <number>, <type>, <time>]

OK

If error is related to ME functionality

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 🔔 Last

+ + + + + - -

Reference(s)

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

### Parameter Description

<reason><sup>(num)</sup>

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><sup>(num)</sup>

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.

- |   |   |
|---|---|
| 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><sup>(str)</sup>

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><sup>(num)</sup>

Type of address octect

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



### <class><sup>(num)</sup>

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.

### <time><sup>(num)</sup>

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

### <status><sup>(num)</sup>

0	Call Forwarding not active
1	Call Forwarding active

### Notes

- 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 ("CME ERROR: operation not supported"). As an alternative, you may use the ATD command followed by \*# codes to check the status of



these two reasons. See Star-Hash (\*#) Network Commands for a complete list of \*# GSM codes. See also examples below.

- 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 conditions 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.

### 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: 1,2,"+493012345678",145
+CCFC: 1,4,"+493012345678",145
OK
```

- To deactivate CFU without specifying `<class>`:

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



To check whether CFU was successfully deactivated (note that the destination number remains registered in the network when you disable CFU):

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

- To query the status of CFU for all classes:

```
at+ccfc=0,2,,255
+CCFC: 0,1
+CCFC: 0,2
+CCFC: 0,4
+CCFC: 0,8
+CCFC: 0,16
+CCFC: 0,32
+CCFC: 0,64
+CCFC: 0,128
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
+CME ERROR: operation not supported
at+ccfc=5,2
+CME ERROR: operation not supported
```



## 5.26. AT+CCUG Closed User Group

### Syntax

Test Command

AT+CCUG=?

Response(s)

list of supported <n>, range of supported <index>, range of supported <info>

OK

ERROR

+CME ERROR: <err>

Read Command

AT+CCUG?

Response(s)

+CCUG:<n>, <index>, <info>

OK

ERROR

+CME ERROR: <err>

Write Command

AT+CCUG=[[<n>][, <index>][, <info>]]

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	☞ Last
+	+	+	+	+	- -

Reference(s)

GSM 07.07, GSM 02.85,  
GSM 03.85, GSM 04.85

### 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><sup>(num)</sup>**

explicit CUG invocation options

0 <sup>(D)</sup>	Deactivate explicit CUG invocation
1	Activate explicit CUG invocation

**<index><sup>(num)</sup>**

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

**<info><sup>(num)</sup>**

state of the call

0 <sup>(D)</sup>	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



## 5.27. 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: **<err>**

PIN	ASC0	MUX1	MUX2	MUX3	🔕	Last
+	+	+	+	+	-	-

Reference(s)

GSM 07.07, GSM 02.04, GSM 02.83,  
GSM 03.83, GSM 04.83

### Unsolicited Result Codes

URC 1

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 wait-ing call to the TE. It appears while the waiting call is still ringing.

URC 2

Indication of a call that has been waiting.

^SCWA:



If  $\langle n \rangle = 1$  and the call waiting supplementary service is enabled in the network, this URC indicates that a waiting call rang when the ME was in online mode during a CSD call, but the calling party hung up before the ME went back to command mode.

### Parameter Description

$\langle n \rangle^{(num)}$

Switch URCs "+CCWA" and "^SCWA" for call waiting on/off

- |   |   |
|---|---|
| 0 | Disable display of URCs "+CCWA" and "^SCWA" |
| 1 | Enable display of URCs "+CCWA" and "^SCWA"  |

$\langle mode \rangle^{(num)}$

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) |

$\langle class \rangle^{(num)}$

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  $\langle class \rangle$  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:  $\langle calling\ number \rangle$ ,  $\langle type\ of\ number \rangle$ ,  $\langle class \rangle$ , ,  $\langle CLI\ validity \rangle$ ", parameter  $\langle class \rangle$  specifies the class of the waiting call.

- |     |  |
|-----|--|
| 1   | Voice  |
| 2   | Data<br>$\langle class \rangle$ 2 (data) comprises all those $\langle class \rangle$ values between 16 and 128, that are supported both by the network and the MS. This means, a setting made for $\langle class \rangle$ 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><sup>(num)</sup>

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

#### <calling number><sup>(str)</sup>

Phone number of waiting caller in the format specified by parameter [<type of number>](#).

#### <type of number><sup>(num)</sup>

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

145	<a href="#">&lt;calling number&gt;</a> includes international access code character '+'
128	number restricted
129	Otherwise

#### <CLI validity><sup>(num)</sup>

0	CLI valid
1	CLI has been withheld
2	CLI is not available

### Notes

- If the active call is a CSD call, and a waiting call is received, then the ME produces a BREAK while still in online mode, and displays
  - the +CCWA URC (as above) when the ME goes back to command mode while the waiting call is still active and can be accepted;
  - or the ^SCWA URC (as above) when the ME goes back to command mode after the waiting call has ended.



- 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).



## 5.28. AT+CHLD Call Hold and Multiparty

The **AT+CHLD** command 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 MG21 can only request the service, but the network decides whether and how the request will be answered.

### 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>

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + + + - -

Reference(s)

GSM 07.07



## Parameter Description

<n><sup>(num)</sup>

- |    |  |
|----|--|
| 0  | Release all held calls or set User Determined User Busy (UDUB) for a waiting call: <ul style="list-style-type: none"><li>- If a call is waiting, release the waiting call. The calling party will receive a "BUSY" indication (Supplementary Service User Determined User Busy "UDUB")</li><li>- Otherwise, terminate all held calls (if any).</li></ul>                     |
| 1  | Terminate all active calls (if any) and accept "the other call" as the active call: <ul style="list-style-type: none"><li>- If a call is waiting, the waiting call will be accepted.</li><li>- Otherwise, if a held call is present, the held call becomes active.</li></ul>   |
| 1X | Terminate a specific call X. The call may be active, held or waiting. The remote party of the terminated call will receive a "NO CARRIER" indication.<br>Parameter X is the call number <idx> in the list of current calls indicated by <a href="#">AT+CLCC</a> . Instead of <a href="#">AT+CLCC</a> , the <a href="#">AT^SLCC</a> command with parameter <idx> can be used. |
| 2  | Place all active calls on hold (if any) and accept "the other call" as the active call: <ul style="list-style-type: none"><li>- If a call is waiting, the waiting call will be accepted.</li><li>- Otherwise, if a held call is present, the held call becomes active.</li></ul>   |
| 2X | Place all active calls on hold except call X.<br>Parameter X is the call number <idx> in the list of current calls indicated by <a href="#">AT+CLCC</a> . Instead of <a href="#">AT+CLCC</a> , the <a href="#">AT^SLCC</a> command with parameter <idx> can be used.   |
| 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. 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"
at+ccwa=1,1,1

OK
atd"1234567";
OK
+CCWA: "+491791292364",145,32,,0
at+chld=2
CONNECT 9600/RLP
Hello
+++
OK
at+clcc
+CLCC: 1,0,1,0,0,"03038639268",129
+CLCC: 2,1,0,1,0,"+491791292364",145
OK
at+chld=1
OK
at+clcc
+CLCC: 1,0,0,0,0,"03038639268",129
OK
```

The mobile is now registered.  
You activate the indication of waiting calls during voice calls.

You make a voice call.

You receive a URC indicating a waiting data call.  
You put the voice call on hold.  
The data connection is set up.

With "+++" you go in command mode.

You interrogate the status of all established calls.

The active data call is terminated and the held voice call becomes active.



## 5.29. 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>**). If no SIM card is available or the SIM-PIN is not entered, the command response is "ERROR".

### 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>

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
±	+	+	+	+	-	-

Reference(s)

GSM 07.07, GSM 02.81

### Unsolicited Result Codes

URC 1

Voice call response format:

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

URC 2

Data/FAX call response format:



+CLIP: [<number>](#), [<type>](#)

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 call occurs.

### Parameter Description

[<n>](#)<sup>(num)(&w)(&v)</sup>

<a href="#">[0]</a> <sup>(&amp;F)</sup>	Suppress unsolicited result codes
1	Display unsolicited result codes

[<m>](#)<sup>(num)(&v)</sup>

0	CLIP not provisioned
1	CLIP provisioned
2	Unknown

[<number>](#)<sup>(str)</sup>

String type phone number of calling address in format specified by [<type>](#).

[<type>](#)<sup>(num)</sup>

Type of address octet in integer format; 145 when dialing string includes international access code character "+", 128 when number is restricted otherwise 129.

[<alpha>](#)<sup>(str)</sup>

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

Due to time constraints on the necessary evaluation of the phonebook, this parameter may show a default value in early call phases (e.g. for [AT^SLCC](#) parameter [<stat>](#)= "dialing", "incoming" or "alerting"), even if a phone-book entry is present for the number concerned.

[<view>](#)<sup>(num)</sup>

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. <a href="#">&lt;number&gt;</a> shall be an empty string ("") and <a href="#">&lt;type&gt;</a> value will not be significant.



When CLI is not available ( <CLI validity>=2), <number> shall be an empty string ("") and <type> value will not be significant. 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.



### 5.30. 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)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + + + - -

Reference(s)

GSM 07.07

#### Parameter Description

<n><sup>(num)</sup>

Parameter shows the settings for outgoing calls:

- |     |  |
|-----|--|
| [0] | Presentation indicator is used according to the subscription of the CLIR service |
| 1   | CLIR invocation  |
| 2   | CLIR suppression   |



<m><sup>(num)</sup>

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 setting of <n> is dependant of the current status at the network. In case of <n>=3 or 4 (temporary mode) the user settings in the network will be presented.



### 5.31. 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 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

<p>Test Command</p> <p>AT+COLP=?</p> <p>Response(s)</p> <p>+COLP:(list of supported &lt;n&gt;s)</p> <p>OK</p>	
<p>Read Command</p> <p>AT+COLP?</p> <p>Response(s)</p> <p>+COLP: &lt;n&gt;, &lt;m&gt;</p> <p>OK</p> <p>ERROR</p> <p>+CME ERROR: &lt;err&gt;</p>	
<p>Write Command</p> <p>AT+COLP=[&lt;n&gt;]</p> <p>Response(s)</p> <p>OK</p> <p>ERROR</p> <p>+CME ERROR: &lt;err&gt;</p>	
<p>PIN ASC0 MUX1 MUX2 MUX3  Last</p> <p>+ + + + + - -</p>	<p>Reference(s)</p> <p>GSM 07.07</p>

#### Unsolicited Result Code

Call response format:

+COLP: <number>, <type>

#### Parameter Description

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



**<m>**<sup>(num)</sup>

0	COLP not provisioned (no presentation)
1	COLP provisioned
2	Unknown

**<number>**<sup>(str)</sup>

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

**<view>**<sup>(num)</sup>

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



## 5.32. 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

+CME ERROR: <err>

Write Command

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

Response(s)

OK

+CME ERROR: <err>

Reference(s)

GSM 07.07

### Parameter Description

<currency><sup>(str)</sup>

string type(string should be included in quotation marks);

three-character currency code (e.g. "GBP", "DEM");

character set as specified by Command Select TE

Character	Set +CSCS
-----------	-----------

<ppu><sup>(str)</sup>

string type(string should be included in quotation marks); price per unit; dot is used as a decimal separator(e.g. "2.66")

<passwd><sup>(str)</sup>

string type(string should be included in quotation marks);

SIM PIN2



## 5.33. 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: <err>

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

Reference(s)

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><sup>(num)</sup>

0 <sup>(&amp;F)(P)</sup>	Suppress "+CSSI" URCs
1	Activate "+CSSI" URCs

#### <m><sup>(num)</sup>

0 <sup>(&amp;F)(P)</sup>	Suppress "+CSSU" URCs
1	Activate "+CSSU" URCs

#### <code 1><sup>(num)</sup>

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

#### <code 2><sup>(num)</sup>

0	The incoming call is a forwarded 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).



### 5.34. AT+CUUSD      Unstructured Supplementary Service Data

**AT+CUUSD** allows to control the handling of 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 AT commands based on other GSM supplementary services is described in the related technical specifications.

Parameter `<ussdMode>` is used to control the presentation of "+CUUSD" URCs to the TE, which will be caused by a USSD response from the network or by different network or **SAT** initiated operations. Therefore, it is recommended to always have "+CUUSD" URCs enabled.

If parameter `<ussdReq>` is given, a mobile initiated USSD send request or a USSD response to a network or **SAT** initiated operation is sent to the network. A possible response USSD of the network is again presented by a subsequent "+CUUSD" URC.

#### Syntax

Test Command

AT+CUUSD=?

Response(s)

+CUUSD: (list of supported<ussdMode>s)  
OK

Read Command

AT+CUUSD?

Response(s)

+CUUSD: <ussdMode>  
OK

Write Command

AT+CUUSD=<ussdMode>[, <ussdReq>[, <ussdDCS>]]

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	+	+	-	-

Reference(s)

GSM 07.07, GSM 02.90, GSM 03.90,  
GSM 04.90



### **Unsolicited Result Code**

+CUSD: <ussdStatus>[, <ussdRsp>[, <ussdDCS>]]

"+CUSD" URC indicates a USSD response from the network, respectively caused by a network or SAT initiated operation.

### **Parameter Description**

<ussdMode><sup>(num)</sup>

- |                       |   |
|-----------------------|---|
| 0 <sup>(&amp;F)</sup> | Disable "+CUSD" URC presentation.   |
| 1                     | Enable "+CUSD" URC presentation. If a USSD send request is sent via ATD or handled by Remote-SAT (in ER mode) this setting is activated implicitly. |
| 2                     | Cancel session (not applicable to read command response).   |

<ussdReq><sup>(str)</sup>

Unstructured Supplementary Service Data (USSD) to be sent to the network.

If <ussdReq> parameter is not given, network is not interrogated. AT+CUSD write command only supports setting <ussdDCS>=15.

<ussdRsp><sup>(str)(+CSGS)</sup>

Unstructured Supplementary Service Data (USSD) received from the network.

If <ussdDCS> indicates GSM 03.38 default alphabet is used, the ME converts GSM alphabet into current TE character set according to rules of GSM 07.05 Annex A. However, in case of invalid or omitted <ussdDCS>, conversion of <ussdRsp> is not possible.

<ussdDCS><sup>(num)</sup>

GSM 03.38 Cell Broadcast Data Coding Scheme (default 15).

In case of an incoming USSD with invalid or omitted data coding scheme information <ussdDCS> will not be presented.



## <ussdStatus><sup>(num)</sup>

0	No further user action required (network initiated USSD notification, or no further information needed after mobile initiated operation).
1	Further user action is required (network initiated USSD request, or further information is needed after mobile initiated operation). If <ussdStatus>=1 the URC ends with ">" to prompt the TE for the response data. The input action is terminated with <CTRL-Z> or aborted with <ESC>.
2	USSD exchange is terminated by network.
4	Operation not supported.
5	Network operation timeout.

### **Note**

- It is recommended to finalize or escape a pending USSD user interaction before further actions are done to prevent blocking situations.



## 6. Internet Service and GPRS Commands



The AT Commands described in this chapter used to operate with various Internet Services and control packet switched services. Access is provided to Socket Client and Server for TCP, Client for UDP, Transparent TCP Client, HTTP Client, FTP Client, SMTP Client and POP3 Client.

Internet Services	GPRS
AT+CDNSCFG	ATA
AT+CDNSGIP	ATH
AT+CDRIND	ATS0
AT+CIFSR	ATD*99#
AT+CIICR	ATD*98#
AT+CIPACK	AT+CGACT
AT+CIPATS	AT+CGANS
AT+CIPCCFG	AT+CGATT
AT+CIPCLOSE	AT+CGAUTO
AT+CIPCSGP	AT+CGDATA
AT+CIPHEAD	AT+CGDCONT
AT+CIPMODE	AT+CGEQMIN
AT+CIPMUX	AT+CGEQREQ
AT+CIPQSEND	AT+CGEREP
AT+CIPSEND	AT+CGMSCLASS
AT+CIPSERVER	AT+CGPADDR
AT+CIPSHOWTP	AT+CGQMIN
AT+CIPSHUT	AT+CGQREQ
AT+CIPSPRT	AT+CGREG
AT+CIPSRIP	AT+CGSMS
AT+CIPSTART	AT^SGAUTH
AT+CIPSTATUS	AT^SGCONF
AT+CSPN	
AT+CSTT	
AT^SICI	
AT^SICS	
AT^SISI	
AT^SISO	
AT^SISC	
AT^SISE	
AT^SISR	
AT^SISS	
AT^SIST	
AT^SISW	



## 6.1. AT+CDNSCFG Configure Domain Name Server

### Syntax

Test Command

```
AT+CDNSCFG=?
```

Response(s)

```
+CDNSCFG: ("Primary DNS"),("Secondary DNS")  
OK
```

Read Command

```
AT+CDNSCFG?
```

Response(s)

```
PrimaryDns: <pri_dns>  
SecondaryDns: <sec_dns>  
OK
```

Write Command

```
AT+CDNSCFG=<pri_dns>,<sec_dns>
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<pri\_dns><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the IP address of the primary domain name server

<sec\_dns><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the IP address of the secondary domain name server



## 6.2. AT+CDNSGIP Query The IP Address Of Given Domain Name

### Syntax

Test Command

```
AT+CDNSGIP=?
```

Response(s)

```
OK
```

Write Command

```
AT+CDNSGIP=<domain name>
```

Response(s)

```
OK
```

```
ERROR
```

If successful, return:

```
+CDNSGIP: 1, <domain name>,<IP>
```

If fail, return:

```
+CDNSGIP:0,<dns error code>
```

### Parameter Description

<domain name><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the domain name

<IP address><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the IP address corresponding to the domain name

<dns error code><sup>(num)</sup>

a numeric parameter which indicates the error code

10	DNS GENERAL ERROR
11	DNS MAX RETRIES
12	DNS NO SERVER ADDR
13	DNS NO MEMORY
14	DNS INVALID NAME
15	DNS INVALID RESP

There are some other error code as well.



### 6.3. AT+CDRIND CS Voice/Data/Fax Call Termination Indication

#### Syntax

Test Command

```
AT+CDRIND=?
```

Response(s)

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

Read Command

```
AT+CDRIND?
```

Response(s)

```
+CDRIND: <n>  
OK
```

Write Command

```
AT+CDRIND=<n>
```

Response(s)

```
OK  
ERROR
```

#### Unsolicited result code

When enabled, an unsolicited result code is returned after the connection has been terminated

```
+CDRIND: < type >
```

#### Parameter Description

<n><sup>(num)</sup>

a numeric parameter which indicates whether to enable an unsolicited event code indicating whether a CS voice call, CS data, fax call has been terminated.

0	Disable
---	---------

1	Enable
---	--------

<type><sup>(num)</sup>

connection type

0	CSV connection
---	----------------

1	CSD connection
---	----------------

2	PPP connection
---	----------------



## 6.4. AT+CIFSR      Get Local IP Address

### **Syntax**

Test Command

```
AT+CIFSR=?
```

Response(s)

```
OK
```

Exec Command

```
AT+CIFSR
```

Response(s)

```
<IP address>
```

```
ERROR
```

### **Parameter Description**

<IP address><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the IP address assigned from GPRS or CSD

### **Note**

- Only at the status of activated the moving scene: IP GPRSACT、TCP/UDP CONNECTING、CONNECT OK、IP CLOSE can get local IP Address by AT+CIFSR, otherwise response ERROR.



## 6.5. AT+CIICR      Bring Up Wireless Connection With GPRS Or CSD

### **Syntax**

Test Command

AT+CIICR=?

Response(s)

OK

Exec Command

AT+CIICR

Response(s)

OK

ERROR

### **Notes**

- AT+CIICR only activates moving scene at the status of IP START, after operating this Command, the state will be changed to IP CONFIG.
- After module accepting the activated operation, if activate successfully, the state will be changed to IP GPRSACT, response OK, otherwise response ERROR.



## 6.6. AT+CIPACK Query Previous Connection Data Transmitting State

### **Syntax**

Test Command

AT+CIPACK=?

Response(s)

OK

Exec Command

If in single IP connection (+CIPMUX=0) AT+CIPACK

Response(s)

+CIPACK: <txlen>, <acklen>, <nacklen>

Write Command

If in multi IP connection (+CIPMUX=1) AT+CIPACK=<n>

Response(s)

+CIPACK: <txlen>, <acklen>, <nacklen>

OK

### **Parameter Description**

<n>

a numeric parameter which indicates the connection number

<txlen>

the data amount which has been sent

<acklen>

the data amount confirmed successful by the server

<nacklen>

the data amount without confirmed by the server



## 6.7. AT+CIPATS

## Set Auto Sending Timer

### Syntax

Test Command

AT+CIPATS=?

Response(s)

+CIPATS: (list of supported <mode>s),(list of supported <time>)  
OK

Read Command

AT+CIPATS?

Response(s)

+CIPATS: <mode>,<time>  
OK

Write Command

AT+CIPATS=<mode>[,<time>]

Response(s)

OK  
ERROR

### Parameter Description

<mode><sup>(num)</sup>

a numeric parameter which indicates whether set timer when sending data

- |   |                                 |
|---|---------------------------------|
| 0 | not set timer when sending data |
| 1 | Set timer when sending data     |

<time><sup>(num)</sup>

0..100 a numeric parameter which indicates the seconds after which the data will be sent



## 6.8. AT+CIPCCFG Configure Transparent Transfer mode

### Syntax

Test Command

```
AT+CIPCCFG=?
```

Response(s)

```
+CIPCCFG: (NmRetry:3-8),(WaitTm:2-10),(SendSz:1-1460),(esc:0,1)  
OK
```

Read Command

```
AT+CIPCCFG?
```

Response(s)

```
+CIPCCFG: <NmRetry>,<WaitTm>,<SendSz>,<esc>  
OK
```

Write Command

```
AT+CIPCCFG=<NmRetry>,<WaitTm>,<SendSz>,<esc>
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<NmRetry><sup>(num)</sup>

number of retries to be made for an IP packet.

<WaitTm><sup>(num)</sup>

number of 200ms intervals to wait for serial input before sending the packet.

<SendSz><sup>(num)</sup>

size in bytes of data block to be received from serial port before sending.

<esc>

whether turn on the escape sequence, default is TRUE.

### Note

- This command will be effective only in single connection mode (+CIPMUX=0)



## 6.9. AT+CIPCLOSE Close TCP Or UDP Connection

### Syntax

Test Command

```
AT+CIPCLOSE=?
```

Response(s)

```
OK
```

Read Command

```
AT+CIPCLOSE
```

Response(s)

If close successfully:

```
CLOSE OK
```

If close fail:

```
ERROR
```

Write Command

1) If single IP connection (+CIPMUX=0)

```
AT+CIPCLOSE=<id>
```

2) If multi IP connection (+CIPMUX=1)

```
AT+CIPCLOSE=<n><id>
```

Response(s)

1) If single IP connection (+CIPMUX=0)

```
CLOSE OK
```

2) If multi IP connection (+CIPMUX=1)

```
<n>, CLOSE OK
```

### Parameter Description

<id><sup>(num)</sup>

0                      slow close (default)

1                      quick close

<n><sup>(num)</sup>

a numeric parameter which indicates the connection number

### Note

- AT+CIPCLOSE only close connection at the status of TCP/UDP CONNECTING or CONNECT OK, otherwise response ERROR, after closing the connection, the status is IP CLOSE when in single IP mode



## 6.10. AT+CIPCSGP Set CSD Or GPRS For Connection Mode

### Syntax

Test Command

```
AT+CIPCSGP=?
```

Response(s)

```
+CIPCSGP:0-CSD,DIALNUMBER,USER  
NAME,PASSWORD,RATE(0-3)  
+CIPCSGP: 1-GPRS,APN,USER NAME,PASSWORD  
OK
```

Read Command

```
AT+CIPCSGP?
```

Response(s)

```
+CIPCSGP: <mode>, <apn>, <user name>, <password>[,<rate>]  
OK
```

Write Command

```
AT+CIPCSGP=<mode>,[(<apn>,<user name>,<password>), (<dialnumber>,<username>,<password>,<rate>)]
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<mode><sup>(num)</sup>

a numeric parameter which indicates the wireless connection mode

0 set CSD as wireless connection mode

1 set GPRS as wireless connection mode

<apn><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the access point name

<user name><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the user name

<password><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the password



`<dial number>(str)`

a string parameter(string should be included in quotation marks) which indicates the CSD dial numbers

`<user name>(str)`

a string parameter(string should be included in quotation marks) which indicates the CSD user name

`<password>(str)`

a string parameter(string should be included in quotation marks) which indicates the CSD password

`<rate>(num)`

a numeric parameter which indicates the CSD connection rate

0	2400
1	4800
2	9600 (default)
3	14400



## 6.11. AT+CIPHEAD Add An IP Head When Receiving Data

### Syntax

Test Command

AT+CIPHEAD=?

Response(s)

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

Read Command

AT+CIPHEAD?

Response(s)

+CIPHEAD: <mode>  
OK

Write Command

AT+CIPHEAD=<mode>

Response(s)

OK  
ERROR

### Parameter Description

<mode><sup>(num)</sup>

a numeric parameter which indicates whether adding an IP header to received data or not

- |   |  |
|---|--|
| 0 | not add IP header                                |
| 1 | add IP header, the format is "+IPD,data length:" |



## 6.12. AT+CIPMODE Select TCPIP Application Mode

### Syntax

Test Command

```
AT+CIPMODE=?
```

Response(s)

```
+CIPMODE 0-NORMAL MODE,1-TRANSPARENT MODE)  
OK
```

Read Command

```
AT+CIPMODE?
```

Response(s)

```
+CIPMODE: <mode>  
OK
```

Write Command

```
AT+CIPMODE=<mode>
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<mode><sup>(num)</sup>

0	normal mode
1	transparent mode



## 6.13. AT+CIPMUX Start Up Multi-IP Connection

### Syntax

Test Command

```
AT+CIPMUX=?
```

Response(s)

```
+CIPMUX: (0,1)  
OK
```

Read Command

```
AT+CIPMUX?
```

Response(s)

```
+CIPMUX: <n>  
OK
```

Write Command

```
AT+CIPMUX=<n>
```

Response(s)

```
OK
```

### Parameter Description

<n><sup>(num)</sup>

0	Single IP connection
1	Multi IP connection

### Notes

- Only in IP initial state, AT+CIPMUX=1 is effective;
- Only when multi IP connection and GPRS application are both shut down, AT+CIPMUX=0 is effective



## 6.14. AT+CIPQSEND Select Data Transmitting Mode

### Syntax

Test Command

```
AT+CIPQSEND=?
```

Response(s)

```
+CIPQSEND: (0,1)  
OK
```

Read Command

```
AT+CIPQSEND?
```

Response(s)

```
+CIPQSEND: <n>  
OK
```

Write Command

```
AT+CIPQSEND=<n>
```

Response(s)

```
OK
```

### Parameter Description

<n><sup>(num)</sup>

- |   |   |
|---|---|
| 0 | Normal mode – when the server receives TCP data, it will response SEND OK                                   |
| 1 | Quick send mode – when the data is sent to module, it will response DATA ACCEPT, while not response SEND OK |



## 6.15. AT+CIPSEND Send Data Through TCP Or UDP Connection

### Syntax

#### Test Command

AT+CIPSEND=?

#### Response(s)

- 1) If single IP connection (+CIPMUX=0)  
+CIPSEND: <length>  
OK
- 2) If multi IP connection (+CIPMUX=1)  
+CIPSEND: <0-7>,<length>  
OK

#### Read Command

AT+CIPSEND?

#### Response(s)

- 1) If single IP connection (+CIPMUX=0)  
+CIPSEND:<size>  
OK
- 2) If multi IP connection (+CIPMUX=1)  
+CIPSEND:<n><size>  
OK

#### Exec Command

AT+CIPSEND response ">" , then type data for send, tap CTRL+Z to send, tap ESC to cancel the operation

#### Response(s)

This Command is used to send changeable length data.

If single IP connection (+CIPMUX=0)

If connection is not established or disconnection:

+CME ERROR <err>

If sending successfully:

When +CIPQSEND=0

SEND OK

When +CIPQSEND=1

DATA ACCEPT:<length>

If sending fail:

SEND FAIL

#### Note

This Command can only be used in single IP connection mode (+CIPMUX=0) and to send data on the TCP or UDP connection that has been established already. Ctrl-Z is used as a termination symbol. ESC is used to cancel sending data. There are at most <size> bytes that can be sent at a time.



#### Write Command

If single IP connection (+CIPMUX=0)  
+CIPSEND=<length>  
2) If multi IP connection (+CIPMUX=1)  
+CIPSEND=<n>[,<length>]

#### Response(s)

This Command is used to send changeable length data

If single IP connection (+CIPMUX=0)

If connection is not established or disconnection:

+CME ERROR <err>

If sending successfully:

When +CIPQSEND=0

SEND OK

When +CIPQSEND=1

DATA ACCEPT:<length>

If sending fail:

SEND FAIL

If multi IP connection (+CIPMUX=1)

If connection is not established or disconnection:

+CME ERROR <err>

If sending successfully:

When +CIPQSEND=0

<n>,SEND OK

When +CIPQSEND=1

DATA ACCEPT:<n>,<length>

If sending fail:

<n>,SEND FAILParameter

### ***Parameter Description***

<n><sup>(num)</sup>

a numeric parameter which indicates the connection number

<size><sup>(num)</sup>

a numeric parameter which indicates the data length sent at a time

<length><sup>(num)</sup>

a numeric parameter which indicates the length of sending data, it must less than <size>



### **Notes**

- The data length which can be sent depends on network status. Set the time that send data automatically with the Command of AT+CIPATS.
- Only send data at the status of established connection



## 6.16. AT+CIPSERVER      Configure As Server

### Syntax

Test Command

```
AT+CIPSERVER=?
```

Response(s)

```
+CIPSERVER: (0-CLOSE SERVER, 1-OPENSERVR),(1,65535)  
OK
```

Read Command

```
AT+CIPSERVER?
```

Response(s)

```
+CIPSERVER: <mode>[,<port>,<channel id>,<bearer>]  
OK
```

Write Command

```
AT+CIPSERVER=<mode>[,<port>]
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<mode><sup>(num)</sup>

0	close server
1	open server

<port><sup>(num)</sup>

1..65535	Listening port
----------	----------------

<channel id>

channel id

<bearer>

GPRS bearer



### Note

- This command is allowed to establish a TCP server only when the state is IP INITIAL or IP STATUS when it is in single state. In multi-IP state, the state is in IP STATUS only.

## 6.17. AT+CIPSHOWTP      Display transfer protocol in IP head when receiving data

### Syntax

Test Command

```
AT+CIPSHOWTP=?
```

Response(s)

```
+CIPSHOWTP: (list of supported <mode>s)
```

```
OK
```

Read Command

```
AT+CIPSHOWTP?
```

Response(s)

```
+CIPSHOWTP: <mode>
```

```
OK
```

Write Command

```
AT+CIPSHOWTP=<mode>
```

Response(s)

```
OK
```

```
ERROR
```

### Parameter Description

<mode><sup>(num)</sup>

a numeric parameter which indicates whether display transfer protocol in IP header to received data or not

0                      does not display transfer protocol

1                      display transfer protocol, the format is "+IPD, <dataSize>, <TCP/UDP>: <data>"

### Note

- Only when +CIPHEAD set to 1, the setting of this command would work



## 6.18. AT+CIPSHUT Deactivate GPRS PDP Context

### **Syntax**

Test Command

AT+CIPSHUT=?

Response(s)

OK

Exec Command

AT+CIPSHUT

Response(s)

If close successfully:

SHUT OK

If close fail:

ERROR

Note Except at the status of IP INITIAL, you can close moving scene by AT+CIPSHUT. After closed, the status is IP INITIAL.

### **Note**

- If this command executed in multi-connection mode, all of the IP connection will be shut



## 6.19. AT+CIPSPRT Set Prompt Of '>' When Sending Data

### Syntax

Test Command

AT+CIPSPRT=?

Response(s)

+CIPSPRT: (<send prompt>s)  
OK

Read Command

AT+CIPSPRT?

Response(s)

+CIPSPRT: <send prompt>  
OK

Write Command

AT+CIPSPRT=<send prompt>

Response(s)

OK  
ERROR

### Parameter Description

<send prompt><sup>(num)</sup>

a numeric parameter which indicates whether echo prompt '>' after issuing AT+CIPSEND Command

- |   |   |
|---|---|
| 0 | no prompt and show "send ok" when send successfully       |
| 1 | echo '>' prompt and show "send ok" when send successfully |
| 2 | no prompt and not show "send ok" when send successfully   |



## 6.20. AT+CIPSRIP Set Whether Display IP Address And Port Of Sender When Receive Data

### Syntax

Test Command

```
AT+CIPSRIP=?
```

Response(s)

```
+CIPSRIP: (list of supported <mode>s)
```

```
OK
```

Read Command

```
AT+CIPSRIP?
```

Response(s)

```
+CIPSRIP: <mode>
```

```
OK
```

Write Command

```
AT+CIPSRIP=<mode>
```

Response(s)

```
OK
```

```
ERROR
```

### Parameter Description

<mode><sup>(num)</sup>

a numeric parameter which indicates whether show the prompt of where the data received are from or not before received data.

0 do not show the prompt

1 show the prompt, the format is as follows: RECV FROM:<IP ADDRESS>:<PORT>

Note that the default mode is not to show the prompt.



## 6.21. AT+CIPSTART Start Up TCP Or UDP Connection

### Syntax

#### Test Command

AT+CIPSTART=?

#### Response(s)

1) If AT+CIPMUX=0

+CIPSTART: (list of supported <mode>),IP address range,(port range)

+CIPSTART: (list of supported <mode>),(domain name),(port range)

OK

2) If AT+CIPMUX=1

+CIPSTART: (list of supported <n>),(list of supported <mode>),IP address range,(port range)

+CIPSTART: (list of supported <n>),(list of supported <mode>),(domain name),(port range)

OK

#### Read Command

1)If single IP connection (+CIPMUX=0)

+CIPSTART=<mode>,<IP address>,<port>

Or +CIPSTART=<mode>,<domain name>,<port>

2)If multi-IP connection (+CIPMUX=1)

+CIPSTART=<n>,<mode>,<address>,<port>

+CIPSTART=<n>,<mode>,<domainname>,<port>

#### Response(s)

1) If single IP connection (+CIPMUX=0)

If format is right response OK, otherwise response

+CME ERROR <err>

If connection exists, response

ALREAY CONNECT

If connected successfully response

CONNECT OK

Otherwise

STATE: <state>

CONNECT FAIL

2) If multi-IP connection

(+CIPMUX=1)

If format is right response OK, otherwise response

+CME ERROR <err>

If connection exists, response

<n>,ALREAY CONNECT

If connected successfully response

<n>,CONNECT OK

Otherwise

<n>,CONNECT FAIL



### ***Parameter Description***

`<n>`<sup>(num)</sup>

0..7                      a numeric parameter which indicates the connection number

`<mode>`<sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the connection type

“TCP”                      Establish a TCP connection

“UDP”                      Establish a UDP connection

`<IP address>`<sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates remote server IP address

`<port>`

remote server port

`<domain name>`<sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates remote server domain name



<state><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the progress of connecting

0	IP INITIAL
1	IP START
2	IP CONFIG
3	IP GPRSACT
4	IP STATUS
5	TCP CONNECTING/UDP CONNECTING/SERVER LISTENING
6	CONNECT OK
7	TCP CLOSING/UDP CLOSING
8	TCP CLOSED/UDP CLOSED
9	PDP DEACT

In Multi-IP state:

0	IP INITIAL
1	IP START
2	IP CONFIG
3	IP GPRSACT
4	IP STATUS
5	IP PROCESSING
9	PDP DEACT

### Notes

- This command is allowed to establish a TCP/UDP connection only when the state is IP INITIAL or IP STATUS when it is in single state. In multi-IP state, the state is in IP STATUS only. So it is necessary to process "AT+CIPSHUT" before establish a TCP/UDP connection with this command when the state is not IP INITIAL or IP STATUS.
- When in multi-IP state, before executing this command, it is necessary to process" AT+CSTT, AT+CIICR, AT+CIFSR"



## 6.22. AT+CIPSTATUS

## Query Current Connection Status

### Syntax

Test Command

```
AT+CIPSTATUS=?
```

Response(s)

```
OK
```

Read Command

```
AT+CIPSTATUS
```

Response(s)

1 ) If single connection mode (+CIPMUX=0)

```
OK
```

```
STATE: <state>
```

2) If multi-connection mode (+CIPMUX=1)

```
OK
```

```
STATE: <state>
```

If the module is set as server

```
S: 0, <bearer>, <port>, <server state>
```

```
C: <n>, <bearer>, <TCP/UDP>, <IP address>, <port>, <client state>
```

### Parameter Description

<n><sup>(num)</sup>

0..7                      a numeric parameter which indicates the connection number

<bearer>

0-1 GPRS bearer, default is 0

<server state>

OPENING

LISTENING

CLOSING



<client state>

INITIAL  
CONNECTING  
CONNECTED  
CLOSING  
CLOSED

<state><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the progress of connecting

0	IP INITIAL
1	IP START
2	IP CONFIG
3	IP GPRSACT
4	IP STATUS
5	TCP CONNECTING/UDP CONNECTING/SERVER LISTENING
6	CONNECT OK
7	TCP CLOSING/UDP CLOSING
8	TCP CLOSED/UDP CLOSED
9	PDP DEACT

In Multi-IP state:

0	IP INITIAL
1	IP START
2	IP CONFIG
3	IP GPRSACT
4	IP STATUS
5	IP PROCESSING
9	PDP DEACT



## 6.23. AT+CSPN Get Service Provider Name From SIM

### Syntax

Test Command

```
AT+CSPN?
```

Response(s)

```
+CSPN: <spn>,<display mode>
```

```
OK
```

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

### Parameter Description

<spn><sup>(str)</sup>

string type(string should be included in quotation marks);  
service provider name on SIM

<display mode><sup>(num)</sup>

0 don't display PLMN. Already registered on PLMN

1 display PLMN

### Note

- CME errors if SIM not inserted.



## 6.24. AT+CSTT

## START Task And Set APN, USER NAME, PASSWORD

### Syntax

Test Command

```
AT+CSTT=?
```

Response(s)

```
+CSTT: "APN","USER","PWD"  
OK
```

Read Command

```
AT+CSTT?
```

Response(s)

```
+CSTT: <apn>,<user name>,<password>  
OK
```

Write Command

```
AT+CSTT=<apn>,<user name>,<password>
```

Response(s)

```
OK  
ERROR
```

Exec Command

```
AT+CSTT=<apn>,<user name>,<password>
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<apn><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the GPRS access point name

<user name><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the GPRS user name

<password><sup>(str)</sup>

a string parameter(string should be included in quotation marks) which indicates the GPRS password



**Note**

- The write command and execution command of this command is valid only at the state of IP INITIAL. After operating this command, the state will be changed to IP START.



## 6.25. AT^SICI Internet Connection Information

The AT^SICI read command requests the current status of the Internet connection profiles currently defined with AT^SICS.

The AT^SICI write command displays the status of the specified Internet connection profile. If the connection profile is not defined yet, the command returns a "+CME ERROR" response.

### Syntax

Test Command

AT^SICI=?

Response(s)

[^SICI:(list of defined <conProfileId>s)]  
OK

Read Command

AT^SICI?

Response(s)

OK  
ERROR

Exec Command

AT^SICI=<conProfileId>

Response(s)

^SICI: <conProfileId>, <conState>, <numServices>, <conAddr>  
OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### Parameter Description

<conProfileId><sup>(num)</sup>

Internet connection profile identifier as defined by AT^SICS (<conProfileId>).

0...5



`<conState>`<sup>(num)</sup>

State of the Internet connection profile.

- |   |   |
|---|---|
| 0 | Down - Internet connection is defined but not connected.  |
| 1 | Connecting - A service has been opened and so the Internet connection is initiated.   |
| 2 | Up - Internet connection is established and usable by one or more services.   |
| 3 | Limited Up - Internet connection is established, but temporarily no network coverage.<br>This state applies only to GPRS profiles (it does not occur with CSD). |
| 4 | Closing - Internet connection is terminating.   |

`<numServices>`<sup>(num)</sup>

Number of services using this Internet connection profile.

0...9

`<conAddr>`<sup>(str)</sup>

Local IP address of the Internet connection profile (empty if no address is associated yet).

### Notes

- Before opening a service profile based on a connection profile recently used, check with `AT^SICI` that the previous connection was properly closed. If `AT^SICI` confirms that the connection profile is in `<conState>=0` (Down) the connection profile may be used again.
- If `AT^SICI` is used simultaneously on different instances (e.g. Mux channels) only one request can be handled at a time. On the other instance(s) `" +CME ERROR: operation temporary not allowed"` will be displayed. If so, repeat the command on this instance.
- After closing the last service which uses this connection profile, parameter value `<numServices>` is decreased after the expiry of the inactivity timeout "inactTO" of `AT^SICS` only.

### 6.25.1. Checking Connection Profile Status

<code>at^sici?</code>	Query the current status of the connection profile.
<code>^SICI: 1,2,1,"10.10.0.161"</code>	One connection profile has been created at <code>&lt;conProfileId&gt;=1</code> , and one service is opened using this connection profile. The Internet connection is in <code>&lt;conState&gt;=2</code> ("Up").

Assume the network connection is temporarily not available. (If URC presentation mode of network registration is enabled the state is shown by the URC `" +CREG: 2"`).



at^sici? ^SICI: 1,2,1,"10.10.0.161"	Query the current status of the connection profile. One connection profile has been created at <code>&lt;conProfileId&gt;=1</code> , and one service is opened using this connection profile. The Internet connection is in <code>&lt;conState&gt;=2</code> ("Up").
--	--

Assume the network connection is temporarily not available. (If URC presentation mode of network registration is enabled the state is shown by the URC "+CREG: 2").

at^sici? ^SICI: 1,3,1,"10.10.0.161" OK	Query once again the current status of the connection profile. Parameter <code>&lt;conState&gt;</code> has changed to state "Lim-ited up".
--	---

The network connection is temporarily not available but the Internet connection is still established, so the host may decide to stop the data transfer to minimize the risk of losing data due to memory limitations.

at^sici? ^SICI: 1,2,1,"10.10.0.161" OK	Query once again the current status of the connection profile. After re-establishing the network connection, <code>&lt;conState&gt;</code> reverts to state "Up".
--	--

Another service has been opened with `AT^SISO`:

at^sici? ^SICI: 1,2,2,"10.10.0.161" OK	Query once again the current status of the connection profile. After opening another service, parameter <code>&lt;numServices&gt;</code> has increased.
--	--

After closing one service with `AT^SISC`:

at^sici? ^SICI: 1,2,1,"10.10.0.161" OK	Query once again the current status of the connection profile. Parameter <code>&lt;numServices&gt;</code> has decreased.
--	---

After closing the last service with `AT^SISC`:

at^sici? ^SICI: 1,2,1,"10.10.0.161" OK	Query once again the current status of the connection profile. The bearer is still open because of the inactivity timeout "inactTO" of <code>AT^SICS</code> .
at^sici? ^SICI: 1,0,0,"0.0.0.0" OK	Query again the current status. The inactivity timeout "inactTO" of <code>AT^SICS</code> has expired, therefore the bearer is closed now. Parameter <code>&lt;numServices&gt;</code> has decreased.



## 6.26. AT^SICS Internet Connection Setup Profile

**AT^SICS** serves to create and edit Internet connection profiles. A connection profile can be assigned to one or more service profiles defined with **AT^SISS**, and thus, determines which type of connection is to be established when opening a service profile with **AT^SISO**.

The **AT^SICS** read command requests the current settings of all Internet connection profiles. One line is issued for every possible parameter of a given `<conParmTag>` "conType" value.

The **AT^SICS** write command specifies all parameters of a connection profile identified by `<conProfileId>`. At first the type of Internet connection needs to be selected via `<conParmTag>` value "conType". This determines the applicability of all other `<conParmTag>` values related to this "conType" and automatically sets their defaults. An exception is the `<conParmValue-alphabet>` which can be set before or after selecting "conType".

To change the settings the write command needs to be executed for each single `<conParmTag>`. All profile parameters set with **AT^SICS** are volatile.

MG21 supports the authentication methods PAP (Password Authentication Protocol), CHAP (Handshake Authentication Protocol) or none. The method actually used for an Internet connection via CSD or GPRS is negotiated at the LCP layer, i.e. it is negotiated with the remote peer at connection setup.

Table: Applicability of **AT^SICS** `<conParmTag>` values

<code>&lt;conParmTag&gt;</code> value	CSD	GPRS0
"conType"	mandatory	mandatory
"user"	optional	optional
"passwd"	optional	optional
"apn"	∅	mandatory
"inactTO"	optional	optional
"calledNum"	mandatory	∅
"dataType"	mandatory	∅
"dns1"	optional	optional
"dns2"	optional	optional
"alphabet"	optional	optional



## Syntax

Test Command

AT^SICS=?

Response(s)

OK

Read Command

AT^SICS?

Response(s)

^SICS: <conProfileId>, <conParmTag>, <conParmValue>

OK

Write Command

AT^SICS=<conProfileId>, <conParmTag>, <conParmValue>

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + - -

## Parameter Description

<conProfileId><sup>(num)</sup>

0...5

Internet connection profile identifier.

The <conProfileId> identifies all parameters of a connection profile, and, when a service profile is created with AT^SISS the <conProfileId> needs to be set as "conId" value of the AT^SISS parameter <srvParmTag>.

<conParmTag><sup>(str)</sup>

Internet connection parameter

"conType"

Type of Internet connection.

For supported values of <conParmValue> refer to <conParmValue-conType>.

"alphabet"

Selects the character set for input and output of string parameters within a pro-file.

The selected value is bound to the specific profile. This means that different profiles may use different alphabets. Unlike other parameters the alphabet can be changed no matter whether the <conParmTag> value "conType" has been set.

For supported values of <conParmValue> refer to <conParmValue-alphabet>.

"user"

User name string: maximum 32 characters (where "" is default).



“passwd“	Password string: maximum 32 characters (where ***** is default).
“apn“	Access point name string value: maximum 100 characters (where "" is default).
“inactTO“	Inactivity timeout value in seconds: 0 ... 2 <sup>16</sup> -1, default = 20 Number of seconds the bearer remains open although the service no longer needs the bearer connection. Do not set the timeout value below 3 sec. This may result in problems when using the <a href="#">&lt;eodFlag&gt;</a> (set in the last <a href="#">AT^SISW</a> command to terminate an upload data stream).
“calledNum“	Called BCD number.
“dataType“	Data call type. For supported values of <a href="#">&lt;conParmValue&gt;</a> refer to <a href="#">&lt;conParmValue-dataType&gt;</a> .
“dns1“	Primary DNS server address (IP address in dotted-four-byte format). This value determines whether to use the DNS server addresses dynamically assigned by the network or a specific DNS server address given by the user. "dns1" = "0.0.0.0" (default) means that the CSD or GPRS connection profile uses dynamic DNS assignment. Any other address means that the Primary DNS is manually set. The default value applies automatically if no other address is set. Note that the <a href="#">AT^SICS</a> read command only returns a manually configured IP address, while the value "0.0.0.0" is not indicated at all, no matter whether assumed by default or explicitly specified. See also note below.
“dns2“	Secondary DNS server address (IP address in dotted-four-byte format). If "dns1" = "0.0.0.0" this setting will be ignored. Otherwise this value can be used to manually configure an alternate server for the DNS1. If "dns1" is not equal "0.0.0.0" and no "dns2" address is given, then "dns2"="0.0.0.0" will be assumed automatically. The <a href="#">AT^SICS</a> read command only returns a manually configured IP address, while the value "0.0.0.0" is not indicated at all, no matter whether assumed by default or explicitly specified.

[<conParmValue>](#)<sup>(str)</sup>

Parameter value; type and supported content depend on related [<conParmTag>](#).



#### <conParmValue-conType><sup>(str)</sup>

Supported connection type values in <conParmValue> for <conParmTag> value "conType".

"CSD"	Circuit-switched data call.
"GPRS0"	GPRS connection. Settings of GPRS related commands are not used, e.g. <a href="#">AT+CGDCONT</a> . When a service based on a GPRS connection profile is started after entering <a href="#">AT^SISO</a> MG21 automatically tries to attach to the GPRS. Yet, the only exception is <a href="#">AT+CGATT</a> which can be used any time to detach from the GPRS and thus disconnect the bearer opened with <a href="#">AT^SISO</a> .
"none"	Clears the connection profile.

#### <conParmValue-alphabet><sup>(str)</sup>

Character set selectable with <conParmValue> for <conParmTag> value "alphabet".

["0"]	Character set determined with <a href="#">AT+CSCS</a> applies.
"1"	International Reference Alphabet (IRA, seven bit ASCII) applies.

#### <conParmValue-dataType><sup>(str)</sup>

Supported data call type values in <conParmValue> for <conParmTag> value "dataType".

["0"]	ISDN
"1"	Analog

### Notes

- Before opening a service profile based on a connection profile recently used, check with [AT^SICI](#) that the previous connection was properly closed. If [AT^SICI](#) confirms that the connection profile is in <conState> 0 (Down) the connection profile may be used again.
- If a GPRS network does not support or is not correctly configured for automatic DNS address assignment the TCP/IP stack cannot resolve fully qualified domain names. In this case, a warning message will be returned when trying to open an Internet service configured for automatic DNS address assignment.

### 6.26.1. Example: Default values of a CSD connection profile

As stated earlier, the "conType" selected with [AT^SICS](#) determines all other matching profile parameters related to this "conType". Once "conType" is set in a new profile, the default values of all other related parameters are assumed. To view the default settings you can use the read command [AT^SICS?](#).



at^sics=1,conType,CSD	Select connection type CSD, identified by <conProfileId>1
OK	
at^sics?	Query current profiles.
^SICS: 0, "conType", ""	Profile with <conProfileId> 0 is still empty.
^SICS: 1, "conType", "CSD"	The new CSD profile just created is indicated with all related parameters set to their default.
^SICS: 1, "alphabet", "0"	Character set determined with AT+CSCS applies when string parameters are input with AT^SICS.
^SICS: 1, "user", ""	No user name set.
^SICS: 1, "passwd", "*****"	Password masked with asterisks.
^SICS: 1, "inactTO", "20"	Inactivity timeout = 20s.
^SICS: 1, "calledNum", ""	No destination set.
^SICS: 1, "dataType", "1"	Remote device is analog, e.g. an analog modem.
^SICS: 2, "conType", ""	Profile with <conProfileId> 2 is still empty.
^SICS: 3, "conType", ""	Profile with <conProfileId> 3 is still empty.
^SICS: 4, "conType", ""	Profile with <conProfileId> 4 is still empty.
^SICS: 5, "conType", ""	Profile with <conProfileId> 5 is still empty.
OK	

### 6.26.2. Example: GPRS connection profile

at^sics=0,conType,GPRS0	Select connection type GPRS0.
OK	
AT^SICS=0,"inactTO", "20"	Inactivity timeout = 20s.
OK	
AT^SICS=0,dns1,"193.254.160.1"	IP address of Primary DNS server.
OK	
AT^SICS=0,passwd,t-d1	Password for GPRS services provided by the German operator T-D1.
OK	
AT^SICS=0,apn,"internet.t-d1.de"	APN to access the GPRS services provided by the German operator T-D1.
OK	



## 6.27. AT^SISI Internet Service Information

AT^SISI serves to monitor the status of Internet service profiles defined with AT^SIS.

The AT^SISI read command requests the current status of all defined Internet service profiles.

The AT^SISI write command requests the status of the specified Internet service profile. If the specified service profile is not defined yet, "+CME ERROR" is returned.

Test Command

AT^SISI=?

Response(s)

[^SISI:(list of defined <srvProfileId>s)]  
OK

Read Command

AT^SISI?

Response(s)

If response is related to service profile(s) created / opened on this interface:

[^SISI: <srvProfileId>, <srvState>, <rxCount>, <txCount>, <ackData>, <unackData>]  
[^SISI: ...]

If response is related to service profile(s) created / opened on other interface(s):

[^SISI: <srvProfileId>, <srvParmTag>value "srvType"]  
[^SISI: ...]  
OK  
ERROR

Exec Command

AT^SISI=<srvProfileId>

Response(s)

^SISI: <srvProfileId>, <srvState>, <rxCount>, <txCount>, <ackData>, <unackData> OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 ☀ Last

- + + + + - -



### **Parameter Description**

**<srvProfileId><sup>(num)</sup>**

Internet service profile identifier as defined by [AT^SISS](#) (<srvProfileId>).

0...9

**<srvState><sup>(num)</sup>**

Internet service state (for details see [AT^SISO](#) parameter <srvState>).

2	Allocated
3	Connecting
4	Up
5	Closing
6	Down

**<rxCount><sup>(num)</sup>**

Number of bytes received via [AT^SISR](#) or [AT^SIST](#) since last successful [AT^SISO](#) write command. This is the same value as displayed by the [AT^SISO](#) read command with the parameter <rxCount>.

**<txCount><sup>(num)</sup>**

Number of bytes sent via [AT^SISW](#) or [AT^SIST](#) since last successful [AT^SISO](#) write command. This is the same value as displayed by the [AT^SISO](#) read command with the parameter <txCount>.

**<ackData><sup>(num)</sup>**

Number of data bytes already sent and acknowledged at TCP layer. Value 0 indicates that no sent data is acknowledged yet.

Parameter is not applicable to HTTP, POP3, SMTP and Socket with UDP. For these services the counter is always set to 0.

**<unackData><sup>(num)</sup>**

Number of data bytes already sent but not yet acknowledged at TCP layer. A value 0 indicates that all sent data is already acknowledged.

This is the same value as displayed in the response of the [AT^SISW](#) write command with the parameter <unackData>.

Parameter is not applicable to HTTP, POP3, SMTP and Socket with UDP. For these services the counter is always set to 0.



**Note**

- If a service is in state "Down" the responses for `<rxCount>`, `<txCount>`, `<ackData>` and `<unackData>` are the last known values for the service in the states "Connecting", "Up" and "Closing".



## 6.28. AT^SISO Internet Service Open

The AT^SISO write command starts the Internet session configured by the service profile. All further steps needed to control the session depend on whether you are using URC mode or polling mode. The AT^SISO read command returns the current status of all services.

URC mode:

If the service opens successfully, the URCs "ASISW" and "ASISR" will trigger the action to follow, either writing data with AT^SISW or reading data with AT^SISR. To terminate an upload data stream set the <eodFlag> within the last AT^SISW command. If the URCs notify that a data transfer has been successful ("ASISR: x, 2" or "ASISW: x, 2"), the service can be closed with AT^SISC. If a special event occurs, e.g. an error or a warning, after opening or while using a service then the URC type "ASIS" will be delivered.

Polling mode:

After opening the service, all progress information needed to control the session shall be explicitly requested by the host application. The particular sequence of AT commands varies depending on the service used. The following list summarizes, by way of an example, the steps normally involved in managing an upload or download job.

### ■ Upload (Socket, FTP, HTTP, SMTP):

- Enter the AT^SISO command, e.g. AT^SISO=9.
- Enter AT^SISW, specify <reqWriteLength>, e.g. AT^SISW=9,20. Check resulting response for <cnfWriteLength>. Optionally, check error with AT^SISE, e.g. AT^SISE=9. If necessary, repeat the sequence several times.
- Enter last AT^SISW command and enable <eodFlag>, e.g. AT^SISW=9,0,1.
- If Socket service: Query available data with AT^SISR, e.g. AT^SISR=9,1430.
- Check service state with AT^SISI, e.g. AT^SISI=9, if necessary several times until <srvState>=6 ("Down").
- Check error with AT^SISE, e.g. AT^SISE=9.
- Close service with AT^SISC, e.g. AT^SISC=9.

### ■ Download (Socket, FTP, HTTP, POP3):

- Enter the AT^SISO command, e.g. AT^SISO=9.
- Enter AT^SISR, specify <reqReadLength>, e.g. AT^SISR=9,1000. Check resulting response for <cnfReadLength>. If necessary, repeat the sequence several times until <cnfReadLength>= -2 (end of data) or ERROR.
- Check error with AT^SISE, e.g. AT^SISE=9.
- Close service with AT^SISC, e.g. AT^SISC=9.



- Socket service (upload and download possible in one session):
  - Recommended: Set `AT+CMEE=2` to enable extended error text.
  - Enter the `AT^SISO` command, e.g. `AT^SISO=9`.
  - Enter `AT^SISR` or `AT^SISW`, specifying `<reqReadLength>` or `<reqWriteLength>`, e.g. `AT^SISR=9,20` or `AT^SISW=9,20`. Check resulting response for `<cnfReadLength>` or `<cnfWriteLength>`. If necessary, repeat the sequence several times.
  - Check error with `AT^SISE`, e.g. `AT^SISE=9`.
  - If write action: Enter last `AT^SISW` command and enable `<eodFlag>`, e.g. `AT^SISW=9,0,1`. <sup>1)</sup> If Socket service: Query available data with `AT^SISR`, e.g. `AT^SISR=9,1430`.
  - Close service with `AT^SISC`, e.g. `AT^SISC=9`.
- Transparent TCP service:
  - Enter the `AT^SISO` command, e.g. `AT^SISO=9`.
  - Enter `AT^SIST` to enter transparent data mode. After communication has finished return to AT command mode via `+++` escape sequence.
  - Check error with `AT^SISE`, e.g. `AT^SISE=9`.
  - Close service with `AT^SISC`, e.g. `AT^SISC=9`.

## Syntax

Test Command

`AT^SISO=?`

Response(s)

OK

Read Command

`AT^SISI?`

Response(s)

`^SISO: <srvProfileId>, <srvParmTag>value "srvType" [, <srvState>, <socketState>, <rxCount>, <txCount>, <locAddr>, <remAddr>]`

`[^SISO: ...]`

OK

Exec Command

`AT^SISI=<srvProfileId>`

Response(s)

`^SISI: <srvProfileId>, <srvState>, <rxCount>, <txCount>, <ackData>, <unackData>`

OK

ERROR

`+CME ERROR: <err>`

PIN ASC0 MUX1 MUX2 MUX3  Last

± + + + + - -



## Parameter Description

**<srvProfileId><sup>(num)</sup>**

<srvProfileId> 0 ... 9 specified with [AT^SISS](#).

**<srvState><sup>(num)</sup>**

Internet service state.

Please note, that the state of an Internet service may influence the state of the serial DCD line. For details see description of value 2 for parameter <value> of command [AT&C](#).

- |   |  |
|---|--|
| 2 | <b>Allocated</b><br>Service profile resources are allocated, i.e. at least the service type has been set (parameter <a href="#">&lt;srvParmTag&gt;</a> , value "srvType" of <a href="#">AT^SISS</a> ). The service is not opened, but ready for configuration.   |
| 3 | <b>Connecting</b><br>State after opening a service with <a href="#">AT^SISO</a> where the connection is being established.<br>If connection setup is successful the service proceeds to the state "4" (Up) and one of the URCs " <a href="#">^SISW</a> " and " <a href="#">^SISR</a> " may follow. If connection setup is not successful, the " <a href="#">^SIS</a> " URC may appear and the service enters <a href="#">&lt;srvState&gt;</a> 6 (Down).<br>In the case of FTP, <a href="#">&lt;srvState&gt;</a> =3 means that the command channel is being established.<br>If the service profile is configured as Socket listener, then the listener always stays at <a href="#">&lt;srvState&gt;</a> =3 and <a href="#">&lt;socketState&gt;</a> =3 (LISTENER), while the <a href="#">&lt;srvState&gt;</a> and <a href="#">&lt;socketState&gt;</a> of the dynamically assigned service pro-file may change. |
| 4 | <b>Up</b><br>The service performs its purpose. The data transfer process is the major function at this state.<br>FTP: Data channel is up.<br>SMTP: The SMTP service will not enter <a href="#">&lt;srvState&gt;</a> =4 until the host has written the first data packet with <a href="#">AT^SISW</a> .   |
| 5 | <b>Closing</b><br>Internet Service is closing the network connection.<br>FTP: Command channel is released.   |
| 6 | <b>Down</b><br>This state is entered if <ul style="list-style-type: none"><li>■ the service has successfully finished its session (see note on Socket),</li><li>■ the remote peer has reset the connection or</li><li>■ the IP connection has been closed because of an error (see note below on service or network errors).</li></ul>   |



If a service in this state be sure to close it with [AT^SISC](#) before reopening it.

#### <socketState><sup>(num)</sup>

Socket state identifier

0	Same as value "1", but applicable only if service profile is POP3.
1	Socket not assigned, i.e. no TCP/UDP connection active.
2	Socket assigned as CLIENT.
3	Socket assigned as LISTENER.
4	Socket assigned as SERVER.

#### <rxState><sup>(num)</sup>

Number of bytes received via [AT^SISR](#) or [AT^SIST](#) since last successful [AT^SISO](#) write command.

#### <txState><sup>(num)</sup>

Number of bytes sent via [AT^SISW](#) or [AT^SIST](#) since last successful [AT^SISO](#) write command..

#### <locAddr><sup>(str)</sup>

Recently used local IP address in dotted-four-byte format and TCP port, separated by colon, e.g. "192.60.10.10:80".

#### <remAddr><sup>(str)</sup>

Remote IP address in dotted-four-byte format and TCP port, separated by colon, e.g. "192.60.10.10:80".



## Notes

- If the bearer cannot be established and `AT^SISO` returns an error there might be a general GSM/GPRS problem. To identify the reason you can take advantage of the `AT+CEER` command. Using `AT+CEER` is especially recommended when the `<infoID>` parameter of the `AT^SISE` command equals 0.
- If a service or network error occurs during an IP session and the "`^SIS`" URC or the `AT^SISE` command display an error message, the service enters `<srvState>=5` and then 6, i.e. the IP connection is closed. In this case, the service still allows reading the data stored in the buffer, but writing data is denied. After reading, close the service and open it again.
- As in polling mode no error URCs are available you are advised to integrate the commands `AT^SISI` and `AT^SISE` into the command sequences for upload and download jobs. So, the `AT^SISO` command may be followed by `AT^SISI` to check that the service has entered the `<srvState>=4` before sending `AT^SISR`, `AT^SISW` or `AT^SIST`. This helps you to detect errors even though the "`^SIS`" URCs are disabled. A typical example is that the service fails to be opened because the service profile contains a wrong destination address. In such a case, after opening with `AT^SISO` and OK response, the service quickly enters the states `<srvState>=2, 4` and 6, with an error being returned no earlier than after sending the first `AT^SISR` or `AT^SISW` command. In URC mode, an error URC, such as "Host not found" would be received in this situation, but in polling mode the only way to detect the state is using `AT^SISI` or, alternatively, `AT^SISO`.

### 6.28.1. Example: Accepting / Rejecting Socket Connection Request from Remote Client

Host 1 configured as Socket listener with IP address 10.10.0.187 at port 65534 is receiving a connection request from the remote client 10.10.0.185 (at port 1024). The example assumes that connection and service profiles have been created as stated earlier.

Start the Socket service in listener mode, then query the IP address dynamically assigned to the Socket listener:

```
at^siso=4
at^siso?
^SISO: 0, " "
^SISO: 1, " "
^SISO: 2, " "
^SISO: 3, " "
^SISO: 4, "Socket","3","3","0","0","10.10.0.187:65534","0.0.0.0"
^SISO: 6, ""
^SISO: 7, ""
^SISO: 8, ""
^SISO: 9, ""
OK
```

Host 1 opens the Socket service.  
Query the current status of all services. All service profiles are unused, except for service profile 4 which is running in listener mode, where `<srvState>=3` (listening) and `<socketState>=3` (LISTENER). The response also indicates the IP address dynamically assigned to the listener. The listener's access data (IP address and TCP port number) shall be passed on to the client.

Indication of incoming Socket connection request:



^SIS: 4, 1, 0 at^siso?

The URC indicates that the listener configured on service profile 4 is receiving a Socket connection request (<urcCause>=1) from the remote client. The last URC parameter <urcnfold> represents the ID of the dynamically assigned service profile, here 0.

at^siso?

Query the current status of services.

^SISO: 0, "Socket", "2", "4", "0", "0",  
"10.10.0.187:0", "10.10.0.185:1024"

Indication on host 1 that the connection request from the remote client has been dynamically assigned to service profile 0 which is set to Server mode (<socketState>=4).

^SISO: 1, ""

^SISO: 2, ""

^SISO: 3, ""

^SISO: 4, "Socket", "3", "3", "0", "0", "10.10.0.187:65534", "0.0.0.0:0"

^SISO: 6, ""

^SISO: 7, ""

^SISO: 8, ""

^SISO: 9, ""

OK

Host 1 accepts the Socket connection request:

at^siso=0

Host 1 accepts the connection request, where 0 is the ID of the dynamically assigned service profile.

OK

The URC indicates that data transmission to the remote client is possible. If the remote client has already sent some data the additional URC ^SISR: 0,1 is displayed.

^SISW: 0, 1

at^siso?

Query the current status of services.

^SISO: 0, "Socket", "4", "4", "0", "0",

The socket connection between host 1 and remote client is successfully established.

^SISO: 1, ""

^SISO: 2, ""

^SISO: 3, ""

^SISO: 4, "Socket", "3", "3", "0", "0", "10.10.0.187:65534", "0.0.0.0:0"

^SISO: 6, ""

^SISO: 7, ""

^SISO: 8, ""

^SISO: 9, ""

OK

Host 1 rejects the Socket connection request:

at^sisc=0

Host 1 rejects the connection request, where 0 is the ID of the dynamically assigned service profile.

OK

Query the current status of services

at^siso?

The dynamically assigned service profile is free again. The Socket listener stays at <srvState>=3 (listening) and <socketState>=3 (LISTENER).

^SISO: 0, ""

^SISO: 1, ""

^SISO: 2, ""

^SISO: 3, ""

^SISO: 4, "Socket", "3", "3", "0", "0", "10.10.0.187:65534", "0.0.0.0:0"

^SISO: 6, ""

^SISO: 7, ""

^SISO: 8, ""

^SISO: 9, ""

OK



## 6.29. AT^SISC Internet Service Close

The **AT^SISC** write command closes the TCP/IP connection to the remote peer which was opened with **AT^SISO**. All resources are released, all status information parameters, e.g. **<svrState>**, **<unackData>**, **<ackData>**, **<rxCount>** and **<txCount>** counters, are reset. Only the initial configuration settings are preserved. The service can be restarted any time, using the same configuration or a new one.

### Syntax

Test Command

AT^SISC?

Response(s)

OK

Write Command

AT^SISC=<svrProfileId>

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

± + + + + - -

### Parameter Description

<svrProfileId><sup>(num)</sup>

0...9

<svrProfileId> specified with **AT^SISC**.



### 6.30. AT<sup>^</sup>SISE Internet Service Error Report

The AT<sup>^</sup>SISE write command returns the current error status of the specified Internet service profile. If the service profile is not defined or the value is invalid "+CME ERROR" response is returned.

The error status is identical to the content of the "<sup>^</sup>SIS" URC last issued.

If a service fails the commands AT<sup>^</sup>SISR, AT<sup>^</sup>SISW or AT<sup>^</sup>SIST will return an error response. However, if the AT<sup>^</sup>SISE command returns <infoID>=0 it is recommended to use the AT+CEER command because a general GSM/GPRS problem might be the reason.

#### Syntax

Test Command

AT<sup>^</sup> SISE?

Response(s)

OK

Write Command

AT<sup>^</sup>SISE=<svProfileId>

Response(s)

<sup>^</sup>SISE: <svProfileId>, <infoID>[, <info>]

OK

ERROR

+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

#### Parameter Description

<svProfileId><sup>(num)</sup>

Internet service profile identifier as defined by AT<sup>^</sup>SISS <svProfileId>.

0...9

<infoID><sup>(num)</sup>

Reason for Internet service error. This is a subset of the <urcInfoID>s. The value 0 indicates there is no special Internet service error. In this case the application may use AT+CEER to check for general GSM/GPRS problems.



`<info>0`

Information text related to `<infoID>`. This is a subset of the `<urInfoText>`s.

### **Note**

- In particular cases, the `AT^SISE` command may deliver information and warnings. This applies the following services:

FTP: Information 2100

POP3: Warnings

SMTP: Warnings

If an error occurs the information and warning messages are overwritten by error messages.



### 6.31. AT^SISR Internet Service Read Data

The AT^SISR command either triggers a read operation (download) or queries the number of bytes in the internal buffer.

The AT^SISR write command may return the following errors:

- "+CME ERROR: operation failed" if there is a problem on application, socket, PPP or GPRS/GSM level. The AT^SISR command and the "^SISR" URC offer additional error information.
- "+CME ERROR: operation temporary not allowed" e.g. if the service has not network resources allocated.
- "+CME ERROR: operation not allowed" e.g. if the service is not configured.

#### Syntax

Test Command AT^ SISR?														
Responses(s) OK														
Write Command AT^SISR=<srvProfileId>, <reqReadLength>														
Responses(s) ^SISR: <srvProfileId>, <cnfReadLength>[, <remainUdpPacketLength>] Number of data bytes are sent as specified by <cnfReadLength>. If peek operator was used no data bytes are sent. OK ERROR +CME ERROR: <err>														
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">PIN</th> <th style="text-align: left;">ASC0</th> <th style="text-align: left;">MUX1</th> <th style="text-align: left;">MUX2</th> <th style="text-align: left;">MUX3</th> <th style="text-align: left;">🔔</th> <th style="text-align: left;">Last</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">±</td> <td style="text-align: center;">+</td> <td style="text-align: center;">+</td> <td style="text-align: center;">+</td> <td style="text-align: center;">+</td> <td style="text-align: center;">-</td> <td style="text-align: center;">+</td> </tr> </tbody> </table>	PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last	±	+	+	+	+	-	+
PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last								
±	+	+	+	+	-	+								

#### Unsolicited Result Code

^SISR: <srvProfileId>, <urcCauseId>

Data availability status of the Internet service configured with AT^SISR has changed. The URC is issued when:

- data is available after opening an Internet service or
- less data was confirmed (in <cnfReadLength>) than requested (with <reqReadLength>) during the last "Read Data" operation and new data is available.

The URC is disabled in polling mode. See AT^SCFG, parameter "Tcp/WithURCs", <tcpWithUrc>.



### Parameter Description

**<srvProfileId><sup>(num)</sup>**

<srvProfileId> 0 ... 9 specified with [AT^SISS](#).

**<reqReadLength><sup>(num)</sup>**

- |          |   |
|----------|---|
| 0        | Peek Operator: Query number of received bytes within internal buffers.<br>The behaviour of the peek operator depends on the selected Internet service, i.e. it may not be supported by all IP Services.<br>For "Socket" service configured for UDP the size of the next available UDP packet is returned. |
| 1...1500 | Requested number of data bytes to be read via the Internet service specified in <a href="#">&lt;srvProfileId&gt;</a> .  |

**<cnfReadLength><sup>(num)</sup>**

- |    |  |
|----|--|
| -2 | Indicates end of data. Data transfer has been finished (all data have been read) and the service can be closed with <a href="#">AT^SISC</a> .  |
| -1 | Applies only to HTTP: Querying number of available bytes is not supported by the HTTP service.   |
| 0  | Indicates that no further data is available at the moment.   |
| >0 | Number of available data bytes. The range is determined by <a href="#">&lt;reqReadLength&gt;</a> :<br>If <a href="#">&lt;reqReadLength&gt;</a> was greater than 0, then <a href="#">&lt;cnfReadLength&gt;</a> may be less or equal to the value requested with <a href="#">&lt;reqReadLength&gt;</a> .<br>If <a href="#">&lt;reqReadLength&gt;</a> equals 0 (peek operator) the value indicated by <a href="#">&lt;cnfReadLength&gt;</a> may be greater than 1500. |

**<urcCauseld><sup>(num)</sup>**

Indicates whether or not data is available for reading with [AT^SISR](#).

- |   |  |
|---|--|
| 1 | Data is available and can be read by sending the <a href="#">AT^SISR</a> command. The URC appears when less data was confirmed (in <a href="#">&lt;cnfReadLength&gt;</a> ) than requested (with <a href="#">&lt;reqReadLength&gt;</a> ) during the last "Read Data" operation and new data is available. |
| 2 | End of data. Data transfer has completed (all data read). The service can be closed with <a href="#">AT^SISC</a> .   |



**<remainUdpPacketLength><sup>(num)</sup>**

Optional third parameter of the AT^SISR write command response displayed only if the Socket service uses the UDP protocol.

The reception of each datagram must be completed before the next datagram can be received. This may be a problem if the buffer of the host application is limited and not designed to handle the maximum packet size of 1500 bytes. To compensate this, the host is advised to request, via <reqReadLength>, an amount less or equal its maximum buffer capacity and wait for the resulting AT^SISR write command response with parameter <remainUdpPacketLength>. The benefit of this approach is that the host may properly receive all parts of a UDP datagram, as after each received data part the number of remaining bytes is synchronized, until reading the datagram is finished.

If the currently read datagram is smaller than the number of bytes requested by the host the <remainUdpPacketLength> parameter is omitted.

Further write attempts with AT^SISR are denied as long as the <remainUdpPacketLength> is unequal 0 or is not omitted. In this case the service returns "+CME ERROR: operation of service temporary not allowed".

- 0 Indicates that all bytes of the current UDP datagram are read.
- 1...(max. data size)-1 Indicates that the currently read UDP datagram is not yet complete. The displayed value is the remaining number of bytes.  
 . <remainUdpPacketLength> is unequal 0 until reading all parts of the current datagram is finished.

**6.31.1. Example: Socket Host Reads Small Amounts of UDP Data Packets (URC Mode)**

This section applies only to the Socket service using the UDP protocol. The example shows how to read UDP packets if the buffer of the host application can handle only a few bytes. There are two datagrams available for reading.

Buffer size: 6 bytes

Datagram A = 18 bytes (content "THIS\_IS\_DATAGRAM\_A")

Datagram B = 3 bytes (content "NEW")

^SISR: 0,1	Service profile 0 is configured for Socket service and UDP. The URC notifies host that data is available for reading.
at^sizr=0,6	The host requests to read 6 bytes.
^SISR: 0,6,12 THIS_I OK	The first 6 bytes of datagram A are confirmed and transmitted. Another 12 bytes are still available.
at^sizr=0,6	The host requests to read the next part of 6 bytes.
^SISR: 0,6,6 S_DATA OK	The next 6 bytes of datagram A are confirmed and transmitted. Another 6 bytes are still available.
at^sizr=0,6	The host requests to read the next part of 6 bytes.
^SISR: 0,6,0	Last part of datagram A was received, no remainder is left.



GRAM_A	
OK	
at^sisr=0,6	Again, the host requests to read 6 bytes. This time, the request refers to datagram B which has only 3 bytes. As the read datagram is smaller than the size requested by the host, the response does not include the <code>&lt;remainUdpPacketLength&gt;</code> .
^SISR: 0,3	3 bytes are confirmed and transmitted. Datagram B was properly received.
NEW	
OK	



## 6.32. AT<sup>^</sup>SISS Internet Service Setup Profile

AT<sup>^</sup>SISS serves to set up the necessary parameters in the Internet service profiles. Any service profile can then be used to control a data link in conjunction with AT<sup>^</sup>SISI, AT<sup>^</sup>SISO, AT<sup>^</sup>SISC, AT<sup>^</sup>SISR, AT<sup>^</sup>SISW, AT<sup>^</sup>SIST and AT<sup>^</sup>SISE.

The AT<sup>^</sup>SISS read command requests the current settings of all Internet service profiles. One line is issued for every possible parameter of a given <svrParmTag> "svrType" value.

The AT<sup>^</sup>SISS write command specifies the parameters for a service profile identified by <svrProfileId>. At first the type of Internet service needs to be selected via <svrParmTag> value "svrType". This determines the applicability of all other <svrParmTag> values related to this "svrType" and sets their defaults. Changing the

<svrParmTag> "svrType" of an existing service profile will reset all <svrParmTag> default values to suit the new "svrType". An exception is the <svrParmValue-alphabet> which can be set before or after selecting "svrType" and is not reset when "svrType" changes.

To change the settings the write command needs to be executed for each single <svrParmTag>. All profile parameters set with AT<sup>^</sup>SISS are volatile.

The list below shows which <svrParmTag> parameters apply to each Internet service and which of them are mandatory or optional.

Table: Applicability of AT<sup>^</sup>SISS <svrParmTag> values

<svrParmTag>	Mandatory or optional
<i>Socket service</i>	
"svrType"	mandatory
"conId"	mandatory
"alphabet"	optional
"address"	mandatory
"tcpMR"	optional
"tcpOT"	optional
<i>Transparent service</i>	
"svrType"	mandatory
"conId"	mandatory
"alphabet"	optional
"address"	mandatory
"tcpMR"	optional
"tcpOT"	optional
<i>FTP service</i>	



"srvType"	mandatory
"conId"	mandatory
"alphabet"	optional
"address"	mandatory
"tcpMR"	optional
"tcpOT"	optional
<i>HTTP service</i>	
"srvType"	mandatory
"conId"	mandatory
"alphabet"	optional
"address"	mandatory
"user"	optional
"password"	optional
"hcContent"	optional
"hcContLen"	optional
"hcUserAgent"	optional
"hcMethod"	mandatory
"hcProp"	optional
"hcRedir"	optional
"hcAuth"	optional
"tcpMR"	optional
"tcpOT"	optional
<i>SMTP service</i>	
"srvType"	mandatory
"conId"	mandatory
"alphabet"	optional
"address"	mandatory
"user"	optional
"password"	optional
"tcpPort"	optional
"smFrom"	mandatory
"smRcpt"	mandatory
"smCC"	optional
"smSubj"	optional
"smHdr"	optional
"smAuth"	optional
"tcpMR"	optional
"tcpOT"	optional
<i>POP3 service</i>	
"srvType"	mandatory
"conId"	mandatory



"alphabet"	optional
"address"	mandatory
"user"	mandatory
"password"	mandatory
"tcpPort"	optional
"pCmd"	mandatory
"pNumber"	optional
"pLength"	optional
"pDelFlag"	optional
"tcpMR"	optional
"tcpOT"	optional

### Syntax

Test Command

```
AT^SISS=?
```

Response(s)

```
OK
```

Read Command

```
AT^ SISS?
```

Responses(s)

```
^SISS: <srvProfileId>, <srvParmTag>, <srvParmValue>
```

```
OK
```

```
ERROR
```

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

Write Command

```
AT^SISS=<srvProfileId>, <srvParmTag>, <srvParmValue>
```

Responses(s)

```
OK
```

```
ERROR
```

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

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -



## Parameter Description

`<srvProfileId>(num)`

Internet service profile identifier.

The `<srvProfileId>` is used to reference all parameters related to the same service profile. Furthermore, when using the AT commands `AT^SISO`, `AT^SISR`, `AT^SISW`, `AT^SIST` and `AT^SISC` the `<srvProfileId>` is needed to select a specific service profile.

0...9

`<srvProfileId>(num)`

Internet service profile parameter.

srvType	Type of Internet service to be configured with consecutive usage of <code>AT^SISS</code> . For supported values of <code>&lt;srvParmValue&gt;</code> refer to <code>&lt;srvParmValue-srvType&gt;</code> .
alphabet	Selects the character set for input and output of string parameters within a profile. The selected value is bound to the specific profile. This means that different profiles may use different alphabets. Unlike other parameters the alphabet can be changed no matter whether the <code>&lt;srvParmTag&gt;</code> value "svType" has been set. For supported values of <code>&lt;srvParmValue&gt;</code> refer to <code>&lt;srvParmValue-alphabet&gt;</code> .
user	User name string <ol style="list-style-type: none"><li>6. Socket Not applicable.</li><li>7. Transparent Not applicable.</li><li>8. FTP Not applicable; set within "address" parameter.</li><li>9. HTTP Length: 2 ... 31 User name for the HTTP authentication mechanism. Currently only HTTP simple authentication is supported.</li><li>10. SMTP User name to be used for SMTP authentication (string). Length: 4 ... 64. If SMTP authentication is disabled, i.e. "smAuth" flag not set, user name parameter will be ignored.</li><li>11. POP3 User name identifying a mailbox, i.e. mailbox name (string). Length: 1 ... 64.</li></ol>



passwd

Password string

1. Socket  
Not applicable.
2. Transparent  
Not applicable.
3. FTP  
Not applicable; set within "address" parameter.
4. HTTP  
Length: 2 ... 31 Password for the HTTP authentication mechanism.  
Currently HTTP simple authentication is supported only.
5. SMTP  
Password to be used for SMTP authentication (string).  
Length: 4 ... 64.  
If SMTP authentication is disabled, i.e. "smAuth" flag not set, password parameter will be ignored.
6. POP3  
Server/mailbox-specific password (string).  
Length: 1 ... 64.  
Used to perform authentication with a POP3 server.

conId

Internet connection profile to be used, for details refer AT^SICS.

tcpPort

TCP Port Number

1. Socket  
Not applicable; set within "address" parameter.
2. Transparent  
Not applicable; set within "address" parameter.
3. FTP  
Not applicable; set within "address" parameter.
4. HTTP  
Not applicable; set within "address" parameter.  
If parameter is omitted the service connects to HTTP default port 80.
5. SMTP  
SMTP server TCP port number (numeric)  
Length: 0 ... 2<sup>16</sup>-1  
If this parameter is not set, SMTP default port number 25 is used.
6. POP3  
POP3 server TCP port number (numeric)  
Length: 0 ... 2<sup>16</sup>-1  
If this parameter is not set, POP3 default port number 110 is used.



address

String value, depending on the service type either a URL in the case of Socket, FTP and HTTP or an address in the case of SMTP and POP3:

### 1. Socket

- Socket type TCP client URL  
"socket://host':remote tcpPort'
- Socket type TCP server URL  
"socket://listener:'local tcpPort' "
- Socket type UDP client URL  
"socketudp://host':remote udpPort'[:size='byte'][:port='word']"  
Parameter "size" (optional):  
0: PDU size is variable (default).  
1 ... 1460: Fixed PDU size in bytes.  
Parameter "port" (optional):  
0: Port number will be assigned from service (default).  
1 ... 2<sub>16</sub>-1: defines the local port number for the UDP client.

### 2. Transparent

- "host':remote TcpPort'[:timer=100][:etx=<etxChar>]"  
Parameter "timer" (optional): 20 ... 500 milliseconds in steps of 20. Default if parameter is not specified: 100ms. The parameter configures the Nagle algorithm, which is used in transparent access mode.  
Parameter "etx" (optional): Specifies the character used to change from transparent access mode to AT command mode.  
Range of <etxChar>: 1 ...15, 17 ... 255. 16 is not allowed because defined as DLE (0x10).  
If value is not set no escaping is configured, thus requiring either +++ or DTR ON-OFF transition for changing to AT command mode. If value is set, the transmitted bytes are parsed for the DLE (0x10) character followed by the specified <etxChar> value. If both characters are found the service returns to AT command mode without transmitting these two bytes. This behavior differs from +++ handling, where +++ is transmitted over the air. If you wish to send DLE characters as normal text string within your payload data the characters shall be doubled (DLE DLE).

### 3. FTP

- FTP client URL (get)  
ftp://user':password'@host':tcpPort'/url-path' [:type='a|i|d']  
Refer to "IETF-RFC 1738".
- FTP client URL (put)  
"ftpput://user':password'@host':tcpPort'/url-path'/element name'  
[:type='a|i'][:mode='u|a|d'] "



Used parameters:

"host" is mandatory, all other parameters are optional.

If "password" is set then "user" must be set as well.

If "user" is omitted the string "anonymous" is selected for "user" and "password".

If "password" is omitted the password request is served by an empty string.

If "tcpPort" is omitted the service connects to the FTP default port 21.

If "url-path" contains only the IP address a directory listing is requested.

If "url-path" contains the IP address and has a slash '/' appended a detailed directory listing is requested.

"type": [a)scii | i)image | d)irectory]

"mode": [u)nique | a)ppend | d)elete]

"u)nique" selects the FTP Store Unique command to create a file name unique to the current directory. If the file name is assigned by the server then the "**^SIS**" URC will appear, indicating `<urclnfold>` 2100 and the file name.

"d)elete" clears given 'element name'.

If "mode" is omitted "replace mode" is default setting.

#### 4. HTTP

HTTP client URL

Length: 6 ... 255

"http://server'/path':tcpPort'."

"server": FQDN or IP-address

"path": path of file or directory

"tcpPort": If parameter is omitted the service connects to HTTP default port 80.

Refer to "IETF-RFC 2616".

#### 5. SMTP

SMTP server address (string).

Length: 4 ... 256.

#### 6. POP3

POP3 server address (string). Length: 4 ... 256.

hcContent

Optional parameter for HTTP method "Post". Length:

0 ... 127

Can be used to transfer a small amount of data. The content of this string will only be sent if "hcContLen" = 0. The maximum length of "hcContent" is 127 bytes.

To transmit a larger amount of data "hcContLen" must be set to a non-zero value. In this case the "hcContent" string will be ignored, and data transmission from the client to the server is done with AT<sup>^SISW</sup>.



hcContLen

Mandatory parameter for HTTP method "Post".

Length: 0 ... 231-1

The content length shall be set in the header of the HTTP "Post" request before the data part is transferred.

If "hcContLen" = 0 then the data given in the "hcContent" string will be posted. If "hcContLen" > 0 then the AT^SISW command will be used to send data from the client to the server. In this case, "hcContLen" specifies the total amount of data to be sent. The data can be sent in one or several parts. For each part, the transmission is triggered by the URC "AT^SISW: x, 1", then the AT^SISW write command can be executed. After the exact number of bytes are transferred via the serial interface, the HTTP client will go from service state "Up" to service state "Closing" (see parameters <srvState> and <srvState> for detail). Finally, the URC "AT^SISW: x, 2" indicates that all data have been transferred and the service can be closed with AT^SISC.

hcUsrAgent

The user agent string must be set by the application to identify the mobile. Usually operation system and software version info is set with this browser identifier.

Length: 0 ... 63

hcMethod

HTTP method specification: 0=GET, 1=POST, 2=HEAD.

hcProp

Parameter for several HTTP settings.

Length: 0 ... 127

The general format is 'key': <space> 'value'

Multiple settings can be given separated by "\0d\0a" sequences within the string, do not put them at the end.

Possible 'key' values are defined at HTTP/1.1 Standard RFC 2616.

hcRedir

This flag controls the redirection mechanism of the MG21 acting as HTTP client (numeric).

If "hcRedir" = 0: No redirection.

If "hcRedir" = 1: The client automatically sends a new HTTP request if the server answers with a redirect code (range 30x).

Default is 1.

hcAuth

If set ("hcAuth" = 1) this flag determines that the HTTP client will automatically answer on authentication requests from the server with the current "passwd" and "user" parameter settings. If these parameters are not specified the MG21 will terminate the HTTP connection and send an indication to the TA.

Default is 1.

smFrom

Email sender address, i.e. "MAIL FROM" address (string).

Length: 6 ... 256

A valid address parameter consists of local part and domain name delimited by a '@' character, e.g. "john.smith@somedomain.de".



smRcpt	<p>Recipient address of the email, i.e. "RCPT TO" address (string). Length: 6 ... 256</p> <p>If multiple recipient addresses are to be supplied the comma character is used as delimiter to separate individual address values, e.g. "john.smith@somedomain.de,tom.meier@somedomain.de". Some mail servers do not accept recipient addresses without brackets &lt;&gt;. It is recommended to use the "RCPT TO" variable with brackets.</p>
smCC	<p>CC recipient address of the email (string). Length: 6 ... 256</p> <p>If multiple CC recipient addresses are to be supplied the comma character is used as delimiter to separate individual address values, e.g. "john.smith@somedomain.de, tom.meier@somedomain.de".</p>
smSubj	<p>Subject content of the email (string). Length: 0 ... 256</p> <p>If no subject is supplied the email will be sent with an empty subject.</p>
smHdr	<p>This parameter, if set, will be appended at the end of the email header section (string). Length: 0... 256</p> <p>Hence, it serves as a generic header field parameter which allows the user to provide any email header field. It is the user's responsibility to provide correct header fields!</p> <p>String of max. 256 characters.</p> <p>Example for multipart MIME messages: <i>"Content-Type: multipart/mixed"</i>.</p>
smAuth	<p>SMTP authentication control flag (numeric).</p> <p>If disabled (&lt;srvParmValue&gt; "0" by default), MG21 performs action without SMTP authentication.</p> <p>If enabled (&lt;srvParmValue&gt; "1") authentication procedure with the SMTP server will be performed by means of supported authentication methods, using values of "user" and "passwd" parameters. If MG21 and SMTP server are not able to negotiate an authentication mechanism supported by both parties, the MG21 continues action without authentication.</p> <p>MG21 supports SMTP authentication.</p>
pCmd	<p>POP3 user command to be executed by the POP3 service (numeric).. For supported values of &lt;srvParmValue&gt; refer to &lt;srvParmValue-pCmd&gt;.</p>



pNumber

Optional message number argument used by the POP3 commands List ("2"), Retrieve ("3") and Delete ("4"). For POP3 commands see <srvParmTag> value "pCmd".

Length: 0 ...  $2^{31}-1$

If no specific value is set in the service profile, the value "0" is assumed by default, i.e. "pNumber" is disabled.

pLength

Maximum message length (string, optional)

Length: 0 ...  $2^{31}-1$

"pLength" can be used to specify the length of the message(s) to be retrieved from or deleted on the POP3 server. If no specific value is set in the service profile, the default value "0" is assumed, which means that there is no limit on the message size.

A warning will be issued in the following cases:

- If "pNumber" > 0 and a specific message to be retrieved from / deleted on the server is longer than "pLength".
- If "pNumber" = 0 and all messages to be retrieved from / deleted on the server are longer than "pLength".

No warning will be issued in the following cases:

- If there are no messages at all on the server.
- If the server has message(s) below and above the "pLength" specified. In this case, the message(s) within the range of "pLength" can be successfully retrieved or deleted, but the message(s) above "pLength" remain on the server without any further notification given to the user.
- Therefore, after retrieving / deleting messages, it is recommended to check the message status on the server. This can be done by adding a further POP3 service profile using the POP3 user command List ("2").

pDelFlag

Flag to be used with the POP3 user command Retrieve ("3"). Specifies whether or not to delete retrieved emails on the server (optional). For supported values of <srvParmValue> refer to <srvParmValue-pDelFlag>.

tcpMR

Parameter can be used to overwrite the global AT^SCFG parameter "Tcp/MaxRetransmissions" <tcpMr> for a specific Internet Service connection pro-file. If the parameter is not specified the value specified with AT^SCFG will be used.

Supported values <srvParmValue> for this parameter are the same as described for <tcpMr>.

Setting is not relevant for Internet Service "Socket" with type "UDP".



## tcpOT

Parameter can be used to overwrite the global `AT^SCFG` parameter "Tcp/OverallTimeout" `<tcpOt>` for a specific Internet Service connection profile. If the parameter is not specified the value specified with `AT^SCFG` will be used. Supported values `<srvParmValue>` for this parameter are the same as described for `<tcpOt>`. Setting is not relevant for Internet Service "Socket" with type "UDP".

### `<srvParmValue>`<sup>(str)</sup>

Parameter value; type and supported content depend on related `<srvParmTag>`.

### `<srvParmValue-srvType>`<sup>(str)</sup>

Supported Internet service type values in `<srvParmValue>` for `<srvParmTag>` value "srvType". Before changing the "srvType" of an existing service profile be sure that the profile is closed. To verify the connection state of the service profile enter the read command `AT^SISI`. Only when `<srvState>=2` is returned for this specific service profile you can change its service type.

"Socket"	MG21 acting as client or server (listener) for TCP or UDP. If MG21 is TCP listener at least two service profiles are required. The first socket profile must be configured as listener. The second service profile will be dynamically assigned when a socket connection request from a remote client is incoming. For this purpose, one service profile must be left free (= not configured with <code>AT^SISS</code> ). An incoming socket connection request will be indicated by the " <code>^SIS</code> " URC, with the next free <code>&lt;srvProfileId&gt;</code> shown inside the URC as parameter <code>&lt;urcInfold&gt;</code> . The connection request can be accepted or rejected by using the commands <code>AT^SISO</code> or <code>AT^SISC</code> and the ID retrieved from the " <code>^SIS</code> ".
"Transparent"	MG21 acting as Transparent TCP socket client.
"Ftp"	MG21 acting as FTP client.
"Http"	MG21 acting as HTTP client.
"SmtP"	MG21 acting as SMTP client.
"Pop3"	MG21 acting as POP3 client.
"none"	Reset Internet service profile settings. Operation is not allowed if profile is in use, i.e. it was activated via <code>AT^SISO</code> .

### `<srvParmValue-alphabet>`<sup>(str)</sup>

Supported string parameter character set selections in `<srvParmValue>` for `<srvParmTag>` value "alphabet".

["0"]	Applicable character set is determined by current setting of <code>AT+CSCS</code> .
"1"	International Reference Alphabet (IRA, seven bit ASCII).



## <srvParmValue-pCmd><sup>(num)</sup>

Supported POP3 user command values in <srvParmValue> for <srvParmTag> value "pCmd".

- 1                   Status command.  
This command retrieves the "drop listing" of a POP3 server. A "drop listing" consists of a single line containing the number of messages in the maildrop list followed by the total size of the maildrop list in bytes. Each drop listing will be finished by a so-called "dotline", i.e. a new line with just a single dot.
  
- 2                   List command.  
If <srvParmTag> value "pNumber" is set to a non-zero value the "List" command returns the "scan listing", consisting of a single line which contains the message number and the message size in bytes if the specified message exists in the maildrop list on the POP3 server. If no such message exists on the server than the POP3 service issues an error response to the user.  
If <srvParmTag> value "pNumber" is zero the "List" command returns a multi-line "scan listing". For each message on the maildrop list of the server the POP3 service returns a line containing the message number and its size in bytes. A final "dotline" will be printed at the end of the "scan listing". If there are no messages on the maildrop list of the server, the POP3 service returns a positive response, i.e. it doesn't issue an error response, but the "scan listing" will be empty.  
In either case, each scan listing will be finished by a so-called "dotline", i.e. a new line with just a single dot.
  
- 3                   Retrieve command.  
If <srvParmTag> value "pNumber" is set to a non-zero value this command retrieves the related message from the POP3 server's maildrop list. If no such message exists on the server the POP3 service issues an error response to the user.  
It depends on the parameter "pDelFlag" if the message will be deleted from the POP3 server upon successful retrieval.  
If <srvParmTag> value "pNumber" is zero the "Retrieve" command returns all messages pending in the POP3 server's maildrop.  
If there are no messages on the maildrop list of the server the POP3 service returns with a positive response, i.e. it doesn't issue an error response, but the returned list will be empty.  
Each email will be finished by a so-called "dotline", i.e. a new line with just a single dot.



4

#### Delete command

If `<svrParmTag>` value "pNumber" is set to a non-zero value the command deletes the related message from the POP3 server's maildrop list. In fact, the message is marked as deleted on the server and will be deleted permanently if the POP3 service command executes successfully. In case an error has occurred, e.g. network loss, the message will not be deleted on the server even though the POP3 service command has been finished.

If `<svrParmTag>` value "pNumber" is zero the "Delete" command deletes all messages from the POP3 server's maildrop list. In fact, the messages are marked as deleted on the server and will be deleted permanently if the POP3 service command executes successfully. In case an error has occurred, the messages will not be deleted on the server even though the POP3 service command has been finished.

`<svrParmValue-pDelFlag>(num)`

Supported flag values in `<svrParmValue>` for `<svrParmTag>` value "pDelFlag". Only applicable if the profile contains the POP3 user command Retrieve ("3").

- |     |   |
|-----|---|
| [0] | Messages will not be deleted on the server.                           |
| 1   | Delete messages on the server which have been retrieved successfully. |

#### Notes

- String parameters are truncated if greater than the maximum length specified above.
- If `AT^SISS` is used simultaneously on different instances (e.g. Mux channels) only one request can be handled at a time. On the other instance(s) `+CME ERROR: operation temporary not allowed` will be displayed. If so, repeat the command on this instance.
- For correct input of the @ character in address parameters.



### 6.33. AT<sup>^</sup>SIST Enter Transparent Access Mode

AT<sup>^</sup>SIST applies only to Transparent TCP service if defined with AT<sup>^</sup>SISS. It can be used after the Transparent service has been opened with AT<sup>^</sup>SISO and is in "Up" state (<srvState>=4). If the service is not "Up" trying to open it will be denied with "+CME ERROR: operation temporary not allowed".

There are two ways to verify that the service is "Up": Each time after opening the service with AT<sup>^</sup>SISO wait for the "<sup>^</sup>SISW: x, 1" URC (if URC mode is enabled). In addition, or when using Polling mode, you can request the <srvState> with AT<sup>^</sup>SISO or AT<sup>^</sup>SISI.

Then, after entering the AT<sup>^</sup>SIST command, the CONNECT response notifies that the service has entered transparent access mode and is ready to transparently send and receive payload data over the serial interface. In this mode, the signaling of URCs is dependent on the settings made with AT<sup>^</sup>SCFG, parameter <udri>.

There are several ways to quit the transparent access mode and revert to AT command mode:

- +++ escape sequence (also transmitted over the air)
- DTR ON-OFF transition (see AT&D for configuring DTR line)
- "etx" parameter set within the server address for transparent access mode (see AT<sup>^</sup>SISS, <srvParmTag>"address").

Switching back and forth between both modes does not affect the underlying socket and has no influence on the service <srvState>.

If the Transparent service is released by the server the following applies:

- If the service is in transparent access mode (CONNECT mode): ME returns to AT command mode, issues a specific "NO CARRIER" result code and goes to <srvState> 6 ("Down"). The "NO CARRIER" result code starts with 0x10 (DLE) and 0x04 (EOT) and ends with the command line termination character (ATS3), followed by the response formatting character (ATS4).
- If the service is in AT command mode and no data is pending: "<sup>^</sup>SIS" URCs notify the client that the server has disconnected and the ME goes to <srvState> 6 ("Down").
- If the service is in AT command mode and data is still available: "<sup>^</sup>SIS" URCs notify the client that the server has disconnected and the service remains in <srvState> 5 ("Closing"). In this case the client shall open the transparent access mode with AT<sup>^</sup>SIST. After the CONNECT response, all remaining data can be transferred. After that, the ME goes to <srvState> 6 ("Down").
- In all above scenarios, the Transparent TCP service shall be closed with AT<sup>^</sup>SISC. Trying to return to transparent access mode with AT<sup>^</sup>SIST would only end up with "NO CARRIER" once again and is not recommended.
- Use AT<sup>^</sup>SISO and AT<sup>^</sup>SISI to check the <srvState>.
- Please note that the "<sup>^</sup>SIS" URCs mentioned above vary with the network. There may be for example "<sup>^</sup>SIS" URCs with <urclnfold> 15 ("Remote host has reset the connection") and 19 ("Socket has been shut down").



## Syntax

Test Command

```
AT^SICT=?
```

Response(s)

```
OK
```

Write Command

```
AT^SIST=<srProfileId>
```

Response(s)

```
CONNECT
```

(indicates that ME has entered transparent access mode)

```
OK
```

```
ERROR
```

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

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - +

## Parameter Description

<srProfileId><sup>(num)</sup>

<srProfileId> 0 ... 9 specified with AT^SISS.



### 6.34. AT^SISW Internet Service Write Data

**AT^SISW** triggers a write operation (upload) and queries the amount of data already sent, but not acknowledged at the TCP layer. The write operation may be run in binary mode, or in interactive text mode.

**AT^SISW** write command may return the following errors:

- "+CME ERROR: operation failed" if there is a problem on application, socket, PPP or GPRS/GSM level. The **AT^SISE** command and the "**^SIS**" URC offer additional error information.
- "+CME ERROR: operation temporary not allowed" e.g. if the service has not network resources allocated.
- "+CME ERROR: operation not allowed" e.g. if the service is not configured.

#### Syntax

Test Command

AT^SISW=?

Response(s)

OK

Write Command

AT^SISW=<srvProfileId>, <reqWriteLength>[, <eodFlag>[, <mode>]]

Response(s)

^SISW: <srvProfileId>, <cnfWriteLength>, <unackData>  
 Number of data bytes as specified by <cnfWriteLength>.  
 OK  
 ERROR  
 +CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

± + + + + - -

#### Unsolicited Result Code

^SISW: <srvProfileId>, <urcCauseId>

Data availability status of the Internet service configured with **AT^SISS** has changed. The URC is issued when the service is ready to accept new user data. In this context the URC is also issued for Transparent TCP service that supports data transfer via **AT^SIST** only.

The URC is disabled in polling mode. See **AT^SCFG**, parameter "Tcp/WithURCs", <tcpWithUrc>.



## Parameter Description

**<srvProfileId><sup>(num)</sup>**

<srvProfileId> 0 ... 9 specified with [AT^SIS](#).

**<reqWriteLength><sup>(num)</sup>**

0...1500

Specifies the number of bytes to be sent with [AT^SISW](#) or, if set to 0, requests the amount of data already sent with [AT^SISW](#) but not yet acknowledged:

- Parameter [<reqWriteLength>](#) may be 1...1500 bytes to specify the amount of data to be sent with [AT^SISW](#).
- If parameter [<reqWriteLength>](#) equals 0, [AT^SISW](#) does not expect any data, but a normal query is performed. This allows the application to explicitly request, in particular at the end of an upload job, the amount of unacknowledged data at the TCP layer indicated by [<unackData>](#).
- In interactive text mode, [<reqWriteLength>](#) must be set to any value greater than 0 (but not necessarily the precise number of bytes). If set to 0 in interactive text mode, [<reqWriteLength>](#) would be interpreted as query for unacknowledged data and, thus, prevent data transfer.
- If Socket service is selected with UDP protocol
  - [<reqWriteLength>](#)=0 can be used to send an empty UDP packet;
  - it is recommended that the size of each data packet be limited to 1460 bytes. Otherwise, it is possible that the following URC occurs: "[^SIS](#): <id>, 0, 9, The supplied buffer was too small / large".

**<eodFlag><sup>(num)</sup>**

End of data indication flag.

Parameter is ignored for HTTP, POP3, FTP download.

- |     |  |
|-----|--|
| [0] | No end of data. Other data may follow to be transmitted via the Internet service.  |
| 1   | End of data is signalled to the Internet Service. Further <a href="#">AT^SISW</a> write commands return an error response. However, reading data may be possible. The <a href="#">&lt;eodFlag&gt;</a> is effective only if the <a href="#">&lt;reqWriteLength&gt;</a> equals <a href="#">&lt;cnfWriteLength&gt;</a> , in particular if the <a href="#">&lt;reqWriteLength&gt;</a> equals 0. If <a href="#">&lt;mode&gt;</a> equals 1 the <a href="#">&lt;eodFlag&gt;</a> is effective only if the write operation has been finished with CTRL-Z. |

**<mode><sup>(num)</sup>**

Control how the application provides the data bytes to be sent.

- |     |   |
|-----|---|
| [0] | Binary mode. This mode allows sending a number of bytes defined with parameter <a href="#">&lt;reqWriteLength&gt;</a> . |
|-----|---|



1

### Interactive text mode

This mode allows the user to type and send 8-bit ASCII characters while the service is open. Ctrl-Z terminates data input and causes the data to be transferred.

Interactive text mode requires that the `<reqWriteLength>` is set to any value greater than 0 (though it is not necessary to specify the precise number of bytes). In this case the `<cnfWriteLength>` parameter indicates the maximum length of the data stream without control character CTRL-Z. In interactive text mode, the following characters are predefined as control codes:

- BACKSPACE ("\x08") deletes the last given character,
- CTRL-Z ("\x1a") terminates the input,
- ESC ("\x1b") aborts the command. An `<eodFlag>` is ignored in this case.

The V.25 command `ATE` also controls the echo mode of the interactive text mode. If echo is enabled (`ATE1`) all characters are echoed until `<cnfWriteLength>` is reached. Any attempt to input further data ends up with the warning message 4001 indicated after the data stream has been completed with CTRL-Z, nevertheless all data within the range of `<cnfWriteLength>` will be sent. `ATE0` disables the echo mode generally.

### `<cnfWriteLength>`<sup>(num)</sup>

0...1500

Confirmed number of data bytes which can be transmitted via the Internet service configured in `<srvProfileId>`. In binary mode (see `<mode>`) this number may be less or equal to the value requested with `<reqWriteLength>`. The application has to deliver exactly the number of bytes indicated by `<cnfWriteLength>`. A 0 value means that no data can be written at this time, i.e. it serves as a flow control mechanism.

In interactive text mode, `<cnfWriteLength>` indicates the maximum number of bytes it can process. Characters above the indicated number are ignored.

### `<unackData>`<sup>(num)</sup>

Number of data bytes already sent but not yet acknowledged at the TCP layer.

The value is constantly changing until the entire upload job has completed. If the value equals 0 all data sent so far is acknowledged.

In binary mode, `<unackData>` includes the `<cnfWriteLength>` value of the pending write operation. Therefore, the very first write operation of an upload job returns identical values for `<cnfWriteLength>` and `<unackData>`.

This mechanism allows the host application to easily verify whether or not the remote host has successfully received the data.

Parameter is not applicable to HTTP, POP3, SMTP and Socket with UDP protocol. For these services the counter is always set to 0.



### <urcCauseld><sup>(num)</sup>

- |   |   |
|---|---|
| 1 | The service is ready to accept new user data.   |
| 2 | Data transfer has been finished successfully and Internet service may be closed without loss of data. |

#### Notes

- Do not send any characters after **AT^SISW** command line termination (**ATS3**) until response "**^SISW**" is received. This is necessary to avoid that any characters related to the AT command can be interpreted as being part of the data stream to be transferred.
- If the Socket service is configured for use as UDP client and fixed size and the interactive text mode is active, the PDU length always equals the specified fixed length. If the input characters exceed the specified fixed length, then all surplus characters will be ignored. If the input characters are less than the specified fixed length, then the remaining range will be filled with "\0" bytes.

#### 6.34.1. Usage of parameter <eodFlag>

Service type	
Socket	After the service accepts the end-of-data flag the service state changes to "Closing". No further user data is accepted. After releasing the TCP link the service remains in state "Down".
FTP	Parameter only applicable for FTP upload session. After accepting the end-of-data flag the service state changes to "Closing" and starts to end the running FTP session. No further user data is accepted. After the FTP session is completed on FTP protocol level the service state switches to "Down". In case of successful completion the URC " <b>^SISW: x,2</b> " is generated.
SMTP	SMTP service sends some "closing" commands to the SMTP server which are necessary to mark the email as successfully sent on the server. The service enters "Closing" state and remains in it until the final protocol exchange with the SMTP server has been completed. The "OK" response following <b>AT^SISW</b> indicates that the SMTP service has accepted the last data - IT DOES NOT indicate the successful completion of the SMTP service. Successful completion will be indicated either by the appropriate URC " <b>^SISW:x,2</b> " or due to the fact that the SMTP service state changes to "Down" state without any error.
HTTP / POP3	Parameter not applicable, i.e. value is ignored.



### 6.35. ATA Manual acceptance of a network request for PDP context activation

The V.250 **ATA** command may be used to accept a network request for a PDP context activation announced by the unsolicited result codes "RING" or "+CRING: GPRS". MG21 responds with CONNECT, enters V.250 online data state and follows the same procedure as it would after having received a **AT+CGANS=1** with no <L2P> or <cid> values specified.

If you try to answer a request which is no longer present or which is already answered by another instance, NO CARRIER is returned.

#### **Syntax**

Exec Command						
ATA						
Response(s)						
CONNECT						
NO CARRIER						
PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	+	+	-	+
Reference(s)						
3GPP 27.007						



### 6.36. ATH Manual rejection of a network request for PDP context activation

The V.250 **ATH** command may be used to deactivate all PDP contexts which are active or online on the same interface. This command should not be used to deactivate PDP contexts during the implicit PDP context deactivation procedure which is started automatically after LCP termination or by dropping the DTR line (if **AT&D2** is configured). The **ATH** command may also be used to reject a network request for PDP context activation announced by the unsolicited result codes "**RING**" or "**+CRING: GPRS**".

#### Syntax

Exec Command							
ATH							
Response(s)							
OK							
PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last	
+	+	+	±	±	-	-	
Reference(s)						3GPP 27.007	

#### Notes

- In contrast to 3GPP 27.007 it is possible to cancel a connection with **ATH** after a break. This is done for compatibility reasons due to the "dial-up network" drivers of Microsoft Windows.
- **ATH** is used as a standard V.250 AT command, too (see ATH for details).
- If **ATH** is used to reject a network request for PDP context activation, then other PDP contexts on the same interface which are active or online will not be deactivated.



## 6.37. ATSO Automatic Response to Network Request for PDP Context Activation

The V.250 `ATSO=<n>` (Automatic answer) command may be used to turn off ( $n=0$ ) and on ( $n>0$ ) the automatic response to a network request for a PDP context activation.

When the `ATSO=<n>` ( $<n> > 0$ ) command is received, MG21 will attempt to perform a GPRS attach if not yet attached and if configured to do so (see `AT+SCFG`, parameter `<gs0aa>`). Subsequently, the ME will announce a network request for PDP context activation by issuing the URCs "RING" or "+CRING: GPRS" to the TE, followed by the intermediate result code CONNECT. The ME then enters V.250 online data state and follows the same procedure as it would after receiving a `AT+CGANS=1` command with no `<L2P>` or `<cid>` values specified.

`ATSO=0` does not perform an automatic GPRS detach.

### Syntax

Read Command	
<code>ATSO?</code>	
Response(s)	
<code>&lt;n&gt;</code>	
OK	
Write Command	
<code>ATSO=&lt;n&gt;</code>	
Response(s)	
OK	
PIN	Reference(s)
ASC0	3GPP 27.007
MUX1	
MUX2	
MUX3	
🔔 Last	
±	
+	
+	
+	
+	
-	
-	

### Parameter Description

<code>&lt;n&gt;</code> <sup>(num)(&amp;W)(&amp;V)</sup>	
000 <sup>(&amp;F)</sup>	Disable automatic response mode.
001-255	Enable automatic response after specified number of rings.

### Notes

- If different settings are used on each interface, and a request for PDP context activation is received, the inter-face 'wins' which is idle and uses the smallest `ATSO` value.
- When a network request for PDP context activation is answered automatically and another AT command is issued at the same time on the same interface then this AT command will not be executed. Any response relates to the automatic context activation procedure. If the AT command which caused the collision was a



CS data call, the CONNECT response does not pertain to this data call but to GPRS. This can be detected if `ATX` is not set to 0. The CS data call will issue `CONNECT <text>`, GPRS will issue `CONNECT` only.

- A network request for PDP context activation has a maximum duration of approximately 40 seconds (for details see GSM 04.08). A RING/CRING URC is issued every 5 seconds, so setting parameter `<n>` to values greater than 7 will not allow a successful context activation and is not recommended.
- Automatic GPRS attach will not be performed on recalling a stored user profile with `ATZ` or on power-up, even though a value `<n>` greater than 0 was stored in the user profile with `AT&W`.
- If `AT^SCFG="GPRS/ATS0/withAttach","on"` is selected, but the automatic GPRS attach attempt fails (e.g. the network rejects the attach request), the `ATS0` write command ends up with "ERROR" or "+CME ERROR: unknown" after approx. 5 minutes, though the new `<n>` value takes effect. This is necessary because `ATS0` is used for circuit switched calls too.



### 6.38. 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. If the context to be used is already activated, it will be deactivated first. This ensures that the right context parameters will be used (e.g. QoS changes since the last context activation or the called address specified by [ATD\\*99#](#)).

To confirm acceptance of the command before entering the V.250 online data state command will respond with CONNECT.

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.

#### Syntax

Exec Command

```
ATD*99[* [<called_address>][* [<L2P>][* [<cid>]]]]#
```

Response(s)

```
CONNECT  
NO CARRIER
```

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
+	+	+	+	+	-	+

Reference(s)

GSM 07.07

#### Parameter Description

**<called\_address><sup>(str)</sup>**

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. This parameter is currently not used and needs not to be specified.

**<L2P><sup>(str)</sup>**

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

“PPP“                      layer 2 protocol PPP

“1“                         layer 2 protocol PPP



<cid><sup>(num)</sup>

Parameter specifies a particular PDP context definition (see [AT+CGDCONT](#) command). If no context is specified, an internal context with default properties is used (see [AT+CGDCONT](#), [AT+CGQREQ](#) and [AT+CGQMIN](#)).

1...2

### **Notes**

- If MG21 is in dedicated mode, command returns "+CME ERROR: phone busy".
- [ATD](#) is used as a standard V.250 AT command, too.



### 6.39. ATD\*98# Request GPRS IP 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 layer 2 protocol.

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. If the context to be used is already activated, it will be deactivated first. This ensures that the right context parameters will be used (e.g. QoS changes since the last context activation).

To confirm acceptance of the command before entering the V.250 online data state command will respond with CONNECT.

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.

#### Syntax

Exec Command

```
ATD*98[* <cid>]#
```

Response(s)

```
CONNECT  
NO CARRIER
```

PIN	ASC0	MUX1	MUX2	MUX3	☎	Last
+	+	+	+	+	-	+

Reference(s)

GSM 07.07

#### Parameter Description

<cid><sup>(num)</sup>

Parameter specifies a particular PDP context definition (see [AT+CGDCONT](#) command). If no context is specified, an internal context with default properties is used (see [AT+CGDCONT](#), [AT+CGQREQ](#) and [AT+CGQMIN](#)).

1...2

#### Notes

- If MG21 is in dedicated mode, command returns "+CME ERROR: phone busy".
- [ATD](#) is used as a standard V.250 AT command, too.



## 6.40. AT+CGACT PDP context activate or deactivate

### Syntax

Test Command

AT+CGACT=?

Response(s)

+CGACT: (list of supported <state>s)  
OK

Read Command

AT+CGACT?

Response(s)

+CGACT: <cid>, <state>  
[+CGACT: <cid>, <state>]  
...  
OK

Write Command

AT+CGACT=[<state>[, <cid>[, <cid>]]]

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + + + - -

Reference(s)

GSM 07.07

### 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. If the MT is not able to activate a context because of a failed attach, the command returns "ERROR" or "+CME ERROR: unknown" after 385 seconds (timer T3310 expired).

If the MT is attached but is not able to activate a context for more than 160 seconds (timer T3380 expired), command returns "ERROR" or "+CME ERROR: unspecified GPRS error". In this case AT+CEER returns "+CEER: 51,3,0".



The command should not be used to deactivate a PDP context during the implicit PDP context deactivation procedure which is started automatically after LCP termination or by dropping the DTR line (if [AT&D2](#) is configured).

### Parameter Description

`<state>`<sup>(num)</sup>

Indicates the state of PDP context activation.

0	deactivated
[1]	activated

`<cid>`<sup>(num)</sup>

PDP Context Identifier is a numeric parameter which 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...2

### Notes

- [ATH](#) will deactivate any PDP context.
- If the MT is in dedicated mode, the write command returns "+CME ERROR: operation temporary not allowed".
- A maximum of 2 contexts can be activated at the same time, no matter on which interface. Trying to activate more than 2 contexts will cause "+CME ERROR: operation temporary not allowed". Note that, depending on the provider, the number of activated contexts may be further restricted. In such cases "+CME ERROR: unspecified GPRS error" will be returned and [AT+CEER](#) returns "+CEER: 50,26,0". Remember that contexts may be activated implicitly by using the [ATD\\*98#](#) or [ATD\\*99#](#) GPRS compatibility commands without specifying a `<cid>`.
- If an activated context will be deactivated without using the command [AT+CGACT](#), then the result code "NO CARRIER" will be issued to indicate the context deactivation. This happens for example if the context deactivation is forced by the network or if deactivation results from a network deregistration with [AT+COPS=2](#).



## 6.41. AT+CGANS Manual response to a network request for PDP context activation

### Syntax

Test Command

AT+CGANS=?

Response(s)

+CGANS: (list of supported <response>s), (list of supported <L2P>s)  
OK

Write Command

AT+CGANS=[<response>[, <L2P>[, <cid>]]]

Response(s)

CONNECT  
NO CARRIER  
ERROR  
+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	+	+	-	-

Reference(s)

3GPP 27.007

### Command Description

The write command requests MG21 to respond to a network request for Packet Domain PDP context activation which has been signaled to the TE by the "RING" or "+CRING: GPRS" URC. The <response> parameter allows the TE to accept or reject the request.

### Parameter Description

<response><sup>(num)</sup>

- |     |   |
|-----|---|
| [0] | the request is rejected and MG21 returns OK to the TE |
| 1   | accept the request                                    |

<response><sup>(num)</sup>

a string parameter which indicates the layer 2 protocol to be used (see [AT+CGDATA](#) command)

<response><sup>(num)</sup>

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



### Note

- If [<response>](#) is 1, the following procedure is followed by MG21:
    - If the [<L2P>](#) parameter value is unacceptable to MG21, then it will return an "ERROR" or "+CME ERROR: [<err>](#)" response. Otherwise, MG21 issues the intermediate result code CONNECT and enters V.250 online data state.
    - A [<cid>](#) may be specified for use in the context activation request.
    - During the PDP startup procedure MG21 has the PDP type and the PDP address provided by the network in the Request PDP context activation message. If this is in conflict with the information provided by a specified [<cid>](#), the command will fail. There will be no conflict, if the PDP type matches exactly and the PDP address given by the context definition for [<cid>](#) is empty or matches exactly with the address specified with the network PDP context activation message.
    - The context will be activated using the values for PDP type and address provided by the network, together with all other information found in the PDP context definition.
    - If no [<cid>](#) is given or if there is no matching context definition, MG21 will attempt to activate the context using the values for PDP type and address provided by the network. The other parameters will be set to their default values (see [AT+CGDCONT](#)).
    - If activation is successful, data transfer will proceed.
    - After data transfer is complete, and the layer 2 protocol termination procedure has completed successfully, the V.250 command state is reentered and MG21 returns the final result code OK.
    - In the event of an erroneous termination or a failure to start up, the V.250 command state is re-entered and MG21 returns the final result code NO CARRIER, or if enabled, "+CME ERROR: [<err>](#)". Attach, activate and other errors may be reported. It is also an error to issue the [AT+CGANS](#) command when there is no pending network request.
- The command can be used in both normal and modem compatibility modes.



## 6.42. AT+CGATT

## GPRS attach or detach

### Syntax

Test Command

```
AT+CGATT=?
```

Response(s)

```
+CGATT: (list of supported <state>s)  
OK
```

Read Command

```
AT+CGATT?
```

Response(s)

```
+CGATT: <state>  
OK
```

Write Command

```
AT+CGATT=[<state>]
```

Response(s)

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

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	+	+	-	-

Reference(s)

GSM 07.07

### Command Description

The test command is used for requesting information on the supported GPRS service states.

The read command returns the current GPRS service state.

The write command is used to attach the MT to, or detach the MT from the GPRS service. After the command has completed, the MT remains in V.250 command state. If the MT is already in the requested state, the command is ignored and the OK response is returned. Any active PDP contexts will be automatically deactivated when the attachment state changes to detached.

If the MT is not able to attach for more than 5 minutes, command returns "ERROR" or "+CME ERROR: unknown", but MT is still trying to attach.

If the MT is not able to detach for more than 80 seconds, command returns "ERROR" or "+CME ERROR: unknown", but MT is still trying to detach. If an attach is issued during a running detach, command returns "ERROR" or "+CME ERROR: unspecified GPRS error".



### **Parameter Description**

`<state>`<sup>(num)</sup>

Indicates the state of GPRS attachment.

0 <sup>(P)</sup>	detached
[1]	attached

### **Note**

- If the MT is in dedicated mode, write command returns "+CME ERROR: operation temporary not allowed".
- When the module is GPRS attached and a PLMN reselection occurs to a non-GPRS network or to a network where the SIM is not subscribed to for using GPRS, the resulting GMM (GPRS mobility management) state according to GSM 24.008 is REGISTERED/NO CELL, meaning that the read command will still show `<state>=1`.



## 6.43. AT+CGAUTO Automatic response to a network request for PDP context activation

### Syntax

Test Command

AT+CGAUTO=?

Response(s)

+CGAUTO: (list of supported <n>s)

OK

Read Command

AT+CGAUTO?

Response(s)

+CGAUTO: <n>

OK

Write Command

AT+CGAUTO=[<n>]

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	☞ Last
+	+	+	+	+	- -

Reference(s)

GSM 07.07

### Command Description

The test command returns the values of <n> supported by the MT as a compound value.

The write command disables or enables an automatic positive response (auto-answer) to the receipt of a Request PDP Context Activation message from the network. It also provides control over the use of the V.250 basic commands [ATS0](#), [ATA](#) and [ATH](#) for handling network requests for PDP context activation.



## Parameter Description

<n><sup>(num)</sup>

0	Disable automatic response for network requests for GPRS PDP context activation. GPRS network requests are manually accepted or rejected by the <a href="#">AT+CGANS</a> command.
1	Enable automatic response for network requests for GPRS PDP context activation. GPRS requests are automatically accepted according to the description below.
3 <sup>(&amp;F)(P)</sup>	Modem compatibility mode. The automatic acceptance of both GPRS and incoming CSD calls is controlled by the <a href="#">ATS0</a> command. Manual control uses the <a href="#">ATA</a> and <a href="#">ATH</a> commands, respectively, to accept or reject GPRS network requests or incoming CSD calls.

## Notes

- It is allowed to have different [AT+CGAUTO](#) settings on different interfaces.
- When the [AT+CGAUTO=0](#) command is received, the MT will not perform a GPRS detach if it is attached. Subsequently, when the MT announces a network request for PDP context activation by issuing the URC RING or CRING, the TE may manually accept or reject the request by issuing the [AT+CGANS](#) command or may simply ignore the network request.
- When the [AT+CGAUTO=1](#) command is received, the MT will attempt to perform a GPRS attach if it is not yet attached. Failure will result in ERROR or, if enabled +CME ERROR being returned to the TE. Subsequently, the MT announces a network request for PDP context activation by issuing the URC RING to the TE, followed by the intermediate result code CONNECT. The MT then enters V.250 online data state and follows the same procedure as it would after having received a +CGANS=1 with no <L2P> or <cid> values specified.
- If a GPRS attach will be initiated by this command and the MT is not able to attach for more than 385 seconds (timer T3310 expired), command returns with "ERROR" or "+CME ERROR: unknown", but MT is still trying to attach and the requested automatic mode <n> is in use.
- If a network request for PDP context activation is answered automatically and if another AT command is issued at the same time on the same interface, then this AT command is not executed. Any response belongs to the automatic context activation procedure. If the AT command which caused the collision was a circuit switched data call, the CONNECT response does not belong to this data call but to the GPRS. This can be detected if [ATX](#) is not set to 0. CS data call will issue CONNECT <text>, GPRS will issue CONNECT only.



## 6.44. 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>[, <cid>]]]

Response(s)

CONNECT  
NO CARRIER  
ERROR  
+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	☞ Last
+	+	+	+	+	- +

Reference(s)

GSM 07.07

### 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 no <cid> is given or if there is no matching context definition, the MT will attempt to activate the context with PDP type IP and all other context parameters set to their default values (see [AT+CGDCONT](#), [AT+CGQREQ](#), [AT+CGQMIN](#)).

If the <L2P> parameter is omitted, the layer 2 protocol is unspecified and PPP will be used. If the write command is successful, the MT issues the intermediate result code CONNECT and enters V.250 online data 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><sup>(str)</sup>

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

[“PPP”]                      layer 2 protocol PPP

<cid><sup>(num)</sup>

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...2

### Notes

- If the MT is in dedicated mode, write command returns "+CME ERROR: operation temporary not allowed".
- It is possible to leave the GPRS data mode and enter the command mode by using the V.250 command **+++**. By using the command **AT+CGDATA** again, the data mode is reentered. Which context is used to return to data mode, depends on the supplied parameter **<cid>**.

If no **<cid>** is specified, this is equivalent to using the V.250 command **ATO**, which is usable for GPRS connections too. In this case the first context will be used, which is active and already in data mode since it has been activated (the internal context used for GPRS connection without explicitly specifying a context identifier has the highest priority).

It is possible to use **AT+CGDATA** to enter the data mode for a context, which is not yet in data mode since it has been activated. With **ATO** this is not possible.



## 6.45. 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: <err>

#### Read Command

AT+CGDCONT?

#### Response(s)

[+CGDCONT: <cid>, <PDP\_type>, <APN>, <PDP\_addr>, <d\_comp>, <h\_comp>]

[+CGDCONT: ...]

OK

ERROR

+CME ERROR: <err>

#### Write Command

AT+CGDCONT=[<cid>[, <PDP\_type>[, <APN>[, <PDP\_addr>]]]]

#### Response(s)

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + + + - -

#### Reference(s)

GSM 07.07

### 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><sup>(num)</sup>**

PDP Context Identifier

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...2

**<PDP\_type><sup>(str)</sup>**

Packet Data Protocol type

Specifies the type of the packet data protocol.

“IP“                      Internet Protocol (IETF STD 5)

**<APN><sup>(str)</sup>**

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><sup>(str)</sup>**

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><sup>(num)</sup>**

Data Compression

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

[0]                      off



<h\_comp><sup>(num)</sup>

Header Compression

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

[0]                      off

### **Notes**

- The MT supports PDP type IP only.
- On ASC0 all context definitions will be stored non volatile. On all other instances only the settings of context 1 are stored non volatile.



## 6.46. AT+CGEQMIN Rel. 99 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: ...]

#### 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: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + + + - -

Reference(s)

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.

The write command allows the TE to specify a Quality of Service Profile for the context identified by the (local) 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.

On ASC0 all QoS profiles will be stored non volatile. On all other instances only the QoS settings for context 1 are stored non volatile.



### Parameter Description

<cid><sup>(num)</sup>

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...2

<Traffic class><sup>(num)</sup>

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

<Maximum bitrate UL><sup>(num)</sup>

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...63	
64...658	(value needs to be divisible by 8 without remainder)
576...8640	(value needs to be divisible by 64 without remainder)

< Maximum bitrate DL ><sup>(num)</sup>

This parameter indicates the maximum number of kbits/s delivered to 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...63	
64...658	(value needs to be divisible by 8 without remainder)
576...8640	(value needs to be divisible by 64 without remainder)



#### <Guaranteed bitrate UL><sup>(num)</sup>

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+CGEQ-MIN=...,32,...](#)).

[0]	subscribed value
1...63	
64...658	(value needs to be divisible by 8 without remainder)
576...8640	(value needs to be divisible by 64 without remainder)

#### <Guaranteed bitrate DL><sup>(num)</sup>

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+CGEQ-MIN=...,32,...](#)).

[0]	subscribed value
1...63	
64...658	(value needs to be divisible by 8 without remainder)
576...8640	(value needs to be divisible by 64 without remainder)

#### <Delivery order><sup>(num)</sup>

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><sup>(num)</sup>

This parameter indicates the maximum allowed SDU size in octets.

[0]	subscribed value
10...1520	(value needs to be divisible by 10 without remainder)
1502	



### <SDU error ratio><sup>(str)</sup>

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  $5 \cdot 10^{-3}$  would be specified as "5E3" (e.g. [AT+CGEQMIN=...](#), "5E3", ...).

["0E0"] subscribed value

"1E2"

"7E3"

"1E3"

"1E4"

"1E5"

"1E6"

"1E1"

### <Residual bit error ratio><sup>(str)</sup>

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  $5 \cdot 10^{-3}$  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><sup>(num)</sup>

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><sup>(num)</sup>

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><sup>(num)</sup>

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><sup>(str)</sup>

Packet Data Protocol Type

“IP“

#### **Notes**

- If parameters are not defined, the parameter default values depend on the HLR-stored subscribed default values.
- Definitions of parameters can be found in 3GPP TS 23.107
- If QOS settings are configured with [AT+CGQMIN](#) and [AT+CQEQMIN](#) in parallel the MT will use only the [AT+CQEQMIN](#) settings for connection setup while the [AT+CGQMIN](#) settings are ignored.



## 6.47. AT+CGEQREQ Rel. 99 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: ...]

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: <err>

PIN	ASC0	MUX1	MUX2	MUX3	Last
+	+	+	+	+	-

Reference(s)

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.

The write command allows the TE to specify a Quality of Service Profile for the context identified by the (local) 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.

On ASC0 all QoS profiles will be stored non volatile. On all other instances only the QoS settings for context 1 are stored non volatile.



### Parameter Description

<cid><sup>(num)</sup>

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...2

<Traffic class><sup>(num)</sup>

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

<Maximum bitrate UL><sup>(num)</sup>

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...63	
64...658	(value needs to be divisible by 8 without remainder)
576...8640	(value needs to be divisible by 64 without remainder)

< Maximum bitrate DL ><sup>(num)</sup>

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...63	
64...658	(value needs to be divisible by 8 without remainder)
576...8640	(value needs to be divisible by 64 without remainder)



#### <Guaranteed bitrate UL><sup>(num)</sup>

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...63	
64...658	(value needs to be divisible by 8 without remainder)
576...8640	(value needs to be divisible by 64 without remainder)

#### <Guaranteed bitrate DL><sup>(num)</sup>

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...63	
64...658	(value needs to be divisible by 8 without remainder)
576...8640	(value needs to be divisible by 64 without remainder)

#### <Delivery order><sup>(num)</sup>

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><sup>(num)</sup>

This parameter indicates the maximum allowed SDU size in octets.

[0]	subscribed value
10...1520	(value needs to be divisible by 10 without remainder)
1502	



### <SDU error ratio><sup>(str)</sup>

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  $5 \cdot 10^{-3}$  would be specified as "5E3" (e.g. [AT+CGEQREQ=..., "5E3", ...](#)).

["0E0"] subscribed value

"1E2"

"7E3"

"1E3"

"1E4"

"1E5"

"1E6"

"1E1"

### <Residual bit error ratio><sup>(str)</sup>

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  $5 \cdot 10^{-3}$  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><sup>(num)</sup>

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><sup>(num)</sup>

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><sup>(num)</sup>

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><sup>(str)</sup>

Packet Data Protocol Type

“IP“

#### Notes

- If parameters are not defined, the parameter default values depend on the HLR-stored subscribed default values.
- Definitions of parameters can be found in 3GPP TS 23.107
- If QOS settings are configured with [AT+CGQREQ](#) and [AT+CGEQREQ](#) in parallel the MT will use only the [AT+CGEQREQ](#) settings for connection setup while the [AT+CGQREQ](#) settings are ignored.



## 6.48. AT+CGEREP GPRS event reporting

The write command enables or disables sending of unsolicited result codes, "+CGEV" from MT to TE in the case of certain events occurring in the GPRS MT or the network. `<mode>` controls the processing of unsolicited result codes specified within this command. `<bfr>` controls the effect on buffered codes when `<mode>` 1 or 2 is entered. If a setting is not supported by the MT, ERROR or +CME ERROR: is returned.

Read command returns the current `<mode>` and buffer settings.

Test command returns the modes and buffer settings supported by the MT as compound values.

### Syntax

#### Test Command

AT+CGEREP=?

#### Response(s)

+CGEREP: (list of supported `<mode>`s), (list of supported `<bfr>`s)  
OK

#### Read Command

AT+CGEREP?

#### Response(s)

+CGEREP: `<mode>`, `<bfr>`  
OK

#### Write Command

AT+CGEREP=[`<mode>`], [`<bfr>`]]

#### Response(s)

OK  
ERROR  
+CME ERROR: `<err>`

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	+	+	-	-

#### Reference(s)

GSM 07.07

### Unsolicited Result Codes

#### URC 1

+CGEV: REJECT `<PDP_type>`, `<PDP_addr>`

A network request for PDP context activation occurred when the MT was unable to report it to the TE with a +CRING unsolicited result code and was automatically rejected.

#### URC 2

+CGEV: NW REACT `<PDP_type>`, `<PDP_addr>`, [`<cid>`]

The network has requested a context reactivation. The `<cid>` that was used to reactivate the context is provided if known to the MT.



#### URC 3

+CGEV: NW DEACT <PDP\_type>, <PDP\_addr>, [<cid>]

The network has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the MT.

#### URC 4

+CGEV: ME DEACT <PDP\_type>, <PDP\_addr>, [<cid>]

The mobile equipment has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the MT.

#### URC 5

+CGEV: NW DETACH

The network has forced a GPRS detach.

#### URC 6

+CGEV: ME DETACH

The mobile equipment has forced a GPRS detach.

#### URC 7

+CGEV: NW CLASS <class>

The network has forced a change of MS class. The highest available class is reported.

#### URC 8

+CGEV: ME CLASS <class>

The mobile equipment has forced a change of MS class. The highest available class is reported.

### <mode><sup>(num)</sup>

0 <sup>(P)</sup>	Buffer unsolicited result codes in the MT. Currently 3 +CGEV URCs can be buffered. If MT result code buffer is full, the oldest ones will be discarded. No codes are forwarded to the TE.
1	Discard unsolicited result codes when MT TE link is reserved (e.g. in on line data mode); otherwise forward them directly to the TE.
2	Buffer unsolicited result codes in the MT when MT TE link is reserved (e.g. in on line data mode) and flush them to the TE when MT TE link becomes available; otherwise forward them directly to the TE. Currently 3 +CGEV URCs can be buffered. If MT result code buffer is full, the oldest URCs will be discarded.



**<bfr><sup>(num)</sup>**

- |   |   |
|---|---|
| 0 | MT buffer of unsolicited result codes defined within this command is cleared when <b>&lt;mode&gt;</b> 1 or 2 is entered   |
| 1 | MT buffer of unsolicited result codes defined within this command is flushed to the TE when <b>&lt;mode&gt;</b> 1 or 2 is entered (OK response will be given before flush-ing the codes). Buffer is empty afterwards. |

**<class><sup>(str)</sup>**

Parameter indicates the GPRS mobile class.

“B”                      class B



## 6.49. AT+CGMSCLASS      Change GPRS Multislot Class

### **Syntax**

Test Command

```
AT+CGMSCLASS=?
```

Response(s)

```
MULTISLOT CLASS: <4,8,9,10>  
OK
```

Read Command

```
AT+CGMSCLASS?
```

Response(s)

```
MULTISLOT CLASS: <class>  
OK
```

Write Command

```
AT+CGMSCLASS=<class>
```

Response(s)

```
OK  
ERROR
```

### **Parameter Description**

<class>

GPRS multislot class



## 6.50. AT+CGPADDR Show PDP address

### Syntax

Test Command

```
AT+CGPADDR=?
```

Response(s)

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

Write Command

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

Response(s)

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

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
+	+	+	+	+	-	-

Reference(s)

GSM 07.07

### Command Description

The test command returns a list of defined [<cid>](#)s.

The write command returns a list of PDP addresses for the specified context identifiers. If no [<cid>](#) is specified, the addresses for all defined contexts are returned.

### Parameter Description

[<cid>](#)<sup>(num)</sup>

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

[<PDP\\_address>](#)<sup>(str)</sup>

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

### Note

- If no [<cid>](#) is specified, the write command will return a list of all defined contexts.



## 6.51. 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: <err>

#### Read Command

AT+CGQMIN?

#### Response(s)

[+CGQMIN: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean>]

[+CGQMIN: ...]

OK

ERROR

+CME ERROR: <err>

#### Write Command

AT+CGQMIN=[<cid>[, <precedence>[, <delay>[, <reliability>[, <peak>[, <mean>]]]]]]

#### Response(s)

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + + + - -

#### Reference(s)

GSM 07.07

### 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. If no minimum profile was explicitly specified for a context, simply OK will be returned, but default values will be used for that context.

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 (local) 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.

On ASC0 all QoS profiles will be stored non volatile. On all other instances only the QoS settings for context 1 are stored non volatile.



### Parameter Description

**<cid><sup>(num)</sup>**

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...2

**<precedence><sup>(num)</sup>**

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

**<precedence><sup>(num)</sup>**

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><sup>(num)</sup>

### 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><sup>(num)</sup>

### 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><sup>(num)</sup>

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><sup>(str)</sup>

Packet Data Protocol Type

“IP“



### **Notes**

- If parameters are not defined, the parameter default values depend on the HLR-stored subscribed default values.
- Definitions of parameters in GSM 02.60 and GSM 03.60 paragraph 15.2 "Quality of Service Profile".
- If some of the QoS parameters are omitted, they will keep their current value (or the default value if not specified so far).
- If QoS settings are configured with [AT+CGQMIN](#) and [AT+CGEQMIN](#) in parallel the MT will use only the [AT+CGEQMIN](#) settings for connection setup while the [AT+CGQMIN](#) settings are ignored.



## 6.52. 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: ...]

#### Write Command

AT+CGQREQ=[<cid>[, <precedence>[, <delay>[, <reliability>[, <peak>[, <mean>]]]]]]

#### Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	+	+	-	-

#### Reference(s)

GSM 07.07

### 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. If no requested profile was explicitly specified for a context, simply OK will be returned, but default values will be used for that context.

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 (local) context identification parameter, <cid>.

A special form of the set command, +CGQREQ=<cid> causes the requested profile for context number <cid> to become undefined.

On ASC0 all QoS profiles will be stored non volatile. On all other instances only the QoS settings for context 1 are stored non volatile.



### Parameter Description

**<cid><sup>(num)</sup>**

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...2

**<precedence><sup>(num)</sup>**

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

**<precedence><sup>(num)</sup>**

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><sup>(num)</sup>

### 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><sup>(num)</sup>

### 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><sup>(num)</sup>

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><sup>(str)</sup>

Packet Data Protocol Type

“IP”

### Notes

- If parameters are not defined, the parameter default values depend on the HLR-stored subscribed default values.



- Definitions of parameters in GSM 02.60 and GSM 03.60 paragraph 15.2 "Quality of Service Profile".
- If some of the QoS parameters are omitted, they will keep their current value (or the default value if not specified so far).
- If QoS settings are configured with [AT+CGQREQ](#) and [AT+CGEQREQ](#) in parallel the MT will use only the [AT+CGEQREQ](#) settings for connection setup while the [AT+CGQREQ](#) settings are ignored.



## 6.53. AT+CGREG

## GPRS Network Registration Status

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

**AT+CGREG** read command queries the current URC presentation status and <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: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + + + - -

Reference(s)

GSM 07.07

### Unsolicited Result Code

+CGREG: <stat>

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

### Parameter Description

<n><sup>(num)</sup>

0 <sup>(&amp;F)(P)</sup>	Disable network registration unsolicited result code
1	Enable network registration URC "+CGREG: <stat>"



<stat><sup>(num)</sup>

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.

### Note

- When the module is GPRS attached and a PLMN reselection occurs to a non-GPRS network or to a network where the SIM is not subscribed to for using GPRS, the resulting GMM (GPRS mobility management) state according to GSM 24.008 is REGISTERED/NO CELL, meaning that the read command will still show <stat>=1 or <stat>=5.



## 6.54. 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: <err>
```

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	+	+	-	-

Reference(s)

GSM 07.07

### 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. If parameter [<service>](#) is not given, the current value remains unchanged.



### **Parameter Description**

`<view>(num)`

A numeric parameter which indicates the service or service preference to be used. Parameter is global for all interfaces and volatile.

0	GPRS
1	Circuit switched
2	GPRS preferred (use circuit switched SMS transfer if mobile is not GPRS attached)
3 <sup>(&amp;F)(P)</sup>	Circuit switched preferred (use GPRS if circuit switched is not available)

### **Note**

- Sending SMS via GPRS is only possible when mobile is attached using [AT+CGATT](#).



## 6.55. AT^SGAUTH Set type of authentication for PPP connection

### Syntax

Test Command

AT^SGAUTH=?

Response(s)

^SGAUTH: (list of supported <auth>s)

OK

ERROR

+CME ERROR: <err>

Read Command

AT^SGAUTH?

Response(s)

^SGAUTH: <auth>

OK

ERROR

+CME ERROR: <err>

Write Command

AT^SGAUTH=<auth>

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### Parameter Description

<auth><sup>(num)</sup>

Indicates types of supported authentication.

0	none
1	PAP
2	CHAP
3(&F)(P)	PAP and CHAP



## 6.56. AT^SGCONF Configuration of GPRS related Parameters

### Syntax

Test Command

AT^SGCONF=?

Response(s)

^SGCONF: (list of supported <llc\_pdu\_length\_U>s), (list of supported <GPRS msclass>es)  
OK

Read Command

AT^SGCONF?

Response(s)

^SGCONF: <llc\_pdu\_length\_U>, <GPRS msclass>  
OK

Write Command

AT^SGCONF=[<llc\_pdu\_length\_U>][, [<GPRS msclass>]]

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + - -

### Parameter Description

<llc\_pdu\_length\_U><sup>(num)</sup>

The maximum number of octets in an information field of Unnumbered (U) frames.

0 No negotiation with network (500 will be used).

140...1520<sup>(P)</sup> Lower values diminish performance.

<GPRS msclass><sup>(num)</sup>

GPRS Multislot Class. The value can be one of the classes indicated with the Test command. The value set is volatile and powerup value is the maximum allowed.

### Note

- AT^SGCONF will respond with "+CME ERROR: operation temporary not allowed" if the module is already GPRS attached (see AT+CGATT).



## 7. FAX Commands



The AT Commands described in this chapter used to operate with fax machines.

Fax
AT+FBADLIN
AT+FBADMUL
AT+FBOR
AT+FCIG
AT+FCLASS
AT+FCQ
AT+FCR
AT+FDCC
AT+FDFFC
AT+FDIS
AT+FDR
AT+FDT
AT+FET
AT+FK
AT+FLID
AT+FMDL
AT+FMFR
AT+FMI
AT+FMM
AT+FMR
AT+FOPT
AT+FPHCTO
AT+FREV
AT+FRH
AT+FRM
AT+FRS
AT+FTH
AT+FTM
AT+FTS
AT+FVRFC



## 7.1. AT+FBADLIN Bad Line Threshold

This command defines the Copy-Quality-OK-threshold. If `<badlin>` consecutive lines have pixel count errors in normal resolution (98 dpi) mode, then the copy quality is unacceptable. If `<badlin> * 2` consecutive lines have pixel count errors in fine resolution (196 dpi) mode, then the copy quality is unacceptable. "Copy Quality Not OK" occurs if either the error percentage is too high or too many consecutive lines contain errors. A value of 0 implies that error checking is not present or disabled.

### Syntax

Read Command

AT+FBADLIN?

Response(s)

`<badlin>`

OK

Write Command

AT+FBADLIN=`<badlin>`

Response(s)

OK

If error is related to ME functionality

ERROR

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + - - - -

Reference(s)

EIA PN-2388

### Parameter Description

`<badlin>`<sup>(num)</sup>

Bad lines

0...10<sup>(P)</sup>...255

### Note

-  Used for Fax Class 2 only.



## 7.2. AT+FBADMUL Error Threshold Multiplier

This command defines the "Copy-Quality-OK" multiplier. The number of lines received with a bad pixel count is multiplied by this number. If the result exceeds the total number of lines on the page the error rate is considered too high. A threshold multiplier value of 20 corresponds to a 5 per cent error rate. A value of 0 implies that error checking is not present or disabled.

### Syntax

Read Command

AT+FBADMUL?

Response(s)

<badmul>  
OK

Write Command

AT+FBADMUL=<badmul>

Response(s)

OK  
If error is related to ME functionality  
ERROR

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + - - - -

Reference(s)

EIA PN-2388

### Parameter Description

<badmul><sup>(num)</sup>

Bad lines

0...20<sup>(P)</sup>...255

### Note

- Used for Fax Class 2 only.



### 7.3. AT+FBOR Query data Bit Order

This command queries the bit order for the receive mode. The mode is set by the ME depending on the selected Service Class, see "[AT+FCLASS](#) Fax: Select, read or test service class".

#### Syntax

<p>Test Command</p> <p>AT+FBOR=?</p> <p>Response(s)</p> <p>(list of supported &lt;bor&gt;s)</p> <p>OK</p>															
<p>Read Command</p> <p>AT+FBOR?</p> <p>Response(s)</p> <p>&lt;bor&gt;</p> <p>OK</p>															
<p>Write Command</p> <p>AT+FBOR=&lt;bor&gt;</p> <p>Response(s)</p> <p>OK</p>															
<table border="1"> <tr> <td>PIN</td> <td>ASC0</td> <td>MUX1</td> <td>MUX2</td> <td>MUX3</td> <td>☺</td> <td>Last</td> </tr> <tr> <td>-</td> <td>+</td> <td>+</td> <td>-</td> <td>-</td> <td>-</td> <td>-</td> </tr> </table>	PIN	ASC0	MUX1	MUX2	MUX3	☺	Last	-	+	+	-	-	-	-	<p>Reference(s)</p> <p>EIA PN-2388</p>
PIN	ASC0	MUX1	MUX2	MUX3	☺	Last									
-	+	+	-	-	-	-									

#### Parameter Description

<bor> <sup>(num)</sup>	
bit order modes	
0	Direct bit order for both Phase C and for Phase B/D data.
[1]	Reversed bit order for Phase C data, direct Bit Order for Phase B/D data.

#### Note

- Used for Fax Class 2 only.



## 7.4. AT+FCIG Query or set the Local Polling ID

### Syntax

Test Command

AT+FCIG=?

Response(s)

(max. length of Local Polling ID string) (range of supported ASCII character values)

OK

Read Command

AT+FCIG?

Response(s)

<id>

OK

Write Command

AT+FCIG=<id>

Response(s)

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-----	------	------	------	------	---	------

-	+	+	-	-	-	-
---	---	---	---	---	---	---

Reference(s)

EIA PN-2388

### Parameter Description

<id><sup>(num)</sup>

Local Polling ID string, max. length and possible content as reported by test command. Default value is empty string ("").

### Note

- Used for Fax Class 2 only.
- See also [AT+FLID](#) Query or set the Local ID setting capabilities.



## 7.5. AT+FCLASS Fax: Select, read or test service class

**AT+FCLASS** sets the ME to a particular mode of operation (data, fax). This allows the ME to process information in a manner suitable for that type of information.

### Syntax

Test Command

AT+FCLASS=?

Response(s)

(list of supported <n>s)

OK

Read Command

AT+FCLASS?

Response(s)

<n>

OK

Write Command

AT+FCLASS=<n>

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3 ☎ Last

- + + - - - -

Reference(s)

EIA/TIA-592-A

### Parameter Description

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

0 <sup>(&amp;F)</sup>	Data (e.g. EIA/TIA-602 or ITU V.250)
1	Fax class 1 (EIA/TIA-578-A, Service Class 1)
2	Fax class 2 (EIA/TIA SP-2388, an early draft version of EIA/TIA-592-A - Service class 2.1)



### **Notes**

- Using Error Correcting Mode (ECM) when sending FAXes over GSM should be avoided.
- If `<n>` is set to 1 or 2, all incoming calls will be answered as fax calls when `ATA` is issued on multiplexer channel 1 resp. ASC0. For calls explicitly signaled as voice or data calls, this procedure will fail with result code "NO CARRIER", but the incoming call will continue to ring.  
It is possible to change the setting of `<n>` to 0 while the call is ringing, and accept the call afterwards with `ATA`.



## 7.6. AT+FCQ Copy Quality Checking

This command controls Copy Quality checking when receiving a fax.

### Syntax

<p>Test Command</p> <p>AT+FCQ=?</p> <p>Response(s)</p> <p>(list of supported copy quality checking &lt;cq&gt;s)</p> <p>OK</p>	
<p>Read Command</p> <p>AT+FCQ?</p> <p>Response(s)</p> <p>&lt;cq&gt;</p> <p>OK</p>	
<p>Write Command</p> <p>AT+FCQ=&lt;cq&gt;</p> <p>Response(s)</p> <p>OK</p>	
<p>PIN ASC0 MUX1 MUX2 MUX3  Last</p> <p>- + + - - - -</p>	<p>Reference(s)</p> <p>EIA PN-2388</p>

### Parameter Description

<cq> <sup>(num)</sup>	Description
0	No copy quality checking. The ME will generate Copy Quality OK (MCF) responses to complete pages.
[1]	ME can check 1-D phase data. The connected application must check copy quality for 2-D phase C data.

### Note

- Used for Fax Class 2 only.



## 7.7. AT+FCR Capability to Receive

### Syntax

Write Command

AT+FCR=<cr>

Response(s)

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	-	-	-	-

Reference(s)

EIA PN-2388

### Parameter Description

<cq><sup>(num)</sup>

0 ME will not receive message data. This value can be used when the application has insufficient storage. The ME can send and can be polled for a file.

[1] ME can receive message data.

### Note

■ Used for Fax Class 2 only.



## 7.8. AT+FDCC Query or set capabilities

This command allows the connected application to sense and constrain the capabilities of the facsimile DCE (=ME), from the choices defined in CCITT T.30 Table 2.

### Syntax

Test Command

AT+FDCC=?

Response(s)

(list of <vr>s), (list of <br>s), (list of <wd>s), (list of <ln>s), (list of <df>s), (list of <ec>s), (list of <bf>s), (list of <st>s)  
OK

Read Command

AT+FDCC?

Response(s)

<vr>, <br>, <wd>, <ln>, <df>, <ec>, <bf>, <st>  
OK

Write Command

AT+FDCC=<vr>, <br>, <wd>, <ln>, <df>, <ec>, <bf>, <st>

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + - - - -

Reference(s)

EIA PN-2388

### Notes

- For further information see [AT+FDIS](#).
- Used for Fax Class 2 only.



## 7.9. AT+FDFFC Data Compression Format Conversion

This command determines the ME response to a mismatch between the data format negotiated for the fax session, reported by the `<df>` subparameter, and the Phase C data desired by the controlling application, indicated by the optional `AT+FDT <df>` subparameter, or the `AT+FDIS <df>` subparameter for `AT+FDR` operation.

### Syntax

<p>Test Command</p> <p>AT+FDFFC=?</p> <p>Response(s)</p> <p>(list of <code>&lt;df&gt;</code>s)</p> <p>OK</p>	
<p>Read Command</p> <p>AT+FDFFC?</p> <p>Response(s)</p> <p><code>&lt;df&gt;</code></p> <p>OK</p>	
<p>Write Command</p> <p>AT+FDFFC=&lt;df&gt;</p> <p>Response(s)</p> <p>OK</p>	
<p>PIN ASC0 MUX1 MUX2 MUX3  Last</p> <p>- + + - - - -</p>	<p>Reference(s)</p> <p>EIA PN-2388</p>

### Parameter Description

<code>&lt;df&gt;</code> <sup>(num)</sup>	
[0]	Mismatch checking is always disabled. The controlling application has to check the <code>&lt;df&gt;</code> subparameter and transfer matching data.

### Notes

-  For further information see [AT+FDIS](#).
-  Used for Fax Class 2 only.



## 7.10. AT+FDIS Query or set session parameters

This command allows the controlling application to sense and constrain the capabilities used for the current session. It uses [AT+FDIS](#) to generate DIS or DTC messages directly, and uses [AT+FDIS](#) and received DIS messages to generate DCS messages.

### Syntax

Test Command

AT+FDIS=?

Response(s)

(list of [<vr>](#)s), (list of [<br>](#)s), (list of [<wd>](#)s), (list of [<ln>](#)s), (list of [<df>](#)s), (list of [<ec>](#)s), (list of [<bf>](#)s), (list of [<st>](#)s)  
OK

Read Command

AT+FDIS?

Response(s)

[<vr>](#), [<br>](#), [<wd>](#), [<ln>](#), [<df>](#), [<ec>](#), [<bf>](#), [<st>](#)  
OK

Write Command

AT+FDIS=[<vr>](#), [<br>](#), [<wd>](#), [<ln>](#), [<df>](#), [<ec>](#), [<bf>](#), [<st>](#)

Response(s)

OK

PIN	ASC0	MUX1	MUX2	MUX3	☎	Last
-	+	+	-	-	-	-

Reference(s)

EIA PN-2388

### Notes

- Used for Fax Class 2 only.



## 7.11. AT+FDR Begin or continue phase C Data Reception

The command initiates transition to Phase C data reception.

### Syntax

Exec Command	
AT+FDR	
Response(s)	
CONNECT	
or	
OK	
If error related to ME functionality	
ERROR	
PIN	ASC0
MUX1	MUX2
MUX3	🔔
Last	
-	+
+	-
-	-
-	-
Reference(s)	
EIA PN-2388	

### Notes

- Used for Fax Class 2 only.



## 7.12. AT+FDT Data Transmission

This command requests the ME to transmit a Phase C page. When the ME is ready to accept Phase C data, it issues the negotiation responses and the CONNECT result code to the application.

In Phase B, the **AT+FDT** command releases the ME to proceed with negotiation, and releases the DCS message to the remote station. In Phase C, the **AT+FDT** command resumes transmission after the end of a data stream transmitted before.

### Syntax

Exec Command

**AT+FDT**

Response(s)

CONNECT

Write Command

**AT+FDT=<df>, <vr>, <wd>, <ln>**

Response(s)

CONNECT

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + - - - -

Reference(s)

EIA PN-2388

### Notes

-  Used for Fax Class 2 only.



### 7.13. AT+FET End a page or document

This command indicates that the current page or partial page is complete. An ERROR response code results if this command is issued while the mode is on-hook.

#### Syntax

Write Command

```
AT+FET=<ppm>
```

Response(s)

```
OK
```

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	-	-	-	-

Reference(s)

EIA PN-2388

#### Parameter Description

<view><sup>(num)</sup>

Post Page Message Codes

1	Another document next
2	No more pages or documents
4	Another page, procedure interrupt
5	Another document, procedure interrupt

#### Notes

- Used for Fax Class 2 only.



## 7.14. AT+FK Kill operation, orderly FAX abort

This command causes the TA to terminate the session in an orderly manner.

### Syntax

Write Command
AT+FK
Response(s)
OK

PIN	ASC0	MUX1	MUX2	MUX3		Last
-	+	+	-	-	-	-

### Notes

- Used for Fax Class 2 only.



## 7.15. AT+FLID Query or set the Local Id setting capabilities

### Syntax

Test Command

AT+FLID=?

Response(s)

(max. length of Local ID string) (range of supported ASCII character values)

OK

Read Command

AT+FLID?

Response(s)

<lid>

OK

Write Command

AT+FLID=<lid>

Response(s)

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	-	-	-	-

Reference(s)

EIA PN-2388

### Parameter Description

<lid><sup>(num)</sup>

Local Polling ID string

Max. length and possible content as reported by test command. Default value is empty string ("").

### Note

- Used for Fax Class 2 only.
- See also [AT+FCIG](#).



## 7.16. AT+FMDL Identify Product Model

This command sends the model identification to the TA.

### Syntax

Write Command

AT+FMDL?

Response(s)

Gipsy Soft Protocolstack

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + - - - -

### Notes

-  Used for Fax Class 2 only.



## 7.17. AT+FMFR Request Manufacturer Identification

This command sends the model identification to the TA.

### Syntax

Write Command

AT+FMFR?

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + - - - -

### Notes

-  Used for Fax Class 2 only.



## 7.18. AT+FMI FAX: Report Manufactured ID

### **Syntax**

Test Command

AT+ FMI =?

Response(s)

OK

Exec Command

AT+ FMI

Response(s)

TA reports one or more lines of information text which permit the user to identify the manufacturer.

<manufacturer Id>

OK

Reference(s)

EIA/TIA-578-D

### **Parameter Description**

<manufacturer Id>

The ID of manufacturer



## 7.19. AT+FMM FAX: Rreport Model ID

### **Syntax**

Test Command

AT+FMM=?

Response(s)

OK

Exec Command

AT+FMM

Response(s)

TA reports one or more lines of information text which permit the user to identify the specific model of device.

<model Id>

OK

Reference(s)

EIA/TIA-578-D

### **Parameter Description**

<model Id>

The ID of model



## 7.20. AT+FMR FAX: Report Revision ID

### **Syntax**

Test Command

AT+FMR=?

Response(s)

OK

Exec Command

AT+FMR

Response(s)

TA reports one or more lines of information text which permit the user to identify the version, revision level or data or other information of the device.

Revision:<Revision Id>

OK

Reference(s)

EIA/TIA-578-D

### **Parameter Description**

<Revision Id>

The ID of model



## 7.21. AT+FOPT Set bit Order independently

Model specific command to set bit order independently of the understanding which is "mirrored" and which is direct.

### Syntax

Write Command

```
AT+FOPT=<opt>
```

Response(s)

```
OK
```

PIN	ASC0	MUX1	MUX2	MUX3	🔊	Last
-	+	+	-	-	-	-

### Parameter Description

<opt><sup>(num)</sup>

0	Non-standard
1	Standard

### Note

- Used for Fax Class 2 only.



## 7.22. AT+FPHCTO DTE Phase C Response Timeout

The timeout value `<tout>` determines how long the DCE will wait for a command after reaching the end of data when transmitting in Phase C. When timeout is reached, the DCE assumes that there are no more pages or documents to send.

### Syntax

Read Command

AT+FPHCTO?

Response(s)

`<tout>`

OK

Write Command

AT+FPHCTO=`<tout>`

Response(s)

OK

If error is related to ME functionality

ERROR

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + - - - -

Reference(s)

EIA PN-2388

### Parameter Description

`<tout>`<sup>(num)</sup>

Timeout

Value in 100ms units

0...30<sup>(P)</sup>...255

### Note

-  Used for Fax Class 2 only.



## 7.23. AT+FREV Identify Product Revision

This comand sends the revision identification to the TA.

### **Syntax**

Read Command

AT+FREV?

Response(s)

V2.550

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-----	------	------	------	------	---	------

-	+	+	-	-	-	-
---	---	---	---	---	---	---

### **Note**

- Used for Fax Class 2 only.



## 7.24. AT+FRH Receive Data Using HDLC Framing

The **AT+FRH** command enables the TA to receive frames using the HDLC protocol and the modulation schemes. An ERROR response code results if the command is issued while the modem is on-hook. The test command can be used in off-hook mode to check the modulation schemes supported by MG21.

### Syntax

Test Command

AT+FRH=?

Response(s)

In off-hook mode only:

+FRH:(list of <mod>s)

OK

In on-hook mode:

ERROR

Write Command

AT+FRH=<mod>

Response(s)

CONNECT

If error is related to ME functionality

ERROR

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	-	-	-	-

Reference(s)

TIA/EIA-578

### Note

- Used for Fax Class 1 only.



## 7.25. AT+FRM Receive Data

The **AT+FRM** command causes the TA to enter the receive mode, using one of the modulation schemes.

An ERROR response code results if the write command is issued while the modem is on-hook. The test command can be used in on-hook or off-hook mode to check the modulation schemes supported by MG21.

### Syntax

Test Command

**AT+FRM=?**

Response(s)

(list of **<mod>**s)

OK

Write Command

**AT+FRM=<mod>**

Response(s)

CONNECT

If error is related to ME functionality:

ERROR

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
-	+	+	-	-	-	-

Reference(s)

TIA/EIA-578

### Note

- Used for Fax Class 1 only.
- **<mod>**= 3 is not possible.



## 7.26. AT+FRS Receive Silence

`<time>=n` causes the TA to report an OK result code to the TE after the specified period of silence was detected on the line.

The command is aborted if any character is received by the TE. The modem discards the aborting character and issues an OK result code. An ERROR response code results if this command is issued while the mode is on-hook.

### Syntax

Write Command

```
AT+FRS=<time>
```

Response(s)

OK

If error is related to ME functionality:

ERROR

PIN	ASC0	MUX1	MUX2	MUX3	☞	Last
-	+	+	-	-	-	-

Reference(s)

TIA/EIA-578

### Parameter Description

`<time>`<sup>(num)</sup>

Number of 10 millisecond intervals

0...255

### Note

- Used for Fax Class 1 only.



## 7.27. AT+FTH Transmit Data Using HDLC Framing

The **AT+FTH** command causes the TA to transmit data using the HDLC protocol and the modulation schemes. An ERROR response code results if the command is issued while the modem is on-hook. The test command can be used in off-hook mode to check the modulation schemes supported by MG21.

### Syntax

Test Command

AT+FTH=?

Response(s)

In off-hook mode only:

+FTH:(list of <mod>s)

OK

In on-hook mode:

ERROR

Write Command

AT+FTH=<mod>

Response(s)

CONNECT

PIN	ASC0	MUX1	MUX2	MUX3	☞	Last
-	+	+	-	-	-	-

Reference(s)

TIA/EIA-578

### Note

■ Used for Fax Class 1 only.



## 7.28. AT+FTM Transmit Data

The **AT+FTM** command causes the TA to transmit data, using one of the modulation schemes.

An ERROR response code results if the write command is issued while the modem is on-hook. The test command can be used in on-hook or off-hook mode to check the modulation schemes supported by MG21.

### Syntax

Test Command

**AT+FTM=?**

Response(s)

(list of **<mod>**s)

OK

Write Command

**AT+FTM=<mod>**

Response(s)

CONNECT

If error is related to ME functionality:

ERROR

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
-	+	+	-	-	-	-

Reference(s)

TIA/EIA-578

### Note

- Used for Fax Class 1 only.
- **<mod>**= 3 is not possible



## 7.29. AT+FTS Stop Transmission and Wait

This command causes the TA to terminate a transmission and wait for `<time>` 10 millisecond intervals before sending the OK result code to the TE.

### Syntax

Write Command

```
AT+FTS=<time>
```

Response(s)

```
OK
```

```
In on-hook mode:
```

```
ERROR
```

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	-	-	-	-

Reference(s)

TIA/EIA-578

### Parameter Description

`<time>`<sup>(num)</sup>

no. of 10 millisecond intervals

0...85

### Note

- Used for Fax Class 1 only.



### 7.30. AT+FVRFC

### Vertical Resolution Format Conversion

This command determines the DCE response to a mismatch between the vertical resolution negotiated for the facsimile session and the Phase C data desired by the DTE.

#### Syntax

Test Command

AT+FVRFC=?

Response(s)

(list of supported <vrfc>s)

OK

Read Command

AT+FVRFC?

Response(s)

<vrfc>

OK

Write Command

AT+FVRFC=<vrfc>

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + - - - -

Reference(s)

EIA PN-2388

#### Parameter Description

<vrfc><sup>(num)</sup>

- |     |  |
|-----|--|
| 0   | Disable mismatch checking.   |
| [2] | Enable mismatch checking, with resolution conversion of 1-D data in the DCE, and an implied <b>AT+FK</b> command executed on 2-D mismatch detection. |

#### Note

- Used for Fax Class 2 only.



## 8. SMS Commands



The AT Commands described in this chapter used to operate with Short Message Service (SMS).

SMS
AT+CCODE
AT+CMGC
AT+CMGD
AT+CMGDA
AT+CMGF
AT+CMGHEX
AT+CMGL
AT+CMGR
AT+CMGS
AT+CMGW
AT+CMSS
AT+CNMA
AT+CNMI
AT+CPMS
AT+CRES
AT+CSAS
AT+CSCA
AT+CSCB
AT+CSDH
AT+SCLASS0
AT+CSMP
AT+CSMS
AT^SLMS
AT^SMGL
AT^SMGO
AT^SMGR
AT^SSCONF
AT^SSDA
AT^SSMSS



## 8.1. AT+CMGC Send SMS Command

### Syntax

Test Command

AT+CMGC=?

Response(s)

OK

Read Command

If text mode (see [AT+CMGF=1](#))

AT+CMGC=<fo>, <ct>[, <pid>[, <mn>[, <da>[, <toda>]]]]<CR> Text can be entered <CTRL-Z>/<ESC>

Response(s)

+CMGC: <mr>[, <scts>]

If sending fails

ERROR

+CMS ERROR: <err>

Write Command

If PDU mode (see [AT+CMGF=0](#))

AT+CMGC=<length><CR> PDU can be entered <CTRL-Z>/<ESC>

Response(s)

+CMGC: <mr>[, <ackpdu>]

OK

If sending fails

ERROR

+CMS ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
+	+	+	+	+	-	-

Reference(s)

GSM 07.05

### Notes

- 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 guard input period.
- In general but especially at baudrates below 19200 it is recommended to only use the command line termination character ([ATS3](#)) before starting text or PDU input. Use of line termination character followed by an additional response formatting character ([ATS4](#)) may cause the problem that the latter will become part of the input data.



## 8.2. 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: <err>
```

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
+	+	+	+	+	-	-

Reference(s)

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 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.



### 8.3. AT+CMGDA Delete All SMS

#### **Syntax**

Test Command

AT+CMGDA=?

Response(s)

+CMGDA: (listed of supported <type>s)

OK

+CMS ERROR: <err>

Read Command

AT+CMGDA=<type>

Response(s)

OK

ERROR

+CMS ERROR: <err>

#### **Parameter Description**

<text>

1) If text mode:

“DEL READ”	delete all read messages
“DEL UNREAD”	delete all unread messages
“DEL SENT”	delete all sent SMS
“DEL UNSENT”	delete all unsent SMS
“DEL INBOX”	delete all received SMS
“DEL ALL”	delete all SMS

2) If PDU mode :

1	delete all read messages
2	delete all unread messages
3	delete all sent SMS
4	delete all unsent SMS
5	delete all received SMS
6	delete all SMS



## 8.4. AT+CMGF      Select SMS message format

The **AT+CMGF** command specifies the input and output format of the short messages.

### Syntax

<p>Test Command</p> <p>AT+CMGF=?</p> <p>Response(s)</p> <p>+CMGF: (list of supported&lt;mode&gt;s)</p> <p>OK</p>															
<p>Read Command</p> <p>AT+CMGF?</p> <p>Response(s)</p> <p>+CMGF: &lt;mode&gt;</p> <p>OK</p> <p>ERROR</p> <p>+CMS ERROR: &lt;err&gt;</p>															
<p>Write Command</p> <p>AT+CMGF=&lt;mode&gt;</p> <p>Response(s)</p> <p>OK</p> <p>ERROR</p> <p>+CMS ERROR: &lt;err&gt;</p>															
<table border="1"> <tr> <td>PIN</td> <td>ASC0</td> <td>MUX1</td> <td>MUX2</td> <td>MUX3</td> <td>🔕</td> <td>Last</td> </tr> <tr> <td>-</td> <td>+</td> <td>+</td> <td>+</td> <td>+</td> <td>-</td> <td>-</td> </tr> </table>	PIN	ASC0	MUX1	MUX2	MUX3	🔕	Last	-	+	+	+	+	-	-	<p>Reference(s)</p> <p>GSM 07.05</p>
PIN	ASC0	MUX1	MUX2	MUX3	🔕	Last									
-	+	+	+	+	-	-									

### Parameter Description

<mode>	(num)(&w)(&v)
[0] <sup>(&amp;F)</sup>	PDU mode
1	Text mode



## 8.5. AT+CMGHEX Enable To Send Non-ASCII Character SMS

### Syntax

Test Command

```
AT+CMGHEX=?
```

Response(s)

```
+CMGHEX: (0,1)  
OK
```

Read Command

```
AT+CMGHEX?
```

Response(s)

```
+CMGHEX: <mode>  
OK
```

Write Command

```
AT+CMGHEX=<mode>
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<mode><sup>(num)</sup>

0	Send SMS in ordinary way
1	Enable to send SMS varying from 0x00 to 0x7f except 0x1a and 0x1b under text mode and GSM character set

### Notes

- Only be available in TEXT mode and +CSCS="GSM".
- It is not supported temporarily.



## 8.6. 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

Read 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: <err>

PIN	ASC0	MUX1	MUX2	MUX3	🔕	Last
+	+	+	+	+	-	-

Reference(s)

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.
- The parameters <ra> and <tora> will only be displayed if parameter <mode> of the AT^SSCONF command is set to 1.
- 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 “Restricted access to SIM data after SIM PIN authentication for further detail”.



## 8.7. 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'.

When using Text mode it is recommended to set `AT+CSDH=1`. In this case the `AT+CMGR` write command responses will include detailed header information. See `AT+CSDH` for details. The parameters `<ra>` and `<tora>` will only be displayed if parameter `<mode>` of the `AT+SSCONF` command is set to 1.

### 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>, <dc>, <sca>, <tosca>, <length>]

<data>

[...]

OK

For SMS-SUBMIT

+CMGR: <stat>, <da>, [`<alpha>`][, <toda>, <fo>, <pid>, <dc>, [`<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: <err>
```

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	+	+	-	-

Reference(s)

GSM 07.05

### Notes

- Response if [AT+CMGR](#) is used to read an empty record index: +CMGR: 0,,0
- Response if [AT+CMGR](#) is used to read a non-existent record index: +CMS ERROR: invalid memory index
- 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.



## 8.8. AT+CMGS Send SMS

**AT+CMGS** write command transmits a short message 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 guard the input period.

To abort sending use <ESC>. Abortion is acknowledged with "OK", though the message will not be sent.

The message reference **<mr>** is returned by the ME 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

<p>Test Command</p> <p>AT+CMGS=?</p> <p>Response(s)</p> <p>OK</p>															
<p>Read Command</p> <p>If text mode (see <a href="#">AT+CMGF=1</a>)</p> <p>AT+CMGS=&lt;da&gt;[, &lt;toda&gt;]&lt;CR&gt; Text can be entered. &lt;CTRL-Z&gt;/&lt;ESC&gt;</p> <p>Response(s)</p> <p>+CMGS: &lt;mr&gt;[, &lt;scts&gt;]</p> <p>OK</p> <p>If sending fails see notes below.</p>															
<p>Write Command</p> <p>If PDU mode (see <a href="#">AT+CMGF=0</a>)</p> <p>AT+CMGS=&lt;length&gt;&lt;CR&gt; PDU can be entered. &lt;CTRL-Z&gt;/&lt;ESC&gt;</p> <p>Response(s)</p> <p>+CMGS: &lt;mr&gt;[, &lt;ackpdu&gt;]</p> <p>OK</p> <p>If sending fails see notes below.</p>															
<table border="1"> <thead> <tr> <th>PIN</th> <th>ASC0</th> <th>MUX1</th> <th>MUX2</th> <th>MUX3</th> <th>🔔</th> <th>Last</th> </tr> </thead> <tbody> <tr> <td>+</td> <td>+</td> <td>+</td> <td>+</td> <td>+</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last	+	+	+	+	+	-	-	<p>Reference(s)</p> <p>GSM 07.05</p>
PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last									
+	+	+	+	+	-	-									

### Notes

- If sending fails, for example, if a message is too long, the result code depends on the current setting of the [AT^SM20](#) command:
  - If the [AT^SM20 <CmgwMode>](#) equals 1 (factory default) any failure to send a message is responded with "OK".
  - Users should be aware, that despite the "OK" response, the message will not be sent to the subscriber. If the [AT^SM20 <CmgwMode>](#) equals 0 any failure to send a message is responded with "ERROR".
- If sending fails due to timeout, then [AT^SM20 <CmgwMode>=1](#) causes "+CMS ERROR: unknown error" to be returned;



`AT^SM20 <CmgwMode>=0` causes "+CMS ERROR: timer expired" to be returned.

- 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).
- All characters entered behind the prompt ">" will be recognized as GSM characters. For example, "Backspace" (ASCII character 8) does not delete a character, but will be inserted into the short message as an additional physical character. As a result, the character you wanted to delete still appears in the text, plus the GSM code equivalent of the Backspace key.
- **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.  
In case UCS2 character set selected it is highly recommended to set Data Coding Scheme (<dcs> of AT+CSMP) to 16-bit data, otherwise the length of sms user data is restricted to 88 octets. Even better for messages with UCS2 character set is the PDU Mode.
- In general but especially at baudrates below 19200 it is recommended to only use the command line termination character (ATS3) before starting text or PDU input. Use of line termination character followed by an additional response formatting character (ATS4) may cause the problem that the latter will become part of the input data.
- During a pending USSD user interaction the AT+CMGS write command returns "+CME ERROR: operation temporary not allowed" to prevent blocking situations.



## 8.9. AT+CMGW Write Short Messages to Memory

**AT+CMGW** 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>`. After the prompt a timer will be started to observe the input. To abort writing use `<ESC>`. Abortion is acknowledged with "OK", though the message will not be saved.

Message Length in Text Mode: The maximum length of a short message depends on the used coding scheme configured with `<dcs>` of **AT+CSMP**:

7 bit GSM coding scheme: 160 characters

8 bit GSM coding scheme: 140 characters

16 bit GSM coding scheme: 70 characters.

The length of 8-bit data coded short messages has to be greater than 0.

For more information on data coding schemes and character sets refer to GSM 03.08.

### 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

If writing fails

ERROR

+CMS ERROR: `<err>`

Write Command

If text mode (see **AT+CMGF=1**):

AT+CMGW=`<oa>/<da>`[, [`<toa>/<toda>`]], `<stat>`]`<CR>` Text can be entered. `<CTRL-Z>/<ESC>`

Response(s)

+CMGW: `<index>`

OK

If writing fails see notes below.

Write Command



If PDU mode (see [AT+CMGF=0](#)):  
 AT+CMGW=<length>[, <stat>]<CR> PDU can be entered. <CTRL-Z>/<ESC>

Response(s)

+CMGW: <index>

OK

If writing fails see notes below.

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + + + - -

Reference(s)

GSM 07.05, 03.38

## Notes

- If writing fails, for example, if a message is too long, the result code depends on the current setting of the [AT^SM20](#) command:
  - If the [AT^SM20 <CmgwMode>=1](#) (factory default) any failure to send a message is responded with "OK". Users should be aware, that despite the "OK" response, the message will not be written to the selected SMS stor-age.
  - If the [AT^SM20 <CmgwMode>](#) equals 0 any failure to write a message is responded with "ERROR".
- If writing fails due to timeout, then
  - [AT^SM20 <CmgwMode>=1](#) causes "+CMS ERROR: unknown error" to be returned;
  - [AT^SM20 <CmgwMode>=0](#) causes "+CMS ERROR: timer expired" to be returned.
- 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).
- In general but especially at baudrates below 19200 it is recommended to only use the command line termination character ([ATS3](#)) before starting text or PDU input. Use of line termination character followed by an additional response formatting character ([ATS4](#)) may cause the problem that the latter will become part of the input data.
- SMS-COMMANDs and SMS-STATUS-REPORTs cannot be stored in text mode.
- All characters entered behind the ">" prompt will be recognized as GSM characters. For example, "Backspace" (ASCII character 8) does not delete a character, but will be inserted into the short message as an additional physical character. As a result, the character you wanted to delete still appears in the text, plus the GSM code equivalent of the Backspace key.



## 8.10. 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

Exec Command

If text mode (AT+CMGF=1):

AT+CMSS=<index>[, <da>[, <toda>]]

Response(s)

+CMSS: <mr>[, <scts>]

OK

If sending fails

ERROR

+CMS ERROR: <err>

Write Command

If PDU mode (AT+CMGF=0):

AT+CMSS=<index>[, <da>[, <toda>]]

Response(s)

+CMSS: <mr>[, <ackpdu>]

OK

If sending fails

ERROR

+CMS ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + + + - -

Reference(s)

GSM 07.05,



## 8.11. AT+CNMA New Message Acknowledgement to ME/TE

Write and execute command confirm successful receipt of a new message (SMS-DELIVER or SMS-STATUS-REPORT) routed directly to the TE.

MG21 will not send another "+CMT" or "+CDS" URC to the TE until previous one is acknowledged with this command. If the ME does not receive acknowledgement within required time (network timeout), it sends an "RP-ERROR" message to the network. The ME will automatically disable routing to the TE 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

+CME ERROR: <err>

Write Command

AT+CNMA=<n>

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + + + - -

Reference(s)

GSM 07.05

### Parameter Description

<n><sup>(num)</sup>

Parameter required only for PDU mode.

0 Command operates similarly as in text mode.

### Notes

- Execute and write command shall only be used if AT+CSMS parameter <service> equals 1 (= phase 2+).



- Execute command can be used no matter whether text mode or PDU mode is activated. Write command is designed for the PDU mode only.
- If multiplex mode is activated (`AT+CMUX=0`) the `AT+CNMI` parameter will be set to zero on all channels, if one channel fails to acknowledge an incoming message within the required time.



## 8.12. AT+CNMI SMS Event Reporting Configuration

**AT+CNMI** controls details of the SMS related URC presentation. It selects the procedure how the receipt of a new SMS from the network is indicated to the TE when TE is active, e.g. DTR signal is ON.

If the 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 (V.250 command **AT&D0**, 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 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  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + + + - -

#### Reference(s)

GSM 07.05

### Unsolicited Result Codes

#### URC 1

<mt>=1:

+CMTI: <mem3>, <index>

Indicates that new message has been received

#### URC 2

<mt>=2 (PDU mode enabled):

+CMT: <length><CR><LF><pdu>



Indicates that new message has been received

#### URC 3

<mt>=2 (text mode enabled):

+CMT: <oa>, <scts>[, <tooa>, <fo>, <pid>, <dc>, <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>, <dc>, <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><sup>(num)(&w)(&v)</sup>

- |                         |  |
|-------------------------|--|
| [0] <sup>(&amp;F)</sup> | SMS related URCs are always buffered in the ME. If the buffer is full, the oldest indications are discarded and replaced with newly received indications.              |
| 1                       | SMS related URCs are forwarded directly to the TE. However, if this is not possible because ME-TE link is reserved, e.g. during a data call, these URCs are discarded. |



- 2 SMS related URCs are forwarded directly to the TE. However, if this is not possible because ME-TE link is reserved these URCs are buffered and flushed to the TE afterwards.
- 3 SMS related URCs are forwarded directly to the TE. However, if this is not possible because ME-TE link is reserved these URCs are buffered and flushed to the TE afterwards.  
Additionally, while ME-TE link is reserved, buffered URCs are signaled to the TE via sending a BREAK or activating the RING line, according to [AT^SCFG](#) parameters [<uri>](#), [<udri>](#) and [<urat>](#).

#### [<mt>](#)<sup>(num)(&vw)(&v)</sup>

Rules for storing received short messages depend on the relevant data coding method (refer to GSM 03.38), preferred memory storage ([AT+CPMS](#)) setting and this value.

Note: If AT command interface is acting as the only display device, the ME must support storage of class 0 messages and messages in the message waiting indication group (discard message)

- [0]<sup>(&F)</sup> No SMS-DELIVER indications are routed to the TE.
- 1 If SMS-DELIVER is stored in the ME, indication of the memory location is routed to the TE via URC.
  - 2 SMS-DELIVERS, except class 2 messages and messages in the message waiting indication group (store message) are routed directly to the TE via URC.
  - 3 Class 3 SMS-DELIVERS are routed directly to the TE using URCs defined in [<mt>=2](#). Messages of other data coding schemes result in indication as defined in [<mt>=1](#).

#### [<bm>](#)<sup>(num)(&vw)(&v)</sup>

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]<sup>(&F)</sup> No CBM indications are routed to the TE.
- 2 New CBMs are routed directly to the TE via URC.
  - 3 Class 3 CBMs are routed directly to TE using URCs defined in [<bm>=2](#).



**<ds>**<sup>(num)(&W)(&V)</sup>

- [0]<sup>(&F)</sup> No SMS-STATUS-REPORTs are routed to the TE.
- 1 SMS-STATUS-REPORTs are routed to the TE via URC.
- 2 If SMS-STATUS-REPORT is routed into ME, indication of the memory location is routed to the TE via URC.

**<bfr>**<sup>(num)(&V)</sup>

- [1]<sup>(&F)</sup> ME's buffer of SMS related URCs is cleared when **<mode>** changes from 0 to 1, 2 or 3.

**<index>**<sup>(num)(&W)(&V)</sup>

Integer type; value in the range of location numbers supported by the associated memory

### Notes

- Parameters **<mt>**=2,3 and **<ds>**=1 are only available with GSM phase 2+ (see **AT+CSMS=1**). Incoming SMs or Status Reports have to be acknowledged with **AT+CNMA=0** when using these phase 2+ parameters.
- Requirements specific to Multiplex mode:  
In multiplex mode (**AT+CMUX=0**) only one channel can use a phase 2+ parameter. The parameter for **<mt>** and **<ds>** on the other channels have to be set to zero. If either a SM or a Status Report is not acknowledged, all **AT+CNMI** parameter in all channels will be set to zero.
- If the ME operates on different instances (MUX channels 1, 2, 3 or ASC0) avoid different settings for routing and indicating short messages. For example, if messages shall be routed directly to one instance of the TE (set with **AT+CNMI**, **AT^SSDA**), it is not possible to activate the presentation of URCs with **AT+CMER** or **AT+CNMI** on another instance. Any attempt to activate settings that conflict with existing settings on another interface, will result in "+CME ERROR", or accordingly "+CMS ERROR".
- Handling of Class 0 short messages:  
If the host application is provided with a display and **AT^SSDA=1** has been set Class 0 short messages can be displayed immediately.  
If the host application does not include a display, ME handles Class 0 short messages as though there was no message class, i.e. it will ignore bits 0 and 1 in the **<dc>** and normal rules for exceeded memory capacity shall apply. This approach is compliant with GSM 03.38.
- The parameters **<ra>** and **<tora>** will only be displayed if **<mode>** of the **AT^SSCONF** command is set to 1.
- If either a SM or a Status Report is not acknowledged, all **AT+CNMI** parameter in all channels will be set to zero.



### 8.13. 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: [<err>](#)

Write Command

AT+CPMS=[<mem1>](#)[, [<mem2>](#) [, [<mem3>](#) ]]

Response(s)

+CPMS: [<used1>](#), [<total1>](#), [<used2>](#), [<total2>](#), [<used3>](#), [<total3>](#)  
OK  
ERROR  
+CMS ERROR: [<err>](#)

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + + + - -

Reference(s)

GSM 07.05

#### Parameter Description

[<used1>](#)<sup>(num)</sup>

Number of messages currently in [<mem1>](#)

[<used2>](#)<sup>(num)</sup>

Number of messages currently in [<mem2>](#)

[<used3>](#)<sup>(num)</sup>

Number of messages currently in [<mem3>](#)



<total1><sup>(num)</sup>

Number of messages storable in <mem1>

<total2><sup>(num)</sup>

Number of messages storable in <mem2>

<total3><sup>(num)</sup>

Number of messages storable in <mem3>

### Notes

- The Mobile Equipment storage "ME" offers space for 25 short messages, see <mem1>.
- "MT" is the sum of "ME" (= 25 locations) and "SM" (capacity varies with SIM card). The indices <index> of the "MT" storage are dependent on the order selected with [AT^SSMSS](#)
- The <mem1>, <mem2> and <mem3> parameter will be stored in non-volatile memory.
- The user should be aware that the setting "MT" involves "ME" and "SM", with "ME" being filled up first. If the "ME" storage is full, MG21 will proceed with the "SM" storage. 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. As a result, the ^SMGO: 2 indication (see [AT^SMGO](#)) may be presented without prior indication of ^SMGO: 1. For more information regarding SIM and ME specific message classes refer to <dc> and the following specifications: GSM 03.38 and 3GPP TS23038.
- When <mem3> is switched over from "MT" to "SM" all free "ME" locations will be filled with dummy short messages. This procedure can take up to 35 seconds, until all the 25 records are written. If switching from "MT" to "SM" was not finished due to error or user break, the value of <mem3> remains "MT", but some of the dummy records remain in the "ME" storage. These records have to be deleted manually. When <mem3> equals "SM", do not delete the dummy messages in the "ME" storage. They will be automatically deleted when you switch back from "SM" to "MT". Again, this may take up to 35 seconds. If switching from "SM" to "MT" was not finished due to an error or user break, the value of <mem3> remains "SM", but the "ME" storage will no longer be filled with dummy records. New incoming short messages may now be written to the "ME" storage, if "SM" is already full. To avoid this, repeat the [AT+CPMS](#) command as soon as possible to switch <mem3> back to "MT". As an alternative, you can manually delete the dummy records and issue [AT+CPMS=MT,MT,MT](#).
- Multiplexer: In Multiplex mode or when the two physical serial interfaces are connected, the parameter <mem3> will be the same on all instances, but the settings of <mem1> and <mem2> may vary on each channel / interface. As a result, changes on parameter <mem1> and/or <mem2> before activating the multiplexer or differences values for other instances can result in not desired behaviours like different outputs for [AT+CMGL](#) and so on.



- 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 when using this AT command quickly after SIM PIN authentication the SIM data may not yet be accessible, resulting in a short delay before the requested AT command response is returned.
- The indices `<index>` of the storage are dependent on the order selected with `AT^SSMSS`.



## 8.14. AT+CRES Restore SMS Settings

### Syntax

Test Command

AT+CRES=?

Response(s)

+CRES: (list of supported <profile>s)  
OK

Exec Command

AT+CRES

Response(s)

Same as AT+CRES=0.  
OK

If error is related to ME functionality:  
+CMS ERROR <err>

Write Command

AT+CRES=<profile>

Response(s)

TA restores SMS settings for +CSCA, +CSMP from non-volatile memory to active memory.  
OK

If error is related to ME functionality:  
ERROR

PIN ASC0 MUX1 MUX2 MUX3 ☎ Last

+ + + + + - -

Reference(s)

GSM 07.05

### Parameter Description

<profile><sup>(num)</sup>

- |   |  |
|---|--|
| 0 | Restore SM service settings from profile 0 |
| 1 | Restore SM service settings from profile 1 |



## 8.15. AT+CSAS      Save SMS Settings

### Syntax

Test Command

AT+CSAS=?

Response(s)

+CSAS: (list of supported <profile>s)  
OK

Exec Command

AT+CSAS

Response(s)

Same as AT+CSAS=0

OK

If error is related to ME functionality:

ERROR

Write Command

AT+CSAS=<profile>

Response(s)

TA saves SMS settings for +CSCA, +CSMP from non-volatile memory to active memory.

OK

If error is related to ME functionality:

ERROR

Reference(s)

GSM 07.05

### Parameter Description

<profile><sup>(num)</sup>

0                      Save SM service setting in profile 0

1                      Save SM service setting in profile 1



## 8.16. 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: <code>&lt;sca&gt;</code> , <code>&lt;tosca&gt;</code>	
OK	
Write Command	
AT+CSCA= <code>&lt;sca&gt;</code> [, <code>&lt;tosca&gt;</code> ]	
Response(s)	
OK	
PIN ASC0 MUX1 MUX2 MUX3 🔔 Last	Reference(s)
+ + + + + - -	GSM 07.05

### Notes

- In case of using no parameter after AT+CSCA= the content of `<sca>` will be deleted.
- This command writes the service center address to non-volatile memo.
- The SMS service center address should be entered as specified by the service provider.



## 8.17. AT+CSCB Select Cell Broadcast Message Indication

The test command returns the supported modes as a compound value. The write command selects which types of CBMs are to be received by the ME.

### Syntax

Test Command

AT+CSCB=?

Response(s)

+CSCB: (list of supported [<mode>s](#))

OK

Read Command

AT+CSCB?

Response(s)

+CSCB: [<mode>](#), [<mids>](#), [<dcss>](#)

OK

Write Command

AT+CSCB=[<mode>](#) [, [<mids>](#) [, [<dcss>](#) ]]

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + + + - -

Reference(s)

GSM 07.05

### Parameter Description

[<mode>](#)<sup>(num)</sup>

Message mode

0<sup>(&F)</sup>

Accept messages that are defined in [<mids>](#) and [<dcss>](#)

1

Forbid messages that are defined in [<mids>](#) and [<dcss>](#)



## <mids><sup>(str)</sup>

### Cell Broadcast Message ID specification

[`""`]<sup>(&F)</sup> default value of this parameter is empty string, and it means that no CBM identifiers are specified.

- For `<mode>=0`: Six different possible combinations of CBM IDs (e.g. "0,1,5,320-478,922,2000-3000"). In certain configurations, e.g. if using SIMs that contain data in Elementary File EF-CBMID (Cell Broadcast Message Identifier for Data download) less than six combinations may be available. To access a SIM's Elementary File data refer to command [AT+CRSM](#).
- For `<mode>=1`: One CBM ID or range of IDs (e.g. "320-478").

## <dcss><sup>(str)</sup>

### CBM data coding scheme specification

[`""`]<sup>(&F)</sup> default value of this parameter is empty string

All different possible combinations of CBM data coding schemes (e.g. "0-3,5"). Using default empty string leads to get all CBMs independent of their dcss.

A given `<dcss>` replaces any former value and is used for consecutive requests.



## 8.18. AT+CSDH Show SMS text mode parameters

The write command sets whether or not detailed header information is shown in text mode result codes.

### Syntax

Test Command

AT+CSDH=?

Response(s)

+CSDH: (list of supported [<show>s](#))

OK

Read Command

AT+CSDH?

Response(s)

+CSDH:[<show>](#)

OK

Write Command

AT+CSDH=[<show>](#)

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + + + - -

### Parameter Description

[<show>](#)<sup>(num)(&W)</sup>

[0]<sup>(&F)</sup>

Do not show header values defined in commands [AT+CSCA](#) and [AT+CSMP](#) ([<sca>](#), [<tosca>](#), [<fo>](#), [<vp>](#), [<pid>](#) and [<dcs>](#)) nor [<length>](#), [<toda>](#) or [<tooa>](#) in "+CMTI", [AT+CMGL](#), [AT+CMGR](#) result codes for SMS-DELIVERs and SMS-SUBMITs in text mode; for SMS-COMMANDs in +CMGR result code, do not show [<pid>](#), [<mn>](#), [<da>](#), [<toda>](#), [<length>](#) or [<cdata>](#)

1

Show the values in result codes



## 8.19. AT+SCLASS0 Store Class 0 SMS To SIM When Received Class 0 SMS

### Syntax

Test Command

```
AT+SCLASS0=?
```

Response(s)

```
+SCLASS0: (0, 1)  
OK
```

Read Command

```
AT+SCLASS0?
```

Response(s)

```
+SCLASS0: <mode>  
OK
```

Write Command

```
AT+SCLASS0=[<mode>]
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<mode><sup>(num)</sup>

0	disable to store Class 0 SMS to SIM when received Class 0 SMS
1	Enable to store Class 0 SMS to SIM when received Class 0 SMS

### Note

- It is not supported temporarily.



## 8.20. AT+CSMP Set SMS text Mode Parameters

The write command selects values for additional parameters needed when the short message is sent to the net-work 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>, <dc>

OK

Write Command

AT+CSMP=<fo>[, <vp>/<scts>[, <pid>[, <dc>]]]

Response(s)

OK

ERROR

+CMS ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	+	+	-	-

Reference(s)

GSM 07.05

### Parameter Description

<fo><sup>(num)</sup>

First Octet

depending on the command or result code: first octet of GSM 03.40 SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format

0...17<sup>(&F)</sup>...255



**<vp>**<sup>(num)</sup>

Depending on SMS-SUBMIT **<fo>** setting: GSM 03.40 TP-Validity-Period either in integer format or in time-string format (refer **<dt>**)

0...167<sup>(&F)</sup>...255

**<dc>**<sup>(num)</sup>

Data Coding Scheme

GSM 03.38 SMS Data Coding Scheme, or Cell Broadcast Data Coding Scheme in integer format

0<sup>(&F)</sup>...247

**<pid>**<sup>(num)</sup>

Protocol Identifier

GSM 03.40 TP-Protocol-Identifier in integer format

0<sup>(&F)</sup>...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.



## 8.21. AT+CSMS Select Message Service

### Syntax

<p>Test Command</p> <p>AT+CSMS=?</p> <p>Response(s)</p> <p>+CSMS: (list of supported&lt;service&gt;s)</p> <p>OK</p>	
<p>Read Command</p> <p>AT+CSMS?</p> <p>Response(s)</p> <p>+CSMS: &lt;service&gt;, &lt;mt&gt;, &lt;mo&gt;, &lt;bm&gt;</p> <p>OK</p>	
<p>Write Command</p> <p>AT+CSMS=&lt;service&gt;</p> <p>Response(s)</p> <p>+CSMS: &lt;mt&gt;, &lt;mo&gt;, &lt;bm&gt;</p> <p>OK</p> <p>ERROR</p> <p>+CMS ERROR: &lt;err&gt;</p>	
<p>PIN ASC0 MUX1 MUX2 MUX3  Last</p> <p>+ + + + + - -</p>	<p>Reference(s)</p> <p>GSM 07.05</p>

### Parameter Description

<service> <sup>(num)(&amp;vv)(&amp;v)</sup>	
0 <sup>(&amp;F)</sup>	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>`<sup>(num)(&v)</sup>

Mobile Terminated Messages:

0	Type not supported
1	Type supported

`<mo>`<sup>(num)(&v)</sup>

Mobile Originated Messages:

0	Type not supported
1	Type supported

`<bm>`<sup>(num)(&v)</sup>

Broadcast Type Messages:

0	Type not supported
1	Type supported

### Notes

- If CSMS mode is switched from Phase 2+ to Phase 2 and one or more [AT+CNMI](#) Parameter are Phase 2+ specific a "+CMS ERROR: unknown error" will appear. It is recommended to switch the [AT+CNMI](#) Parameters to Phase 2 specific values before entering Phase 2.
- Phase 2+ ([<service>](#)=1) must be set before the following features can be used:
  - Configuring procedures for indicating received short messages with the [AT+CNMI](#) parameters [<mt>](#)=2 or [<mt>](#)=3 and [<ds>](#)=1.
  - Acknowledging incoming short messages with [AT+CNMA](#).
  - Receiving Status Reports and acknowledging them with [AT+CNMA](#).



## 8.22. AT^SLMS List SMS Memory Storage

**AT^SLMS** indicates the max. capacity of each SMS storage type and the number of locations currently used.

### Syntax

Test Command

```
AT^SLMS=?
```

Response(s)

```
OK
```

Exec Command

```
AT^SLMS?
```

Response(s)

```
^SLMS: "MT",<total3>, <used3>
```

```
^SLMS: "SM",<total1>, <used1>
```

```
^SLMS: "ME",<total2>, <used2>
```

```
OK
```

```
ERROR
```

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

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-----	------	------	------	------	---	------

+	+	+	+	+	-	-
---	---	---	---	---	---	---

### Parameter Description

<total1><sup>(num)</sup>

Maximum number of messages storable in the SMS memory of the SIM (physical storage "SM")

<total2><sup>(num)</sup>

Maximum number of messages storable in the SMS memory of the Mobile Equipment (physical storage "ME")

<total3><sup>(num)</sup>

Sum of "SM" and "ME", indicated as "MT". Maximum number of all messages storable in the SIM memory and the Mobile Equipment memory.



<used1><sup>(num)</sup>

Number of messages currently stored in the SMS memory of the SIM (physical storage "SM")

<used2><sup>(num)</sup>

Number of messages currently stored in the SMS memory of the Mobile Equipment (physical storage "ME")

<used3><sup>(num)</sup>

Concatenated logical SMS storages of SIM ("SM") and Mobile Equipment ("ME"). Sum of all messages currently stored, indicated as "MT".

### **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.



## 8.23. AT^SMGL List Short Messages from preferred store without setting status to REC READ

The write command allows to select a status type and lists, from the message storage `<mem1>`, all messages that currently have the specified `<stat>`. The major difference over the standard command `AT+CMGL` is that the status of the listed messages remains `unread` (unread remains unread).

The execute command is the same as the write command, but uses the given default of `<stat>`.

### Syntax

Test Command

```
AT^SMGL=?
```

Response(s)

same as `AT+CMGL`

Exec Command

```
AT^SMGL
```

Response(s)

```
^SMGL: (default values of <stat>)
```

```
OK
```

Write Command

```
AT^SMGL=<stat>
```

Response(s)

same as `AT+CMGL`

PIN	ASC0	MUX1	MUX2	MUX3	☞	Last
-----	------	------	------	------	---	------

+	+	+	+	+	-	-
---	---	---	---	---	---	---

### 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 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.



## 8.24. AT^SMGO Set or query SMS overflow presentation mode or query SMS overflow

The write command sets the overflow presentation mode.

The read command returns the overflow presentation mode and the SMS overflow status.

### Syntax

Test Command

AT^SMGO=?

Response(s)

^SMGO: (list of supported<n>s) OK

Read Command

AT^SMGO?

Response(s)

^SMGO: <n>, <mode>  
OK  
ERROR  
+CMS ERROR: <err>

Write Command

AT^SMGO=<n>

Response(s)

OK  
ERROR  
+CMS ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + + + - -

### Unsolicited Result Code

SMS buffer change:

^SMGO: <mode>

Status of SMS buffer has changed.



### Parameter Description

<n><sup>(num){&W}{&V}</sup>

SMS overflow presentation mode

[0] <sup>(&amp;F)</sup>	Disable
1	Enable

<mode><sup>(num){&V}</sup>

SMS overflow status

0	Space available
1	SMS buffer full (The buffer for received short messages is <mem3>. See <a href="#">AT+CPMS</a> .)
2	Buffer full and new message waiting in SC for delivery to phone

### Notes

- Incoming short messages with message class 1 (ME specific short messages) or class 2 (SIM specific short messages), see <dc> in GSM 03.38, will be stored either in "ME" or in "SM" storage. Therefore the "^SMGO: 2" indication could occur, without issuing the indication "^SMGO: 1" before. The indication "^SMGO: 1" means that both buffers ("ME" and "SM") are full.
- For more information regarding SIM and ME specific message classes refer to <dc> and the following specifications: GSM 03.38 and 3GPP TS 23.038 .



## 8.25. AT^SMGR Read short message without setting status to REC READ

The [AT^SMGR](#) command is a proprietary command which has the same syntax as [AT+CMGR](#). The only functional difference is that the status "REC UNREAD" of a short message is not overwritten to "REC READ".

### Syntax

Test Command

```
AT^SMGR=?
```

Response(s)

```
^SMGR:
```

```
OK
```

Write Command

```
AT^SMGR=<index>
```

Response(s)

see [AT+CMGR](#)

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
-----	------	------	------	------	---	------

+	+	+	+	+	-	-
---	---	---	---	---	---	---

### Note

- Users should be aware that when using this AT command quickly after SIM PIN authentication the SIM data may not yet be accessible, resulting in a short delay before the requested AT command response is returned.



## 8.26. AT^SSCONF SMS Command Configuration

**AT^SSCONF** controls the presentation of the SMS parameters **<ra>** and **<tora>**. **<ra>** and **<tora>** are indicated within the result codes of **AT+CMGL**, **AT^SMGL**, **AT+CMGR**, **AT^SMGR** and the URC **" +CDS"**.

### Syntax

Test Command

```
AT^SSCONF=?
```

Response(s)

```
^SSCONF:(list of supported <mode>s)  
OK
```

Read Command

```
AT^SSCONF?
```

Response(s)

```
^SSCONF:<mode>  
OK
```

Write Command

```
AT^SSCONF=<mode>
```

Response(s)

```
OK
```

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
-	+	+	+	+	-	-

### Parameter Description

**<mode>**<sup>(num)</sup>

Display recipient address

0(&F)(P)                    MG21 does not display **<ra>** and **<tora>**.

1                            MG21 displays **<ra>** and **<tora>**.



## 8.27. AT^SSDA Set SMS Display Availability

This command allows to notify the MG21 of its controlling application's capability to immediately display incoming SMS on a display.

If the application is able to display incoming short messages, a class 0 message shall be displayed immediately. However, if it does not, class 0 messages shall be treated as if no message class is determined (GSM 03.38).

The effect of this command if `<da>=1` is to determine the behavior of parameter `<mt>` of `AT+CNMI`:

If `<da>=1` and `<mt>=1` or `<mt>=3` incoming class 0 messages need to be acknowledged with `AT+CNMA` (see also `AT+CNMI` and `AT+CSMS`)

If multiplex mode is enabled (`AT+CMUX`) and `<da>=1` with `<mt>=1` or `<mt>=3` is set on any logical channel, all other channels have to use `<mt>=0`.

### Syntax

Test Command

`AT^SSDA=?`

Response(s)

`^SSDA:(list of supported <da>s)`  
OK

Read Command

`AT^SSDA?`

Response(s)

`^SSDA:<da>`  
OK

Write Command

`AT^SSDA=<da>`

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3 🔔 Last

- + + + + - -

### Parameter Description

`<da>`<sup>(num)</sup>

Display Availability

0(&F) Application is not able to display incoming short message

1 Application is able to display incoming short message



**Note**

- If the ME operates on different instances (MUX channels 1, 2, 3 or ASC0) avoid different settings for routing and indicating short messages. For example, if messages shall be routed directly to one instance of the TE (set with [AT+CNMI](#), [AT^SSDA](#)), it is not possible to activate the presentation of URCs with [AT+CMER](#) or [AT+CNMI](#) on another instance. Any attempt to activate settings that conflict with existing settings on another interface, will result in "+CME ERROR", or accordingly "+CMS ERROR".



## 8.28. AT^SSMSS Set Short Message Storage Sequence

The short message storage "MT" (see [AT+CPMS](#)) is a logical storage. It consists of two physical storages "ME" and "SM". This command allows to select the sequence of addressing this storage.

### Syntax

Test Command

AT^SSMSS=?

Response(s)

^SSMSS: (list of supported <seq>s)

Read Command

AT^SSMSS?

Response(s)

^SSMSS: <seq>

OK

Write Command

AT^SSMSS=<seq>

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### Parameter Description

<view><sup>(num)</sup>

MT sequence

0<sup>(&F)(P)</sup> "MT" storage is "ME" then "SM"

1 "MT" storage is "SM" then "ME"

### Note

- Access to the SIM storage is faster. For compatibility with previous software re-releases, the "MT" sequence <seq>=0 is the factory default.



## 9. SIM related Commands



The AT Commands described in this chapter used to operate with SIM and SAT (SIM Application Tool).

SIM	SIM Applikation Toolkit
AT+CCVM	AT^SSTA
AT+CGID	AT^SSTGI
AT+CRSM	AT^SSTR
AT+CSIM	
AT+CXXCID	
AT^SCID	
AT^SCKS	
AT^SSET	
AT^SXSM	



## 9.1. AT+CCVM Get And Set The Voice Mail Number On The SIM

### Syntax

Test Command

AT+CCVM=?

Response(s)

+CCVM: <vm number>[,<alpha string>]  
OK

Read Command

AT+CCVM?

Response(s)

If voice mail number is not set:

OK

If voice mail number is set:

+CCVM: <vm number>[,<alpha string>]

OK

Write Command

AT+CCVM=<vm number>,<alpha string>

Response(s)

OK

ERROR

If error is related to ME functionality:

+CME ERROR: <err>

### Parameter Description

<vm number><sup>(str)</sup>

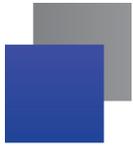
String type(string should be included in quotation marks)

The voice mail number to write to the SIM

<alpha string><sup>(str)</sup>

String type(string should be included in quotation marks)

The alpha-string to write to the SIM



## 9.2. AT+CGID Get SIM Card Group Identifier

### **Syntax**

Exec Command

AT+ CGID

Response(s)

+GID: <gid1> <gid2>

OK

ERROR

### **Parameter Description**

<gid1><sup>(num)</sup>

integer type of SIM card group identifier 1

<gid2><sup>(num)</sup>

integer type of SIM card group identifier 2

### **Note**

- If the SIM supports GID files, the GID values were returned. Otherwise 0xff is returned.



### 9.3. 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>](#). However, additional SIM commands are available via [AT^SXSM](#). All parameters of **AT+CRSM** are used as specified by GSM 11.11. MG21 handles internally all required SIM interface locking and file selection routines.

As response to the command, the MG21 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.

#### Syntax

Test Command

```
AT+CRSM=?
```

Response(s)

```
OK
```

Write Command

```
AT+CRSM=<command>[, <fileID>[, <P1>, <P2>, <P3>[, <data>]]]
```

Response(s)

```
+CRSM: <sw1>,<sw2>[,<response>]
```

```
OK
```

```
ERROR
```

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

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -



### ***Parameter Description***

**<command><sup>(num)</sup>**

SIM command number.

176	READ BINARY
178	READ RECORD
192	GET RESPONSE
214	UPDATE BINARY
220	UPDATE RECORD
242	STATUS

**<fileID><sup>(num)</sup>**

Identifier for an elementary data file on SIM, if used by <command>.

**<P1><sup>(num)</sup>**

Parameter to be passed on by the MG21 to the SIM.

0...255

**<P2><sup>(num)</sup>**

Parameter to be passed on by the MG21 to the SIM.

0...255

**<P3><sup>(num)</sup>**

Parameter to be passed on by the MG21 to the SIM.

0...255

**<data><sup>(str)</sup>**

Information which shall be written to the SIM (hexadecimal character format).

**<sw1><sup>(num)</sup>**

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>`<sup>(num)</sup>

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>`<sup>(str)</sup>

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.



## 9.4. 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 [21].

However, only the following SIM commands are fully supported by **AT+CSIM**: SELECT, STATUS, READ BINARY, UPDATE BINARY, READ RECORD, UPDATE RECORD, SEEK, INCREASE and GET RESPONSE. Other SIM commands will work in conjunction with the SIM but the correct interaction of the SIM with the MG21 is not guaranteed.

### Syntax

Test Command

AT+CSIM=?

Response(s)

OK

Write Command

AT+CSIM=<length>, <command>

Response(s)

+CSIM: <length>,<response>

OK

ERROR

+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

Reference(s)

GSM 07.07

### Parameter Description

<length><sup>(num)</sup>

Length of <command> or <response> string.

<command><sup>(str)</sup>

Command passed on by the ME to the SIM.

<response><sup>(str)</sup>

Response data of the command returned by the SIM.



### **Example**

The following examples explain how to use **AT+CSIM**.

```
AT+CSIM=14,"A0A40000027F10"      Select DF-Telekom
+CSIM: 4,"9F19"                  Command successful, length '19' of the response data

OK

AT+CSIM=14,"A0A40000026F3A"      Select EF-ADN (Abbreviated dialling numbers)
+CSIM: 4,"9F0F"                  Command successful, length '0F' of the response data

OK

AT+CSIM=10,"A0C000000F"          Get Response
+CSIM: 34,"000002306F3A040011F0220102011C9000"

OK
```



## 9.5. AT+CXXCID Display card ID

### Syntax

Test Command

```
AT+CXXCID=?
```

Response(s)

```
OK
```

Read Command

```
AT+CXXCID
```

Response(s)

```
+CXXCID: <cid>
```

```
OK
```

```
ERROR
```

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

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
-	+	+	+	+	-	-

### Command Description

TA returns the card identification number in SIM (see GSM 11.11 Chap.10.1.1) as string type.

### Note

■ See also: [AT^ASCID](#).



## 9.6. AT^SCID      Display SIM card identification number

### Syntax

Test Command

```
AT^SCID=?
```

Response(s)

```
OK
```

Exec Command

Response(s)

```
^SCID: <cid>
```

```
OK
```

```
ERROR
```

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

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
-	+	+	+	+	-	-

### Command Description

TA returns the card identification number in SIM (SIM file EF<sub>ICCID</sub>, see GSM 11.11 Chap.10.1.1) as string type.

### Parameter Description

<cid><sup>(str)</sup>

card identification number of SIM card



## 9.7. 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 MG21.

### Syntax

Test Command

AT^SCKS =?

Response(s)

^SCKS:(list of supported <mode>s)  
OK

Read Command

AT^SCKS

Response(s)

^SCKS: <mode>, <SimStatus>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

AT^SCKS=<mode>

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### Unsolicited Result Code

^SCKS: <SimStatus>

If the SIM connection status has changed an unsolicited result code (URC) is issued.

### Parameter Description

<mode><sup>(num)(&W)(&V)</sup>

0 <sup>(P)</sup>	Suppress unsolicited result codes
1	Output unsolicited result codes



### <SimStatus><sup>(num)(&V)</sup>

0	Card holder tray removed or SIM connection error
1	SIM inserted (refer to note)
2	The SIM interface hardware has been deactivated (e.g. because an invalid SIM or a SIM with unsupported electrical specifications has been detected). The SIM interface can be reactivated only by restarting the ME, e.g. via " <a href="#">AT+CFUN= n,1</a> ".

#### **Note**

- <SimStatus> reflects the status of the SIM and the card holder tray. Therefore if an empty SIM card holder tray is inserted, two URCs will be presented, indicating the status 1 followed by 0. See example.

#### **Example**

```
AT^SCKS=1      Activates the presentation of unsolicited result codes
OK
```

Now, after inserting an empty card tray the following URCs appear:

```
^SCKS: 1      Tray connected
^SCKS: 0      No SIM card found
```



## 9.8. AT^SSET SIM Data Ready Indication

After power-up and personalization (PIN entry if required) MG21 starts reading data from the SIM. AT^SSET controls the presentation of "**^SSIM READY**" URC which indicates that the ME has finished this initial reading. Afterwards all AT commands that depend on SIM data can be used, e.g. SMS and phonebook related AT commands.

### Syntax

Test Command

AT^SSET=?

Response(s)

^SSET:(list of supported <n>s)  
OK

Read Command

AT^SSET?

Response(s)

^SSET: <n>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

AT^SSET=[<n>]

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### Unsolicited Result Code

^SSIM READY

This URC indicates that the ME has finished its initial SIM access. Before that, any attempt to access phonebook, SMS or other SIM data may result in "+CME ERROR" type "SIM busy".



### ***Parameter Description***

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

URC presentation mode

0(&F)                      Disable "^SSIM READY" URC.

1                              Enable "^SSIM READY" URC.



## 9.9. AT<sup>^</sup>SXSM Extended SIM Access

AT<sup>^</sup>SXSM extends AT+CRSM with additional SIM commands.

All parameters of AT<sup>^</sup>SXSM are used as specified by GSM 11.11. MG21 handles internally all required SIM interface locking and file selection routines.

MG21 may return error result code "+CME ERROR" if the command cannot be passed to the SIM, e.g. if no SIM is inserted. However, errors related to SIM action are reported in <sw1> and <sw2> parameters as defined in GSM 11.11.

### Syntax

Test Command

```
AT^SXSM=?
```

Response(s)

```
OK
```

Write Command

```
AT^SXSM=<command>[, <fileID>[, <P1>, <P2>, <P3>[, <data>]]]
```

Response(s)

```
^SXSM: <sw1>, <sw2>[,<response>]
```

```
OK
```

```
ERROR
```

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

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	+	+	-	-

### Parameter Description

<command><sup>(num)</sup>

136

RUN GSM ALGORITHM

Start the authentication mechanism and cipher key generation on the SIM. It runs the algorithms A3 and A8 using a 16 byte random number and the subscriber authentication key Ki, which is stored in the SIM.

<fileID><sup>(num)</sup>

Identifier for an elementary data file on SIM, if used by <command>.

<P1><sup>(num)</sup>

Parameter to be passed on by the MG21 to the SIM.



<P2><sup>(num)</sup>

Parameter to be passed on by the MG21 to the SIM.

<P3><sup>(num)</sup>

Parameter to be passed on by the MG21 to the SIM.

<data><sup>(str)</sup>

If <command>=136 (RUN GSM ALGORITHM):  
16 byte random number.

<sw1><sup>(num)</sup>

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><sup>(num)</sup>

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><sup>(str)</sup>

Response in case of a successful completion of the previously issued SIM command.

If <command>=136 (RUN GSM ALGORITHM); MG21 returns SRES and cipher key Kc as calculated by the SIM.

Byte(s)	Description	Length
1 - 4	SRES - Signed RESponse	4
5 - 12	Kc - Cipher Key	8

### **Example**

Use <command>=136 (RUN GSM ALGORITHM) to obtain SRES and cipher key Kc values as calculated by the SIM.



at^sxsms=136,,0,0,16,"0011223

Start SIM command "RUN GSM ALGORITHM" with 16 byte random number.

3445566778899AABBCCDDEEFF"

^SXSM:

SRES (bytes 1-4) and Cypher Key Kc (bytes 5-12) values as returned by the SIM.

144,0,00112233445566778899AA

BB

OK



## 9.10. AT^SSTA Remote-SAT Interface Activation

AT^SSTA write command can be used to determine the Remote-SAT activation mode `<mode>` and, if Explicit Response mode is enabled, to activate the Remote-SAT interface. Removing and inserting the SIM does not affect the activation status. SAT commands which are not using the AT interface (non-MMI related SAT commands, e.g. PROVIDE LOCAL INFORMATION) are executed without activating Remote-SAT. The read command can be used to request the current operating status and the used alphabet of the Remote-SAT interface.

### Syntax

Test Command

AT^SSTA=?

Response(s)

^SSTA:(list of supported `<state>`s), (list of supported `<Alphabet>`s)

OK

Read Command

AT^SSTA?

Response(s)

^SSTA: `<state>`, `<Alphabet>`, `<allowedInstance>`, `<SatProfile>`

OK

Write Command

AT^SSTA=`<mode>`[, `<Alphabet>`]

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + - -

### Parameter Description

`<state>`<sup>(num)</sup>

MG21 Remote-SAT interface states

0	RESET
1	OFF
2	IDLE
3	PAC
4	WAIT



### <Alphabet><sup>(num)</sup>

Parameter is stored non-volatile and takes effect after next restart of the ME.

- |                  |   |
|------------------|---|
| 0 <sup>(D)</sup> | GSM character set<br>Input of a character requests one byte, e.g. "Y".  |
| 1                | UCS2<br>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><sup>(num)</sup>

Remote-SAT handling (i.e. "**^SSTN**" URC, **AT^SSTGI** and **AT^SSTR** sequence) is only usable via the serial channel on which the Explicit Response (ER) mode was activated.

To change the serial channel execute **AT^SSTA=1** on the desired channel and perform a restart.

- |   |  |
|---|--|
| 0 | SAT is already used on another instance (logical channel in case of the multi-plex protocol). Only test and read commands can be used. |
| 1 | SAT may be started on this instance via the write version of this command.   |

### <allowedInstance><sup>(num)</sup>

SAT profile according to GSM 11.14.

The profile tells the SIM Application which features (e.g. Proactive Commands) are supported by the SIM Application Toolkit implementation of the MG21.

### <allowedInstance><sup>(num)</sup>

Select Remote-SAT activation mode.

Parameter is stored non-volatile and takes effect after next restart of the ME. Removing and inserting the SIM does not affect the activation status.

- |                  |   |
|------------------|---|
| 0 <sup>(D)</sup> | Automatic Response (AR) mode. All commands and responses are exchanged automatically between the ME and the SIM application. This eliminates the need to enter any Remote-SAT commands including the <b>AT^SSTA</b> command. If AR mode is enabled the ME enters the OFF state (<state>=1) after restart.     |
| 1                | Explicit Response (ER) mode. This mode is intended for use with an MMI. If ER mode is enabled the MMI is required to handle, via MG21's Remote-SAT interface, all commands and responses transmitted to or from the SIM or USIM. If ER mode is enabled the ME enters the IDLE state (<state>=2) after reboot. |



## 9.11. 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 TE is expected to acknowledge the [AT^SSTGI](#) response with [AT^SSTR](#) to confirm that the Proactive Command has been executed. [AT^SSTR](#) will also provide any user information, e.g. a selected menu item. The Proactive Command type value specifies to which "[^SSTN](#)" the command is related.

### Syntax

Test Command

[AT^SSTGI](#)=?

Response(s)

[^SSTGI](#):(list of supported [<state>](#)s), (list of supported [<cmdType>](#)s)  
OK

Read Command

[AT^SSTGI](#)?

Response(s)

[^SSTGI](#): [<state>](#), [<cmdType>](#)  
OK

Write Command

[AT^SSTGI](#)=[<cmdType>](#)

Response(s)

OK  
ERROR  
+CME ERROR: [<err>](#)

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### Parameter Description

[<state>](#)<sup>(num)</sup>

MG21 Remote-SAT interface states

0	RESET
1	OFF
2	IDLE
3	PAC
4	WAIT



<cmdType><sup>(num)</sup>

Related Proactive Command

### 9.11.1. AT^SSTGI SAT Get Information - Refresh (1)

The AT^SSTGI=1 command shall be used after receiving the URC "^SSTN: 1". This URC notifies the TE that one or more Elementary Files on the SIM have been changed as a result of a SIM application activity, usually caused by the network provider. The response to the AT^SSTGI=1 command indicates what type of SIM refresh has occurred. The change requires that the Elementary Files of the SIM be synchronized with the equivalent information (if any) stored inside the TE. Depending on the type of SIM refresh the TE may need to use the AT+CRSM command to read out the Elementary Files and store the refreshed information.

The response parameters <pathLen>, <fileNum> and <fileList> are mandatory if <commandDetails> equals 1 or 2. In all other cases they are optional and can be ignored.

#### Syntax

Write Command

AT^SSTGI=1

Response(s)

^SSTGI: <cmdType>, <commandDetails>[, <pathLen>, <fileNum>, <fileList>]

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 ↻ Last

- + + + + - -

#### Parameter Description

<cmdType><sup>(num)</sup>

1



#### <commandDetails><sup>(num)</sup>

For every return value of <commandDetails> other than 4 (SIM Reset) the TE shall complete the proactive command cycle using `AT^SSTGI=1`.

0	SIM Initialization and Full File Change Notification
1	File Change Notification
2	SIM Initialization and File Change Notification
3	SIM Initialization
4	Value "4" means SIM Reset, but the value itself never appears. This is because value "4" is mapped to the URC " <code>^SSTN: 255</code> " which will be sent when a SIM reset occurs. In this case, the TE does not need to respond, i.e. the SIM Refresh commands <code>AT^SSTGI</code> and <code>AT^SSTR</code> are neither required nor allowed. Instead, as the SIM application restarts, the Toolkit application inside the TE should also return to initial state after receiving the URC " <code>^SSTN: 255</code> ". For more information on SIM reset and the URC " <code>^SSTN: 255</code> " refer to <code>^SSTN</code> SAT Notification.
5...255	Reserved values

#### <pathLen><sup>(num)</sup>

Number of bytes coded in <fileList>

#### <fileNum><sup>(num)</sup>

Number of updated Elementary Files (EF) with path given in <fileList>

#### <fileList><sup>(num)</sup>

String containing Elementary File paths. Each path contains at least two file entries; each file entry (MF, EF or DF) consists of two bytes, e.g. '3F002FE2' or '3F007F206FAD'. Every path in the file description begins with the Master File (MF). There can be any number of Dedicated File (DF) entries between Master File and Elementary File.

### **Example**

In general, the TE only needs to take care of SIM content synchronization if it is permanently interested in the latest contents of one or more specific SIM files, e.g. because the TE has its own cache for specific SIM information. In this case, the TE needs to know exactly the paths and file IDs of these specific SIM files. For the SIM, the paths and file IDs can be found in 3GPP TS 11.11.



When `<commandDetails>` equals 0, 2 or 3 or the "`^SSTN: 255`" notification is received (refer to `^SSTN` SAT Notification), the TE shall synchronize its own cache for SIM information in any case.

When `<commandDetails>` equals 1, reloading the SIM information is only necessary if the TE finds that an important file is included in the Refresh `<fileList>`. For example, assuming that the TE is always interested in the latest contents of the "FD" (Fixed Dialing) phonebook, it has to know that EF\_FDN is located at path "3F00\7F10\6F3B". Then, during normal operation, the TE should always check the Refresh `<fileList>`, if it includes the path and file ID of EF\_FDN. An example is given below:

SYSSTART	ME has been started.
AT+CLCK="FD",2	Request "FD" lock state.
+CLCK: 1	"FD" lock is enabled.
OK	
AT+CPBS="FD"	Select the "FD" phonebook.
OK	
AT+CPBR=1	Read first "FD" phonebook entry.
+CPBR: 1,"123",129,"ABC"	This is the "FD" phonebook content before Refresh.
OK	
^SSTN: 1	Indicates that a SIM Refresh has occurred.
AT^SSTGI=1	Request type of SIM Refresh.
^SSTGI: 1,1,6,1,"3F007F106F3B"	The Refresh <code>&lt;fileList&gt;</code> includes path and file ID 3F00\7F10\6F3B which corresponds to EF_FDN, indicating that its contents may have changed.
OK	
AT^SSTR=1,0	Terminate the proactive command.
OK	
^SSTN: 254	Session finished.
AT+CPBR=1	Read first "FD" phonebook entry.
+CPBR: 1,"0123456789",129,"ABC"	This is the "FD" phonebook content after the Refresh.
OK	

Please keep in mind that this process is only necessary if the TE has its own cache for SIM information (e.g. SIM phonebook is cached inside the TE). If the TE does not have a cache for SIM information (e.g. SIM phonebook is read by the TE only at the user's request, directly from the SIM), it is not necessary to synchronize the content. The TE SIM content synchronization is not required for a proper operation of the ME. As long as the TE answers the "`^SSTN: 1`" notification with the commands `AT^SSTGI=1` and `AT^SSTR=1,0`, the ME will use the latest SIM contents and will continue to work flawlessly, regardless of a possible TE SIM content synchronization.

### 9.11.2. AT^SSTGI SAT Get Information - Set Up Event List (5)

This command shall be used after receiving the URC `^SSTN: 5`.

However, please refer to the note below.



The response informs the TE of the events that it must monitor within itself. If any of these events occur the TE must report them to the ME.

### Syntax

Write Command

```
AT^SSTGI=5
```

Response(s)

```
^SSTGI: <cmdType>, <commandDetails>, <eventList>
```

```
OK
```

```
ERROR
```

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

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

### Parameter Description

<cmdType><sup>(num)</sup>

5 Proactive command ID, see Table “Command Type Table”.

<commandDetails><sup>(num)</sup>

This byte is RFU.



`<eventList>(num)`

The event list tells the TE which events have to be reported to the ME via the related commands  
AT<sup>^</sup>SSTR=(232, 233, 235, 236)

0...65535	Used as bit field
bit 1-4	RFU
bit 5	0: User Activity not in Event List 1: Any user activity (keyboard press) has to be signaled to the ME
bit 6	0: Idle Screen Available not in Event List 1: Any idle screen available event has to be signaled to the ME.
bit 7	RFU
bit 8	0: Language Selection not in Event List 1: Language Selection events have to be signaled to the ME.
bit 9	0: Browser Termination not in Event List 1: Browser Termination events have to be signaled to the ME
bit 10-16	RFU

### **Note**

It is possible to issue AT<sup>^</sup>SSTGI during states IDLE, PAC and WAIT for this proactive command without pre-viously receiving a URC <sup>^</sup>SSTN:<cmdType>, see AT<sup>^</sup>SSTGI.

### **9.11.3. AT<sup>^</sup>SSTGI SAT Get Information - Set Up Call (16)**

This command shall be used after receiving the URC <sup>^</sup>SSTN: 16. If the SIM Application attempts to set up a call it uses this response to inform the TE of the call parameters.

The sequence of events is as follows:

1. After the Remote-SAT notification 16 was issued the TE has to request the command parameter using AT<sup>^</sup>SSTGI=16.
2. If the SIM Application does not supply a confirmation text or icon parameter, the TE gives other information to the user, e.g. the telephone number. In this case refer to step 4.
3. If the SIM Application supplies a non empty confirmation text or icon parameter, the TE uses only these to ask the user whether or not he wishes to set up the call.
4. If the user confirms to set up the call, AT<sup>^</sup>SSTR=16,0 shall be responded.



5. If the user denies to set up the call, AT^SSTR=16,34 shall be responded.
6. After confirmation phase the TE may present a dialing animation on the screen until a mandatory parameter line ^SSTR: 16, <TermQualifier>, <TerminationCauseText> is issued.
7. If <TermQualifier> is not equal to 0 the call setup process has not been successfully. If <TerminationCauseText> is not an empty string, this text shall be shown to the user for an appropriate time, e.g. 2 seconds. The text contains information regarding the dial termination cause, e.g. call barring through Call Control by SIM mechanism. If <TerminationCauseText> is an empty string, the TE shall give an own indication to the user.
8. If <TermQualifier> is equal to 0, the call setup process has been started:  
 If <TerminationCauseText> is not an empty string, this text shall be used to inform the user during the call setup.  
 If <TerminationCauseText> is an empty string, <callSetupText> and/or <confirmationIconId> shall be used to inform the user during call setup. However, if <callSetupText> contains no data, too, no indication shall be shown.
9. The TE shall give the user an opportunity to end an ongoing call, set up by the Proactive Command. In this case the TE shall issue an ATH command to the ME.

### Syntax

Write Command

AT^SSTGI=16

Response(s)

^SSTGI: <cmdType>, <commandDetails>, <confirmationText>, <calledNumber>, <callSetupText>, <confirmationIconQualifier>, <confirmationIconId>, <callSetupIconQualifier>, <callSetupIconId>

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + - -

### Parameter Description

<cmdType><sup>(num)</sup>

16

Proactive command ID, see Table "Command Type Table".



**<commandDetails><sup>(num)</sup>**

0	Set up call, but only if not currently busy on another call
1	Set up call, but only if not currently busy on another call, with redial
2	Set up call, putting all other calls (if any) on hold
3	Set up call, putting all other calls (if any) on hold, with redial
4	Set up call, disconnecting all other calls (if any)
5	Set up call, disconnecting all other calls (if any), with redial
6...255	Reserved Values

**<confirmationText><sup>(str)</sup>**

String for user confirmation stage

**<calledNumber><sup>(num)</sup>**

String containing called number

**<callSetupText><sup>(str)</sup>**

String for call set up stage

**<confirmationIconQualifier><sup>(num)</sup>**

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text 1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

**<confirmationIconId><sup>(num)</sup>**

0...255	
0	No Icon



**<callSetupIconQualifier><sup>(num)</sup>**

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text 1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

**<callSetupIconId><sup>(num)</sup>**

0...255	
0	No Icon

**Note**

- If the Fixed Dialling Number service is enabled, the number included in the SET UP CALL proactive command shall not be checked against those of the FDN list.

**9.11.4. AT^SSTGI SAT Get Information - Send SS (17)**

This command shall be used after receiving the URC ^SSTN: 17

The module is sending a supplementary service request to the network, and is alerting the user of this. Text and an icon identifier shall be passed to the TE to display to the user.

**Syntax**

Write Command

AT^SSTGI=17

Response(s)

^SSTGI: <cmdType>[, <commandDetails>][, <text>], <iconQualifier>, <iconId>

OK

ERROR

+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	☞	Last
+	+	+	+	+	-	-



### ***Parameter Description***

**<cmdType><sup>(num)</sup>**

17 Proactive command ID, see Table “Command Type Table”.

**<commandDetails><sup>(num)</sup>**

This byte is RFU.

**<text><sup>(str)</sup>**

String to provide the user with information.

If the string is provided by the SIM, the TE shall use it to inform the user. This is also an indication that the TE should not give any other information to the user on the fact that the ME is sending an SS request.

If the alpha identifier is not provided by the SIM, the ME may give information to the user concerning what is happening.

**<cmdType><sup>(num)</sup>**

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text 1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

**<cmdType><sup>(num)</sup>**

0...255	
0	No Icon

#### **9.11.5. AT<sup>^</sup>SSTGI SAT Get Information - Send USSD (18)**

This command shall be used after receiving the URC <sup>^</sup>SSTN: 18

The module is sending an unstructured supplementary service request to the network, and is alerting the user of this.

Text and an icon identifier shall be passed to the TE to display to the user.



## Syntax

Write Command

AT^SSTGI=18

Response(s)

^SSTGI: <cmdType>[, <commandDetails>][, <text>], <iconQualifier>, <iconId>

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + - -

## Parameter Description

<cmdType><sup>(num)</sup>

18 Proactive command ID, see Table “Command Type Table”.

<commandDetails><sup>(num)</sup>

This byte is RFU.

<text><sup>(str)</sup>

String to provide the user with information.

If the string is provided by the SIM, the TE shall use it to inform the user. This is also an indication that the TE should not give any other information to the user on the fact that the ME is sending a USSD request.

If the alpha identifier is not provided by the SIM, the ME may give information to the user concerning what is happening.

<iconQualifier><sup>(num)</sup>

0...255 Used as bit field

bit 1 0: Icon is self explanatory and replaces text

1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).

bit 2-8 RFU



<iconQualifier><sup>(num)</sup>

0...255

0 No Icon

### 9.11.6. AT^SSTGI SAT Get Information - Send Short Message (19)

This command shall be used after receiving the URC ^SSTN: 19

The SIM Application is sending a Short Message and the TE is informed of this. The user can be passed a string containing information to display.

#### Syntax

Write Command

AT^SSTGI=19

Response(s)

^SSTGI: <cmdType>, <commandDetails>, <textInfo>, <iconQualifier>, <iconId>

OK

ERROR

+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	☞	Last
-	+	+	+	+	-	-

#### Parameter Description

<cmdType><sup>(num)</sup>

19 Proactive command ID, see Table "Command Type Table".

<commandDetails><sup>(num)</sup>

This byte is RFU.

<textInfo><sup>(str)</sup>

String to provide the user with information.

If the string is provided by the SIM, the TE shall use it to inform the user. This is also an indication that the TE should not give any other information to the user on the fact that the ME is sending a USSD request.

If the alpha identifier is not provided by the SIM, the ME may give information to the user concerning what is happening.



**<iconQualifier><sup>(num)</sup>**

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text 1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

**<iconId><sup>(num)</sup>**

0...255	
0	No Icon
1	An icon is provided by the SIM, the icon indicated in the command may be used by the ME to inform the user, in addition to, or instead of the alpha identifier, as indicated with the icon qualifier.

**9.11.7. AT^SSTGI SAT Get Information - Send DTMF (20)**

This command shall be used after receiving the URC ^SSTN: 20 The SIM Application is sending DTMF tones to the network, and can provide the TE with some information about this. Text and an icon identifier can be passed to the TE to display to the user.

**Syntax**

Write Command

AT^SSTGI=20

Response(s)

^SSTGI: <cmdType>, <commandDetails>, <text>, <iconQualifier>, <iconId>

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

**Parameter Description**

**<cmdType><sup>(num)</sup>**

20	Proactive command ID, see Table "Command Type Table".
----	---



`<commandDetails>`<sup>(num)</sup>

This byte is RFU.

`<text>`<sup>(str)</sup>

String to provide the user with information.

If the string is provided by the SIM, the TE shall use it to inform the user. This is also an indication that the TE should not give any other information to the user on the fact that the ME is performing a SEND DTMF command.

If the alpha identifier is not provided by the SIM, the ME may give information to the user concerning what is happening.

`<iconQualifier>`<sup>(num)</sup>

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text 1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

`<iconId>`<sup>(num)</sup>

0...255	
0	No Icon

### 9.11.8. AT<sup>^</sup>SSTGI SAT Get Information - Launch Browser (21)

This command shall be used after receiving the URC <sup>^</sup>SSTN: 21.

If the SIM Application attempts to start an Internet Browser, it uses this response to inform the TE of the launch parameters.

The sequence of events is as follows:

1. After the Remote-SAT notification 21 was issued the TE shall ask for the command parameters via AT<sup>^</sup>SSTGI=21.
2. The ME shall ask the user for confirmation using the Alpha Identifier/Icon Identifier (user confirmation phase) if present, when it receives a LAUNCH BROWSER command which requests to connect the existing browser session to a new URL or to terminate a browser session.
3. If the user confirms to start the browser, AT<sup>^</sup>SSTR=21,0 shall be responded.



4. If the user denies to start the browser, AT^SSTR=21,34 shall be responded.
5. The SIM Application will end the proactive session.
6. The ME shall request content using the given URL. However, if no URL string is supplied a default URL shall be used.
7. On response AT^SSTR=21,0 the browser session may still be active while a next proactive command is issued. Therefore the end of the browser session shall be reported to the ME via browser termination event command asynchronously if determined by the event list. For details please refer to [AT^SSTR](#).

### Syntax

Write Command

AT^SSTGI=21

Response(s)

^SSTGI: <cmdType>, <commandDetails>, <text>, <iconQualifier>, <iconId>

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### Parameter Description

<cmdType><sup>(num)</sup>

21

<commandDetails><sup>(num)</sup>

This byte is RFU.

<confirmationText><sup>(str)</sup>

String for user confirmation stage

<confirmationIconQualifier><sup>(num)</sup>

0...255

Used as bit field

bit 1

0: Icon is self explanatory and replaces text

1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).

bit 2-8

RFU



#### <iconId><sup>(num)</sup>

0...255

0 No Icon

#### <browserIdentity><sup>(num)</sup>

0...255 Browser to be used

0 Default Browser shall be used.

1...255 RFU

#### <url><sup>(str)</sup>

String containing URL to be used by the TE to request content. The way the ME requests content using the URL is out of the scope of the present document. This is specified in RFC 1738 Annex K for example.

#### <bearerList><sup>(str)</sup>

“00” SMS

“01” CSD

“02” USSD

“03” GPRS

04...FF RFU

#### <fileRefList><sup>(str)</sup>

String containing full path to the provisioning file. The first byte contains the number of files. Every comma separated path is the concatenation of file identifiers starting from the Master File (e.g. 3F007F206FX). The file contains a single unambiguous set of parameters required to make the connection. The content of the file is expected to be consistent with the format defined for provisioning information for the requested type of browser.

#### <gatewayIdentity><sup>(str)</sup>

String containing the Gateway/Proxy Identity which gives to the mobile the name/identity of the Gateway/Proxy to be used for connecting to the URL. This Gateway/Proxy identity is required when the bearer data object is present.



### 9.11.9. AT^SSTGI SAT Get Information - Play Tone (32)

This command shall be used after receiving the URC ^SSTN: 32.

The ME has been instructed to generate an audible tone, and may pass to the TE some information to support this.

#### **Syntax**

Write Command

```
AT^SSTGI=32
```

Response(s)

```
^SSTGI: <cmdType>, <commandDetails>, <infoText>, <tone>, <durationUnit>, <duration>, <iconQualifier>, <iconId>  
OK  
ERROR  
+CME ERROR: <err>
```

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

#### **Parameter Description**

<cmdType><sup>(num)</sup>

32

<commandDetails><sup>(num)</sup>

This byte is RFU.

<infoText><sup>(str)</sup>

String to accompany tone



### <tone><sup>(str)</sup>

Tone generated by the ME

01...08	Standard supervisory tones:
“01“	Dial tone
“02“	Called subscriber busy
“03“	Congestion
“04“	Radio path acknowledge
“05“	Radio path not available / Call dropped
“06“	Error / Special information
“07“	Call waiting tone
“08“	Ringing tone
16...18	ME proprietary tones:
“16“	General beep
“17“	Positive acknowledgement tone
“18“	Negative acknowledgement or error tone

### <durationUnit><sup>(num)</sup>

0	Minutes
1	Seconds
2	Tenth of Seconds

### <duration><sup>(num)</sup>

1...255	Duration of tone, expressed in units
---------	--------------------------------------

### <iconQualifier><sup>(num)</sup>

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text 1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU



<iconId><sup>(num)</sup>

0...255

0 No Icon

### 9.11.10. AT^SSTGI SAT Get Information - Display Text (33)

This command shall be used after receiving the URC ^SSTN: 33.

The TE gets a message to be displayed to the user. The message can have different display characteristics.

#### Syntax

Write Command

AT^SSTGI=33

Response(s)

^SSTGI: <cmdType>, <commandDetails>, <text>, <immediateResponse>, <iconQualifier>, <iconId>

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + - -

#### Parameter Description

<cmdType><sup>(num)</sup>

33 Proactive command ID, see Table "Command Type Table".

<commandDetails><sup>(num)</sup>

0...255 Used as bit field

bit 1 0: Normal priority (see note).  
1: High priority (see note).

bit 2-7 RFU

bit 8 0: Clear message after a delay.  
1: Wait for user to clear message.



`<text>`<sup>(str)</sup>

String to be displayed (up to 240 bytes)

`<immediateResponse>`<sup>(num)</sup>

This parameter indicates whether the ME should sustain the display beyond sending the TERMINAL RESPONSE.

- |   |   |
|---|---|
| 0 | Send TERMINAL RESPONSE when text is cleared from screen.  |
| 1 | Send TERMINAL RESPONSE immediately and continue to display the text until one of the following events occurs: <ul style="list-style-type: none"><li>- A subsequent proactive command is received, containing display data.</li><li>- A short delay notified with <code>&lt;commandDetails&gt;</code> has expired.</li><li>- User intervention.</li><li>- A higher priority event occurs, e.g. a mobile terminated call.</li></ul> |

No further TERMINAL RESPONSE shall be sent when the ME removes the text from the display, regardless of the cause.

If the `<immediateResponse>` parameter equals "1" the subsequent "`^SSTN: 254`" URC should not be used to clear the text from the screen - in this case the text should remain on the screen until one of the above events occurs.

`<iconQualifier>`<sup>(num)</sup>

- |         |   |
|---------|---|
| 0...255 | Used as bit field   |
| bit 1   | 0: Icon is self explanatory and replaces text.<br>1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists). |
| bit 2-8 | RFU   |

`<iconId>`<sup>(num)</sup>

- |         |         |
|---------|---------|
| 0...255 |         |
| 0       | No Icon |



### Notes

- The MMI shall reject normal priority text commands if the screen is currently used for more than its normal standby display, e.g. if the MMI is in sub-menu. If the command is rejected, the MMI sends the TERMINAL RESPONSE message to the SIM (ME currently unable to process command - screen busy).
- High priority text shall be displayed on the screen immediately, except if a priority conflict of the alerting events occurs, e.g. incoming call, see GSM 11.14, Chapter "Proactive SIM commands and procedures, Display Text".

### 9.11.11. AT<sup>^</sup>SSTGI SAT Get Information - Get Inkey (34)

This command shall be used after receiving the URC <sup>^</sup>SSTN: 34.

The TE is asked to prompt the user for an input, which is a single character. Help can be requested by the user, if available.

### Syntax

Write Command

```
AT^SSTGI=34
```

Response(s)

```
^SSTGI: <cmdType>, <commandDetails>, <text>, <iconQualifier>, <iconId>
```

```
OK
```

```
ERROR
```

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

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### Parameter Description

<cmdType><sup>(num)</sup>

34



#### <commandDetails><sup>(num)</sup>

0...255	Used as bit field
bit 1	0: Digits only (0 9, *, # and +) 1: Alphabet set
bit 2	0: SMS default alphabet (GSM character set) 1: UCS2 alphabet
bit 3	0: Character sets defined by bit 1 and bit 2 are enabled 1: Character sets defined by bit 1 and bit 2 are disabled and the "Yes/No" response is requested
bit 4-7	RFU
bit 8	0: No help information available 1: Help information available

#### <text><sup>(str)</sup>

String as prompt for text.

#### <iconQualifier><sup>(num)</sup>

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text 1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

#### <iconId><sup>(num)</sup>

0...255	
0	No Icon

### 9.11.12. AT<sup>^</sup>SSTGI      SAT Get Information - Get Input (35)

This command shall be used after receiving the URC <sup>^</sup>SSTN: 35.

The TE is asked to prompt the user for an input, of a specified length and type, e.g. digits only. Help can be requested by the user, if available.



## Syntax

Write Command

```
AT^SSTGI=35
```

Response(s)

```
^SSTGI: <cmdType>, <commandDetails>, <text>, <responseMin>, <responseMax>[, <defaultText>], <iconQualifier>, <iconId>  
OK  
ERROR  
+CME ERROR: <err>
```

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

## Parameter Description

<cmdType><sup>(num)</sup>

35

<commandDetails><sup>(num)</sup>

0...255	Used as bit field
bit 1	0: Digits only (0 9, *, # and +) 1: Alphabet set
bit 2	0: SMS default alphabet (GSM character set) 1: UCS2 alphabet
bit 3	0: ME may echo user input on the display 1: User input shall not be revealed in any way (see note)
bit 4	0: User input to be in unpacked format 1: User input to be in SMS packed format
bit 5-7	RFU
bit 8	0: No help information available 1: Help information available

<text><sup>(str)</sup>

String as prompt for text.

<responseMin><sup>(num)</sup>

0...255 Minimum length of user input.



<responseMax><sup>(num)</sup>

0...255                      Minimum length of user input.

<defaultText><sup>(str)</sup>

String supplied as default response text

<iconQualifier><sup>(num)</sup>

0...255                      Used as bit field

bit 1                          0: Icon is self explanatory and replaces text

1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).

bit 2-8                        RFU

<iconId><sup>(num)</sup>

0...255

0                                No Icon

#### **Note**

- Hidden entry mode (see GSM 11.14) is only available when using digit input. In hidden entry mode only characters ('0', '9', '\*' and '#') are allowed.

### **9.11.13. AT^SSTGI      SAT Get Information - Select Item (36)**

This command shall be used after receiving the URC ^SSTN: 36.

The TE is supplied with a list of items allowing the user to select one. Help can be requested by the user, if available and the presentation style is specified. In addition to text strings and icon identifiers, a next action indicator informs the user of the likely result of selecting a chosen item.



## Syntax

Write Command

```
AT^SSTGI=35
```

Response(s)

The first line of output from the ME is:

```
^SSTGI: <cmdType>, <commandDetails>, <numOfItems>, <titleText>, <defaultItemId>, <itemIconsPresent>, <itemIconsQualifier>, <titleIconQualifier>, <titleIconId>
```

One line follows for every item, repeated for <numOfItems>:

```
^SSTGI: <cmdType>, <itemId>, <itemText>, <nextActionId>, <iconId>
```

OK

ERROR

+CME ERROR: <err>

```
PIN ASC0 MUX1 MUX2 MUX3  Last
```

```
- + + + + - -
```

## Parameter Description

<cmdType><sup>(num)</sup>

36

<commandDetails><sup>(num)</sup>

0...255	Used as bit field
bit 1	0: Presentation type is not specified 1: Presentation type is specified in bit 2
bit 2	0: Presentation as a choice of data values, if bit 1 = '1' 1: Presentation as a choice of navigation options if bit 1 is '1'
bit 3	0: No selection preference 1: Selection using soft key preferred
bit 4-7	RFU
bit 8	0: No help information available 1: Help information available

<numOfItems><sup>(num)</sup>

Number of items in the list

<titleText><sup>(str)</sup>

String giving menu title



#### <defaultItemId><sup>(str)</sup>

ID of default item

The SIM may supply with the list an indication of the default item, e.g. the previously selected item

0	No default item issued by the SIM application
1...255	Id of the default Item

#### <itemIconsPresent><sup>(num)</sup>

0	No icons
1	Icons present

#### <itemIconsQualifier><sup>(num)</sup>

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text 1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

#### <titleIconQualifier><sup>(num)</sup>

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text 1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

#### <titleIconId><sup>(num)</sup>

0...255	
0	No Icon

#### <itemId><sup>(num)</sup>

Item identifier (1 - <numOfItems>)



`<itemText>`<sup>(str)</sup>

String giving menu title

`<nextActionId>`<sup>(num)</sup>

The next proactive command type to be issued upon execution of the menu item. See [Remote-SAT Command Types](#)

0                      Next Action information available

`<iconId>`<sup>(num)</sup>

0...255

0                      No Icon

#### **9.11.14. AT<sup>^</sup>SSTGI      SAT Get Information - Set up Menu (37)**

This command shall be used after receiving the URC <sup>^</sup>SSTN: 37. The response provides the main menu of the SIM Application to the TE. It needs to be stored by the TE so that it can be displayed without invoking a proactive session.

As with every proactive command the TE is expected to acknowledge the <sup>^</sup>SSTGI response with AT<sup>^</sup>SSTR to confirm that the proactive command has been executed. Terminal Response via AT<sup>^</sup>SSTR will not provide any user information in case of this proactive command. Refer to [AT<sup>^</sup>SSTR](#).

AT<sup>^</sup>SSTGI can be issued during states IDLE, PAC and WAIT for this proactive command without previously receiving a URC <sup>^</sup>SSTN: `<cmdType>`, see [AT<sup>^</sup>SSTGI](#).



## Syntax

Write Command

```
AT^SSTGI=35
```

Response(s)

The first line of output from the ME is:

```
^SSTGI: <cmdType>, <commandDetails>, <numOfItems>, <titleText>, <menuitemIconsPresent>, <menuitemIconsQualifier>, <titleIconQualifier>, <titleIconId>
```

One line follows for every item, repeated for <numOfItems>:

```
^SSTGI: <cmdType>, <itemId>, <itemText>, <nextActionId>, <iconId>
```

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

## Parameter Description

<cmdType><sup>(num)</sup>

37

<commandDetails><sup>(num)</sup>

0...255	Used as bit field
bit 1	0: No selection preference 1: Selection using soft key preferred
bit 2-7	RFU
bit 8	0: No help information available 1: Help information available

<numOfItems><sup>(num)</sup>

Number of menu items in the list

<titleText><sup>(str)</sup>

String displaying menu title



#### <menuItemIconsPresent><sup>(num)</sup>

0	No icons
1	Icons present

#### <menuItemIconsQualifier><sup>(num)</sup>

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text 1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

#### <titleIconQualifier><sup>(num)</sup>

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text 1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

#### <titleIconId><sup>(num)</sup>

0...255	
0	No Icon

#### <itemId><sup>(num)</sup>

Menu item identifier (1 - <numOfItems>)

#### <itemText><sup>(str)</sup>

Title of menu item



<nextActionId><sup>(num)</sup>

The next proactive command type to be issued upon execution of the menu item. See [Remote-SAT Command Types](#)

0 No next Action information available

<iconId><sup>(num)</sup>

0...255

0 No Icon

### 9.11.15. AT^SSTGI SAT Get Information - Set up Idle Mode Text (40)

This command shall be used after receiving the URC ^SSTN: 40.

It provides text and optionally an icon to be displayed by the TE when the display is Idle.

#### Syntax

Write Command

AT^SSTGI=40

Response(s)

^SSTGI: <cmdType>, <commandDetails>, <text>, <iconQualifier>, <iconId>

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

#### Parameter Description

<cmdType><sup>(num)</sup>

40

<commandDetails><sup>(num)</sup>

This byte is RFU.

<text><sup>(str)</sup>

Text to be displayed when TE in IDLE mode



#### <iconQualifier><sup>(num)</sup>

0...255	Used as bit field
bit 1	0: Icon is self explanatory and replaces text 1: Icon is not self-explanatory and shall be displayed with the text Determined value only if associated icon ID is not 0 (an icon exists).
bit 2-8	RFU

#### <iconId><sup>(num)</sup>

0...255	
0	No Icon

#### **Note**

- AT<sup>^</sup>SSTGI can be issued during states IDLE, PAC and WAIT for this proactive command without previously receiving a URC <sup>^</sup>SSTN:<cmdType>, see AT<sup>^</sup>SSTGI.

### **9.11.16. AT<sup>^</sup>SSTGI SAT      Get Information - Language Notification (53)**

This command shall be used after receiving the URC <sup>^</sup>SSTN: 53.

It provides text to inform the TE about the language currently used for any text string within proactive commands or envelope command responses.

The notified language remains valid until the end of the card session or upon executing another LANGUAGE NOTIFICATION command.

If the Toolkit application is not aware of the currently selected language, no specific language or several languages will be used. The SIM may notify non-specific language. All LANGUAGE NOTIFICATION previously made will be cancelled.

Two types of language notification are defined:

- specific, where a two-character language notification is issued in <langText> ,
- non-specific, where no language notification is issued, i.e. <langText> is an empty string.

The TE may use the language included in LANGUAGE NOTIFICATION as appropriate. For instance, this could be done to avoid a mix of languages in screen displays combining ME MMI and SIM Toolkit originating text strings.



## Syntax

Write Command

```
AT^SSTGI=53
```

Response(s)

```
^SSTGI: <cmdType>, <commandDetails>, <langText>  
OK  
ERROR  
+CME ERROR: <err>
```

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

## Parameter Description

<cmdType><sup>(num)</sup>

53

<commandDetails><sup>(num)</sup>

0...255	Used as bit field
bit 1	0: non-specific language notification 1: specific language notification
bit 2-8	RFU

<langText><sup>(num)</sup>

Language code string provided as a pair of alpha-numeric characters, defined in ISO 639. Each alphanumeric character is coded on one byte using the SMS default 7-bit coded alphabet as defined in 3GPP TS 23.038.

### Note

- AT^SSTGI can be issued during states IDLE, PAC and WAIT for this proactive command without previously receiving a URC ^SSTN:<cmdType>, see AT^SSTGI.



## 9.12. AT^SSTR SAT Response

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed. AT^SSTR will also provide any user information, e.g. a selected menu item.

### Syntax

Test Command

AT^SSTR=?

Response(s)

^SSTR:(list of supported <state>s), (list of supported <cmdType>s)

OK

Read Command

AT^SSTR?

Response(s)

^SSTR: <state>, <cmdType>

OK

Write Command

AT^SSTR=<cmdType>, <status>[, <inputNumber>][, <inputString>]

Response(s)

^SSTR: <cmdType>[, <TerminationQualifier>, <TerminationCauseText>]

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### Parameter Description

<state><sup>(num)</sup>

MG21 Remote-SAT interface states

0	RESET
1	OFF
2	IDLE
3	PAC
4	WAIT

<cmdType><sup>(num)</sup>

Number related to Proactive Command or event type according to GSM 11.14.



<TerminationQualifier><sup>(num)</sup>

- |         |   |
|---------|---|
| 0       | The proactive command has been successfully finished. |
| 1...255 | The proactive command did not perform successfully.   |

<TerminationCauseText><sup>(str)</sup>

This text has to be shown to the user for an appropriate time, e.g. 2 seconds. The text contains information regarding the termination cause, e.g. in case of a failed dialing process call barring through Call Control by SIM mechanism may be indicated.

In case of <TerminationCauseText> is an empty string and <TerminationQualifier> is not equal to 0, the TA may give an own indication to the user.

<status><sup>(num)</sup>

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.

<inputNumber><sup>(num)</sup>

Response number entered by user

<inputString><sup>(num)</sup>

Response string entered by user

### 9.12.1. AT^SSTR SAT Response - Refresh (1)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

#### Syntax

Write Command

AT^SSTR=1, <status>

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -



### Parameter Description

<status><sup>(num)</sup>

0...255

0 Command performed successfully

#### Note

- The refresh action (SIM data cache update) will be performed in any case, i.e. <status> values other than 0 will be ignored.

### 9.12.2. AT^SSTR SAT Response - Set Up Event List (5)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed. The TE acknowledges that the event list has been set up correctly.

#### Syntax

Write Command

AT^SSTR=5, <status>

Response(s)

OK

PIN	ASC0	ASC1	MUX1	MUX2	MUX3	🔊	Last
-	+	+	+	+	+	-	-

### Parameter Description

<status><sup>(num)</sup>

0...255

0 Command performed successfully

32 ME currently unable to process command

48 Command beyond ME's capabilities

132 ME currently unable to process command because screen is busy



### 9.12.3. AT^SSTR SAT Response - Set Up Call (16)

The TE is expected to acknowledge the AT^SSTGI response with AT^SSTR to confirm that the Proactive Command has been executed.

#### Syntax

Write Command

AT^SSTR=16, <status>

Response(s)

^SSTR: 16, <TerminationQualifier>, <TerminationCauseText>

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

#### Parameter Description

<state><sup>(num)</sup>

0...255

0	Command performed successfully. Indicate that the user has accepted the call request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
20	USSD/SS Transact terminated by user
32	ME currently unable to process command
34	User did not accept the proactive command. Indicate that the user has denied the call request
35	User cleared down call before connection or network release
48	Command beyond ME's capabilities
132	ME currently unable to process command because screen is busy

#### Note

- After confirmation phase the TE may show a dialling animation on the screen until a mandatory response parameter is issued.

^SSTR: <cmdType>, <TerminationQualifier>, <TerminationCauseText>



### 9.12.4. AT^SSTR SAT Response - Send SS (17)

The TE is expected to acknowledge the [AT^SSTGI](#) response with [AT^SSTR](#) to confirm that the Proactive Command has been executed.

#### Syntax

Write Command

```
AT^SSTR=17, <status>
```

Response(s)

```
^SSTR: 17, <TerminationQualifier>, <TerminationCauseText>  
OK
```

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

#### Parameter Description

<status><sup>(num)</sup>

0...255

0	Command performed successfully. Indicate that the user has accepted the SS request.
4	Command performed successfully, but requested icon could not be displayed.
20	USSD/SS Transact terminated by user
32	ME currently unable to process command
48	Command beyond ME's capabilities
132	ME currently unable to process command because screen is busy

### 9.12.5. AT^SSTR SAT Response - Send USSD (18)

The TE is expected to acknowledge the [AT^SSTGI](#) response with [AT^SSTR](#) to confirm that the Proactive Command has been executed.



### Syntax

Write Command

AT^SSSTR=18, <status>

Response(s)

^SSSTR: 18, <TerminationQualifier>, <TerminationCauseText>  
OK

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + - -

### Parameter Description

<status><sup>(num)</sup>

0...255

0	Command performed successfully. Indicate that the user has accepted the USSD request.
4	Command performed successfully, but requested icon could not be displayed.
20	USSD/SS Transact terminated by user
32	ME currently unable to process command
48	Command beyond ME's capabilities
132	ME currently unable to process command because screen is busy

#### 9.12.6. AT^SSSTR SAT Response - Send Short Message (19)

The TE is expected to acknowledge the [AT^SSSTGI](#) response with [AT^SSSTR](#) to confirm that the Proactive Command has been executed.

### Syntax

Write Command

AT^SSSTR=19, <status>

Response(s)

^SSSTR: 19, <TerminationQualifier>, <TerminationCauseText>  
OK

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + - -



### Parameter Description

<status><sup>(num)</sup>

0...255

0	Command performed successfully. Indicate that the user has accepted the Send SMS request.
4	Command performed successfully, but requested icon could not be displayed.
32	ME currently unable to process command
48	Command beyond ME's capabilities
132	ME currently unable to process command because screen is busy

#### 9.12.7. AT^SSTR SAT Response - Send DTMF (20)

The TE is expected to acknowledge the [AT^SSTGI](#) response with [AT^SSTR](#) to confirm that the Proactive Command has been executed.

#### Syntax

Write Command

AT^SSTR=19, <status>

Response(s)

^SSTR: 19, <TerminationQualifier>, <TerminationCauseText>

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -



### Parameter Description

<status> <sup>(num)</sup>	
0...255	
0	Command performed successfully. Indicate that the user has accepted the Send DTMF request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
32	ME currently unable to process command
48	Command beyond ME's capabilities
132	ME currently unable to process command because screen is busy

#### 9.12.8. AT^SSTR SAT Response - Launch Browser (21)

The TE is expected to acknowledge the [AT^SSTGI](#) response with [AT^SSTR](#) to confirm that the Proactive Command has been executed.

#### Syntax

Write Command

AT^SSTR=21, [<status>](#)

Response(s)

OK

PIN	ASC0	MUX1	MUX2	MUX3		Last
-	+	+	+	+	-	-



### Parameter Description

<status><sup>(num)</sup>

0...255

0	Command performed successfully. Indicate that the user has accepted the Launch Browser request.
4	Command performed successfully, but requested icon could not be displayed.
32	ME currently unable to process command
34	User did not accept the proactive command. Indicate that the user has denied the Launch Browser request
38	Launch Browser generic error with additional information "No specific cause can be given".
48	Command beyond ME's capabilities
132	ME currently unable to process command because screen is busy
138	Launch Browser generic error with additional information "Bearer unavailable".
238	Launch Browser generic error with additional information "Browser unavail-able".
239	Launch Browser generic error with additional information "ME unable to read the provisioning data".

#### 9.12.9. AT^SSTR SAT Response - Play Tone (32)

The TE is expected to acknowledge the [AT^SSTGI](#) response with [AT^SSTR](#) to confirm that the Proactive Command has been executed.

#### Syntax

Write Command

AT^SSTR=32, <status>

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -



### Parameter Description

<status><sup>(num)</sup>

0...255

0	Command performed successfully. Indicate that the user has accepted the call request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
32	ME currently unable to process command
48	Command beyond ME's capabilities
132	ME currently unable to process command because screen is busy

### Note

- It is possible for the TE to stop playing the tone by sending the [AT^SSTR](#) before Tone is finished.

### 9.12.10. AT^SSTR SAT Response - Display Text (33)

The TE is expected to acknowledge the [AT^SSTGI](#) response with [AT^SSTR](#) to confirm that the Proactive Command has been executed.

### Syntax

Write Command

AT^SSTR=33, <status>

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3 🔔 Last

- + + + + - -



### Parameter Description

<status> <sup>(num)</sup>	
0...255	
0	Command performed successfully. Indicate that the user has accepted the call request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
17	Backward move in the proactive SIM session requested by the user
18	No response from user
32	ME currently unable to process command
48	Command beyond ME's capabilities
132	ME currently unable to process command because screen is busy

#### 9.12.11. AT^SSTR SAT Response - Get Inkey (34)

The TE is expected to acknowledge the [AT^SSTGI](#) response with [AT^SSTR](#) to confirm that the Proactive Command has been executed.

#### Syntax

```
Write Command
AT^SSTR=34, <status>, , <inputString>

Response(s)
OK
```

PIN	ASC0	MUX1	MUX2	MUX3	🔊	Last
-	+	+	+	+	-	-



## Parameter Description

`<status>`<sup>(num)</sup>

0...255

0	Command performed successfully. Indicate that the user has accepted the call request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
17	Backward move in the proactive SIM session requested by the user
18	No response from user
19	Help information required by the user
32	ME currently unable to process command
48	Command beyond ME's capabilities
132	ME currently unable to process command because screen is busy

`<inputString>`<sup>(str)</sup>

User response entered as a string parameter

### Notes

- Coding of any input character is related to the selected alphabet:
  - Input of a character in case of GSM character set requests one byte, e.g. "Y".
  - Input of any characters in UCS2 alphabet requests a 4 byte set, e.g. "0059" is coding the same character "Y".
  - If, as a user response, a binary choice (Yes/No) is requested by the SIM application using bit 3 of the `<commandDetails>` parameter the valid content of the `<inputString>` is: a) GSM alphabet: "Y" or "y" (positive answer) and "N" or "n" (negative answer). b) UCS2 alphabet "0079" or "0059" (positive answer) and "006E" or "004E" (negative answer). For more detailed information refer to [AT^SSTGI](#).
  - Coding of an empty string is done as a "\1b" string with every alphabet.
  - The `<Alphabet>` parameter of [AT^SSTA](#) determines the alphabet used on the AT command interface, while the value reported by the `<commandDetails>` bit 2 of the [AT^SSTGI=34](#) command determines the set of characters allowed. If these alphabet settings are different, the following applies:  
Example: If UCS2 alphabet is selected with [AT^SSTA](#) and the `<commandDetails>` bit 2 of the [AT^SSTGI=34](#) command is reported as "SMS default alphabet (GSM character set)" any input has to be done in UCS2 alphabet. However, take care to enter only UCS2 characters for which equivalent characters are defined in the SMS (GSM) default alphabet. In this case, the ME will correctly translate the given UCS2 data into a TERMINAL RESPONSE coded in SMS (GSM) default alphabet.



### 9.12.12. AT^SSTR SAT Response - Get Input (35)

The TE is expected to acknowledge the [AT^SSTGI](#) response with [AT^SSTR](#) to confirm that the Proactive Command has been executed.

#### Syntax

Write Command

```
AT^SSTR=35, <status>, , <inputString>
```

Response(s)

```
OK
```

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

#### Parameter Description

<status><sup>(num)</sup>

0...255

0	Command performed successfully. Indicate that the user has accepted the call request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
17	Backward move in the proactive SIM session requested by the user
18	No response from user
19	Help information required by the user
32	ME currently unable to process command
48	Command beyond ME's capabilities
132	ME currently unable to process command because screen is busy

<inputString><sup>(str)</sup>

User response entered as a string, length depends on the [<responseMin>](#) and [<responseMax>](#) values returned by the related [AT^SSTGI=35](#) command.



### Notes

- Coding of any input character is related to the selected alphabet:
  - Input of a character in case of GSM character set requests one byte, e.g. "Y".
  - Input of any characters in UCS2 alphabet requests a 4 byte set, e.g. "0059" is coding the same character "Y".
  - Coding of an empty string is done as a "\1b" string with every alphabet.
- The `<Alphabet>` parameter of `AT^SSTA` determines the alphabet used on the AT command interface, while the value reported by the `<commandDetails>` bit 2 of the `AT^SSTGI=35` command determines the set of characters allowed. If these alphabet settings are different, the following applies: Example: If UCS2 alphabet is selected with `AT^SSTA` and the `<commandDetails>` bit 2 of the `AT^SSTGI=35` command is reported as "SMS default alphabet (GSM character set)" any input has to be done in UCS2 alphabet. However, take care to enter only UCS2 characters for which equivalent characters are defined in the SMS (GSM) default alphabet. In this case, the ME will correctly translate the given UCS2 data into a TERMINAL RESPONSE coded in SMS (GSM) default alphabet.

### 9.12.13. AT^SSTR SAT Response - Select Item (36)

The TE is expected to acknowledge the `AT^SSTGI` response with `AT^SSTR` to confirm that the Proactive Command has been executed. The TE sends a response that can indicate the user's intentions, e.g. when the user is requesting help or selecting a menu item.

GSM11.14 states:

"When the ME issues a successful TERMINAL RESPONSE ('0X' result value ...) for a SELECT ITEM command, it shall supply the identifier of the item selected by the user in the Item identifier data object. If the ME issues a TERMINAL RESPONSE with result "Help information required by the user" for a SELECT ITEM command, it shall supply the identifier of the item for which the user is requiring help information. All other types of TERMINAL RESPONSE do not need to include Item identifier. If one is included by the ME, the SIM shall ignore it."

For compatibility reasons `<itemId>` is optional in case of `<status>=19` ("Help information required by the user"). In this case `<itemId>=0` is sent to the SIM.



## Syntax

Write Command

AT^SSSTR=36, <status>, , <itemId>

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + - -

## Parameter Description

<status><sup>(num)</sup>

0...255

0	Command performed successfully. Indicate that the user has accepted the call request.
4	Command performed successfully, but requested icon could not be displayed.
16	Proactive SIM session terminated by user
17	Backward move in the proactive SIM session requested by the user
18	No response from user
19	Help information required by the user
32	ME currently unable to process command
48	Command beyond ME's capabilities
132	ME currently unable to process command because screen is busy

<itemId><sup>(num)</sup>

Item IDs are supplied by the SIM Application

1...255 ID of selected item can be issued if a <status> value of 0 is returned

### 9.12.14. AT^SSSTR SAT Response - Setup Menu (37)

The TE is expected to acknowledge the [AT^SSTGI](#) response with [AT^SSSTR](#) to confirm that the Proactive Command has been executed.



## Syntax

Write Command

AT^SSTR=37, <status>

Response(s)

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

-	+	+	+	+	-	-
---	---	---	---	---	---	---

## Parameter Description

<status><sup>(num)</sup>

0...255

0	Command performed successfully. Indicate that the user has accepted the call request.
4	Command performed successfully, but requested icon could not be displayed.
32	ME currently unable to process command
48	Command beyond ME's capabilities
132	ME currently unable to process command because screen is busy

## Note

- The response simply conveys, to the SAT, the information that the main menu was received and set up on the user interface. It does not transmit any information about a selected item, like in the case of [AT^SSTR](#).  
Once this command was executed the user can proceed as described in the [AT^SSTR SAT Response - Setup Menu \(37\)](#).

### 9.12.15. AT^SSTR SAT Response - Set Up Idle Mode Text (40)

The TE is expected to acknowledge the [AT^SSTGI](#) response with [AT^SSTR](#) to confirm that the Proactive Command has been executed.



### Syntax

Write Command

AT^SSTR=40, <status>

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + - -

### Parameter Description

<status><sup>(num)</sup>

0...255

0	Command performed successfully. Indicate that the user has accepted the call request.
4	Command performed successfully, but requested icon could not be displayed.
32	ME currently unable to process command
48	Command beyond ME's capabilities
132	ME currently unable to process command because screen is busy

#### 9.12.16. AT^SSTR SAT Response - Language Notification (53)

The TE is expected to acknowledge the [AT^SSTGI](#) response with [AT^SSTR](#) to confirm that the Proactive Command has been executed. The TE indicates whether the Language Notification command was correctly executed.

### Syntax

Write Command

AT^SSTR=53, <status>

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + - -



### Parameter Description

<status><sup>(num)</sup>

0...255

0 Command performed successfully. Indicate that the user has accepted the call request.

### 9.12.17. AT^SSSTR SAT Event - Menu Selection (211)

The TE specifies the user's selection of an item from the main menu, which was set up using SETUP MENU command. Alternatively help can be requested.

#### Syntax

Write Command

AT^SSSTR=211, <status>, <itemId>

Response(s)

OK

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### Parameter Description

<status><sup>(num)</sup>

0...255

0 Command performed successfully.

19 Help information required by the user, no other value can be returned.

<itemId><sup>(num)</sup>

ID of selected item

0...255

### 9.12.18. AT^SSSTR SAT Event - User Activity (232)

Sent by the customer application to indicate that a key has been pressed.



**Syntax**

Write Command  
AT^SSTR=232

Response(s)  
OK

PIN	ASC0	ASC1	MUX1	MUX2	MUX3		Last
-	+	+	+	+	+	-	-

**9.12.19. AT^SSTR SAT Event - Idle Screen Available (233)**

Sent by the customer application to indicate that the screen has become idle.

**Syntax**

Write Command  
AT^SSTR=233

Response(s)  
OK

PIN	ASC0	MUX1	MUX2	MUX3		Last
-	+	+	+	+	-	-

**9.12.20. AT^SSTR SAT Event - Language Selection (235)**

Sent by the customer application to indicate that the customer application has changed the language.

The last value given via this command is also provided to the SIM as response to the proactive command "Provide Local Information (Language Setting)".

**Syntax**

Write Command  
AT^SSTR=235, , , <inputString>

Response(s)  
OK

PIN	ASC0	MUX1	MUX2	MUX3		Last
-	+	+	+	+	-	-



### Parameter Description

`<inputString>(str)`

Two character language tag, e.g. "en" for English or "de" for German. Default value is "en".

#### 9.12.21. AT^SSTR SAT Event - Browser Termination (236)

Sent by the customer application to indicate that the internet browser application has been terminated.

#### Syntax

Write Command

AT^SSTR=236, , , <TermCause>

Response(s)

OK

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

### Parameter Description

`<TermCause>(num)`

Browser Termination Cause

0...255

0 User termination.

1 Error termination

#### 9.12.22. AT^SSTR SAT Event - Terminate Command (254)

This command allows the TE to finish an ongoing proactive command. This is done by sending repeatedly a Terminal Response "ME currently unable to process command" to the SIM (see GSM 11.14), if issued in states PAC or WAIT. No action is performed if the interface is already in IDLE state. However, the command returns "OK".

The reaction to the terminal response depends on the SIM application. The command can be used to return to IDLE state regardless whether a proactive command is ongoing or not.



## Syntax

Write Command

```
AT^SSSTR=254
```

Response(s)

```
OK
```

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

## Note

- This command is allowed in states IDLE, PAC and WAIT and forces a return to IDLE state.

### 9.12.23. Examples for Using Remote-SAT

To give you an idea of how to start and use Remote-SAT, you may follow the steps described below:

```
// Start after switch on the module
```

```
at
```

```
OK
```

```
// Switch on verbose error messages
```

```
at+cmee=2
```

```
OK
```

```
// Enter the PIN code (if necessary due to SIM configuration)
```

```
at+cpin=1234
```

```
OK
```

```
// Query the Remote-SAT activation status
```

```
at^ssta?
```

```
^SSTA: 1,0,1,"6FFFFFFF7F0300DF7F"
```

```
OK
```

// First '1' indicates that the interface is in OFF state, i.e. the Automatic Response (AR) mode is enabled.

During this mode all SAT Proactive Commands are handled internally by the ME.

```
// Tell the module that the TE ; is interested in handling SAT, i.e. switch to Explicit Response (ER) mode.
```

```
at^ssta=1,0
```



OK

// This setting takes effect after next start of the ME only, so switch off first

AT^SMSO

^SMSO: MS OFF

OK

^SHUTDOWN

// Switch on ME again and wait until system start indication (if not in autobaud mode, refer AT+IPR)

^SYSSTART

// Switch on verbose error messages

at+cmee=2

OK

// Enter the PIN code (if necessary due to SIM configuration)

at+cpin=1234

OK

// Receiving the first proactive command (if the mounted SIM carries a SIM Application)

^SSTN:37

// Requesting parameter details

at^sstgi=37

// These are the details:

^SSTGI: 37,0,3,"SAT Special Menu",0,1,1,0

^SSTGI: 37,1,"News",0,0

^SSTGI: 37,2,"EMail",0,0

^SSTGI: 37,3,"Banking",0,0

OK

// To query the status of the proactive command

at^sstr=37,0

OK

// SAT indicates that the proactive session has ended and enters its main menu (which should then be opened on the screen by an MMI): ^SSTN:254



```
// Selecting item number 1 of the menu sent before: at^sstr=211,0,1  
OK
```

```
// Receiving the next proactive command:
```

```
^SSTN:36
```

```
// Requesting more information...
```

```
at^sstgi=36
```

```
// ... and get it:
```

```
^SSTGI: 36,0,12,"Rubriken >",0,0,1,1,0
```

```
^SSTGI: 36,1,"News >",0,0
```

```
^SSTGI: 36,2,"Stock Infos>",0,0
```

```
^SSTGI: 36,3,"Aktien D >",0,0
```

```
^SSTGI: 36,4,"Aktien INT >",0,0
```

```
^SSTGI: 36,5,"Sports >",0,0
```

```
^SSTGI: 36,6,"1.BL-Clubs >",0,0
```

```
^SSTGI: 36,7,"Unterhaltung>",0,0
```

```
^SSTGI: 36,8,"Horoskop >",0,0
```

```
^SSTGI: 36,9,"Wetter D >",0,0
```

```
^SSTGI: 36,10,"Wetter INT >",0,0
```

```
^SSTGI: 36,11,"Wetter spez>",0,0
```

```
^SSTGI: 36,63,"Extras >",0,0
```

```
OK
```

```
// Remember to acknowledge:
```

```
at^sstr=36,0,63
```

```
OK
```

```
// And again: Receiving the next proactive command:
```

```
^SSTN:36
```

```
// ...
```

### **Examples**

#### EXAMPLE 1

```
// Switch on verbose error messages
```

```
at+cmee=2
```

```
OK
```



EXAMPLE 2

```
// Enter the PIN code
at+cpin=1234
OK
```

EXAMPLE 3

```
// Start Remote-SAT
at^ssta=1,0
OK
```

EXAMPLE 4

```
// Proactive command "GET INKEY" is issued by the SIM
^SSTN: 34
```

EXAMPLE 5

```
// Get complete data
at^sstgi=34
^SSTGI: 34,0,"<COLOUR-ICON>",1,2
OK
```

EXAMPLE 6

```
// Use GET RESPONSE command (192) to analyze SIM file EF-IMG (hex. 4F20)
at+crsm=192,20256,0,0,15
+CRSM: 144,0,000000644F20040014F04401020114
OK
```

EXAMPLE 7

```
// Use READ RECORD command (178) to get its content
at+crsm=178,20256,2,4,20
+CRSM: 144,0,010808214F0200000016FFFFFFFFFFFFFFFFFFFFFFF
OK
```

EXAMPLE 8

```
// Use READ BINARY command (176) to get content of image instance data file (e.g. hex 4F02)
at+crsm=176,20226,0,0,22
+CRSM: 144,0,080802030016AAAA800285428142814281528002AAAA
OK
```

```
at+crsm=176,20226,0,22,9
```



```
+CRSM: 144,0,FF000000FF000000FF  
OK
```

EXAMPLE 9

```
// Finalize Proactive Command session  
at^sstr=34,0, "+"  
OK
```

EXAMPLE 10

```
// Session end indication, i.e. display SAT main menu  
^SSTN: 254
```



## 10. Phonebook Commands



The AT Commands described in this chapter used to operate with phonebooks located in the MG21's memory or on the attached SIM.

Phonebook
AT+CNUM
AT+CPBF
AT+CPBR
AT+CPBS
AT+CPBW
AT^SDLD
AT^SPBC
AT^SPBD
AT^SPBG
AT^SPBS



## 10.1. 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>](#)

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	+	+	-	-

Reference(s)

GSM 07.07

### Parameter Description

[<alpha>](#)<sup>(str)</sup>

Optional alphanumeric string associated with [<number>](#).

[<number>](#)<sup>(str)</sup>

Phone number in format specified by [<type>](#).

[<type>](#)<sup>(str)</sup>

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.



## 10.2. AT+CPBF Find Phonebook Entries

### Syntax

Test Command

AT+CPBF=?

Response(s)

+CPBF: maximum length of field <nlength>,maximum length of field <tlength>  
OK

If error is related to ME functionality:

+CME ERROR: <err>

Write Command

AT+CPBF=[<findtext>]

Response(s)

TA returns phone book entries (from the current phone book memory storage selected with +CPBS) which contains alphanumeric string <findtext>.

[+CPBF:<index1>,<number>,<type>,<text>][----]  
<CR><LF>[+CBPF:<index2>,<number>,<type>,<text>]  
OK

### Parameter Description

<index1><sup>(num)</sup>

integer type values in the range of location numbers of phonebook memory

<index2><sup>(num)</sup>

integer type values in the range of location numbers of phonebook memory

<number><sup>(str)</sup>

string type (string should be included in quotation marks) phone number of format <type>

<type><sup>(num)</sup>

type of address octet in integer format;

129	Unknown type (ISDN format number)
161	National number type (ISDN format)
145	International number type (ISDN format)
177	Network specific number (ISDN format)



`<text>(str)`

string type(string should be included in quotation marks) field of maximum length `<tlength>` in current TE character set specified by +CSCS.

`<nlength>(num)`

integer type value indicating the maximum length of field `<number>`

`<tlength>(num)`

integer type value indicating the maximum length of field `<text>`



### 10.3. 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 parentheses.

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 "OK" will be returned.

#### Syntax

Test Command

AT+CPBR=?

Response(s)

+CPBR: (1-<maxloc>), <nlength>, <tlength>

OK

ERROR

+CME ERROR: <err>

Write Command

AT+CPBR=<location1>[, <location2>]

Response(s)

[+CPBR: <location1>, <number>, <type>, <text>]

[+CPBR: <location2>, <number>, <type>, <text>]

OK

ERROR

+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	🔊	Last
+	+	+	+	+	-	-

Reference(s)

GSM 07.07, GSM 11.11

#### Parameter Description

**<location1>**<sup>(num)</sup>

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><sup>(num)</sup>

The last (highest) location number within phonebook memory where to stop reading. The maximum range supported by the current phonebook is given in the test command response.

If both <location1> and <location2> are in the range indicated by the test command parameter <maxloc>, the list of entries will be output and terminated with "OK".

If <location2> exceeds the range indicated by the test command parameter <maxloc>, the list of entries will be output but terminated with "+CME ERROR: invalid index".

### <number><sup>(str)</sup>

Phone number in format specified by <type>, it may be an empty string.

### <type><sup>(num)</sup>

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:

- |     |  |
|-----|--|
| 145 | Dialing string <number> includes international access code character '+'   |
| 161 | National number. Network support of this type is optional.   |
| 209 | Dialing string <number> has been saved as ASCII string and includes non-digit characters other than "*", "#", "+" or "p". Note that phonebook entries saved with this type cannot be dialed. |
| 255 | Dialing string <number> is a command to control a Supplementary Service, i.e. "*", "#" codes are contained. Network support of this type is optional.  |
| 129 | Otherwise  |

### <text><sup>(str)(+CSGS)</sup>

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.

### <maxloc><sup>(num)</sup>

Maximum location number for the currently selected storage. For phonebooks located on the SIM this value depends on the SIM card type.



**<nlength><sup>(num)</sup>**

Maximum length of phone number for "normal" locations. Depending on the storage a limited number of locations with extended memory is available per phonebook. These locations allow storing numbers with twice the standard length, which is  $2 * \text{<nlength>}$  digits for normal numbers, but only  $\text{<nlength>}$  digits for numbers saved with  $\text{<type>}=209$ .

**<tlength><sup>(num)</sup>**

Maximum length of  $\text{<text>}$  assigned to the telephone number. The value indicated by the test command is given in octets. If  $\text{<text>}$  is given as GSM characters each character corresponds to one octet. If the  $\text{<text>}$  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 [21]. In the worst case the number of UCS2 characters is at least one less than half the number of GSM characters.

#### **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.



## 10.4. 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  
ERROR  
+CME ERROR: **<err>**

#### Read Command

AT+CPBS?

#### Response(s)

+CPBS: **<storage>**, **<used>**, **<total>**  
OK  
ERROR  
+CME ERROR: **<err>**

#### Write Command

AT+CPBS=**<storage>**

#### Response(s)

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

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + + + - -

#### Reference(s)

GSM07.07



## Parameter Description

<storage><sup>(str)</sup>

“FD“	Fixed dialing phonebook Capacity: depending on SIM Location: SIM
“SM“ <sup>(&amp;F)(P)</sup>	SIM phonebook Capacity: depending on SIM Location: SIM
“ON“	MSISDN list Capacity: depending on SIM Location: SIM
“ME“	Mobile Equipment Phonebook Capacity: max. 250 entries Location: ME
“LD“	Last number dialed phonebook. Stores all voice call numbers dialed with ATD, but no data call numbers. Capacity: max. 10 entries Location: depending on SIM this phonebook may reside partly or completely in ME <a href="#">AT+CPBW</a> command is not applicable to this storage. The LD list can be deleted with <a href="#">AT^SDLD</a> or with <a href="#">AT^SPBD</a> .
“MC“	Missed (unanswered received) calls list Capacity: max. 10 entries Location: ME <a href="#">AT+CPBW</a> command is not applicable to this storage. The MC list can be deleted with <a href="#">AT^SPBD</a> .
“RC“	Received calls list Capacity: max. 10 entries Location: ME <a href="#">AT+CPBW</a> command is not applicable to this storage. The RC list can be deleted with <a href="#">AT^SPBD</a> .
“VM“	CPHS voice mailbox phonebook Capacity: 1 or 2 entries, depending on SIM 1 - Line 1 mailbox 2 - Line 2 mailbox Location: SIM



<used><sup>(num)</sup>

Value indicating the number of used locations in selected memory storage.

<total><sup>(num)</sup>

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.
- If the SIM card is changed, all records of the "MC", "RC" and "LD" phonebooks stored on the ME will be deleted automatically. If the same SIM is removed and reinserted, no automatic deletion is performed. Calls made after last switch-on will be cleared from the "MC", "RC" and "LD" phonebook, if the SIM is removed and reinserted during normal operation.
- Missed and received calls which are not presented to the called party are not stored in MC and RC phonebook.



## 10.5. 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 parentheses.

### Syntax

Test Command

AT+CPBW=?

Response(s)

+CPBW: (1-**<maxloc>**), **<nlength>**, (list of supported **<type>**s), **<tlength>**

OK

ERROR

+CME ERROR: **<err>**

Write Command

AT+CPBW=[**<location>**][, **<number>**[[, **<type>**][, **<text>**]]]

Response(s)

OK

ERROR

+CME ERROR: **<err>**

PIN	ASC0	MUX1	MUX2	MUX3	🔒	Last
+	+	+	+	+	-	-

Reference(s)

GSM 07.07, GSM 04.08

### Parameter Description

**<location>**<sup>(num)</sup>

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><sup>(str)</sup>

Phone number in format specified by <type>. Parameter must be present, although it may be an empty string. Alphabetic characters are not permitted. The <number> may contain dialstring modifiers "\*", "#", "+" or "p".

If other printable 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 "p" 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><sup>(num)</sup>

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:

- |     |   |
|-----|---|
| 145 | Dialing string <number> includes international access code character "+"  |
| 161 | National number. The network support for this type is optional.   |
| 209 | Dialing string <number> will be saved as ASCII string.<br>This is the default value, if <type> is not specified explicitly and characters other than "*", "#", "+" or "p" are included in <number>.<br>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 lead-ing "+", then this sign is removed.   |

### <text><sup>(str)(+CSCS)</sup>

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.



`<maxloc>(num)`

Maximum number of locations supported by the currently selected storage. For phonebooks located on SIM, this value varies depending on the SIM card. See [AT+CPBS](#) for typical values.

`<nlength>(num)`

Maximum length of phone number for "normal" locations. Depending on the storage, a limited number of locations with extended memory is available per phonebook. These locations allow storing numbers with twice the standard length, which is  $2 * \text{<nlength>}$  digits for normal numbers, but only `<nlength>` digits for numbers saved with parameter `<type>= 209`. If all extended locations of the selected phonebook are used up, then any attempt to write a number which requires extended memory will be denied with "+CME ERROR: invalid dial string".

`<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.

#### 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.
- During [AT+CPBW](#) write command it is possible that in some cases returns "+CME ERROR: operation temporary not allowed". Use [AT+CPBW](#) write command again.
- DTMF transmission:  
If a dial string contains the call modifier "p" the digits after this call modifier will be saved as DTMF tones. The DTMF tones 'A', 'B', 'C' and 'D' can not be saved due to BCD limitations.

#### Examples

##### EXAMPLE 1

Make a new phonebook entry at the first free location

```
AT+CPBW=,"+431234567",145,"international"
```



#### EXAMPLE 2

Delete entry at location 1

```
AT+CPBW=1
```

#### EXAMPLE 3

The following examples are provided to illustrate the effect of writing phonebook entries with different types of dial string modifiers in `<number>`

```
AT+CPBW=5,"12345678",,"Arthur"  
AT+CPBW=6,"432!p-765()&54*654#",,"John"  
AT+CPBW=7,"432!p-765()&54*654#",129,"Eve"  
AT+CPBW=8,"432!p-765()&54*654#",145,"Tom"  
AT+CPBW=9,"432!p-765()&54*654#",209,"Richard"
```

#### EXAMPLE 4

Read phonebook entries from locations 5 - 9 via [AT+CPBR](#)

```
+CPBR:5,"12345678",129,"Arthur"  
+CPBR:6,"432!p-765()&54*654#",209,"John"  
+CPBR:7,"432p76554*654#",129,"Eve"  
+CPBR:8,"+432p76554*654#",145,"Tom"  
+CPBR:9,"432!p-765()&54*654#",209,"Richard"
```



## 10.6. AT^SDLD Delete the 'last number redial' memory

AT^SDLD deletes all numbers stored in the "LD" memory.

### Syntax

Test Command

```
AT^SDLD=?
```

Response(s)

```
OK
```

Exec Command

```
AT^SDLD
```

Response(s)

```
OK
```

```
ERROR
```

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

PIN	ASC0	MUX1	MUX2	MUX3		Last
+	+	+	+	+	-	-

### Note

- Users should be aware that when using this AT command quickly after SIM PIN authentication the SIM data may not yet be accessible, resulting in a short delay before the requested AT command response is returned.



## 10.7. AT<sup>^</sup>SPBC Find first matching entry in sorted phonebook

The AT<sup>^</sup>SPBC write command searches the current phonebook for the index number of the first (lowest) entry that matches the character specified with <schar>. The AT<sup>^</sup>SPBC test command returns the list of phonebooks which can be searched through with AT<sup>^</sup>SPBC.

CAUTION: Please note that AT<sup>^</sup>SPBC is assigned the same index as AT<sup>^</sup>SPBG or AT<sup>^</sup>SPBS which is not identical with the physical location numbers used in the various phonebooks. Therefore, do not use the index numbers retrieved with AT<sup>^</sup>SPBC to dial out or modify phonebook entries.

### Syntax

Test Command

AT<sup>^</sup>SPBC=?

Response(s)

<sup>^</sup>SPBC: (list of supported <storage>s)

OK

ERROR

+CME ERROR: <err>

Write Command

AT<sup>^</sup>SPBC=<schar>

Response(s)

<sup>^</sup>spbc: <index>

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

+ + + + + - -

### Parameter Description

<storage><sup>(str)</sup>

Response parameter of AT<sup>^</sup>SPBC test command.

For a detailed description of storages see AT+CPBS.

“FD“	Fixed dialing phonebook
“SM“	SIM phonebook
“ME“	Mobile Equipment Phonebook

<schar><sup>(str)</sup>

First character of the entry to be searched in the sorted list of phonebook entries.



<index><sup>(num)</sup>

In the active phonebook, the first (lowest) index number of an entry beginning with <schar>. As stated above, the retrieved index number shall not be used to dial out or edit phonebook entries. If no matching phonebook entry is found, <index>=0 will be returned.

### **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.



## 10.8. AT^SPBD Purge phonebook memory storage

**AT^SPBD** can be used to purge the selected phonebook `<storage>` manually, i.e. all entries stored in the selected phonebook storage will be deleted. CAUTION! The operation cannot be stopped nor reversed! The **AT^SPBD** test command returns the list of phonebooks which can be deleted with **AT^SPBD**.

An automatic purge of the phonebooks is performed when the SIM card is removed and replaced with a different SIM card. This affects the ME based part of the "LD" storage, and storages "MC" and "RC". Storage "ME" is not affected.

### Syntax

Test Command

```
AT^SPBD=?
```

Response(s)

```
^SPBD: (list of supported <storage>s)  
OK  
ERROR  
+CME ERROR: <err>
```

Write Command

```
AT^SPBD=<storage>
```

Response(s)

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

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
+	+	+	+	+	-	-

### Parameter Description

`<storage>`<sup>(str)</sup>

If test command: List of phonebooks which can be deleted by **AT^SPBD**.

If write command: Phonebook to be deleted.

For a detailed description of storages see **AT+CPBS**.

"LD"	Last number dialed phonebook
"MC"	Missed (unanswered received) calls list
"RC"	Received calls list



**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.



## 10.9. AT^SPBG Display phonebook entries in alphabetical order

**AT^SPBG** sorts the entries of the current phonebook in alphabetical order by name (the first six characters matter).

There are two ways to use **AT^SPBG**:

- If the optional parameter **<RealLocReq>** equals 0 or is omitted the sorted entries will be sequentially numbered. As these numbers are not identical with the location numbers stored in the various phonebooks **AT^SPBG** can be used for reading only. For example, it helps you find entries starting with matching characters. Do not use the serial numbers to dial out or modify entries.
- If parameter **<RealLocReq>=1** is given by the write command, the response parameter **<location>** additionally appended to each entry indicates the actual location number. This number can be used for editing with **AT+CPBW** or dialing with **ATD<mem><n>**. The first index number of each entry is only the serial number of the sorted list.

Before using the **AT^SPBG** write command it is recommended to query the number of records currently stored in the active phonebook (refer to test command parameter **<used>**). The test command also includes the parameters **<nlength>** and **<tlength>**. Note that if SIM storage is selected the length may not be available. If storage does not offer format information, the format list should be empty parentheses.

### Syntax

Test Command

AT^SPBG=?

Response(s)

^SPBG: (1-<used>), <nlength>, <tlength>

OK

ERROR

+CME ERROR: <err>

Write Command

AT^SPBG=<index1>[, <index2>][, <RealLocReq>]

Response(s)

[^SPBG: <index1>, <number>, <type>, <text>[, <location>]]

[^SPBG: <index2>, <number>, <type>, <text>[, <location>]]

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

+ + + + + - -



### **Parameter Description**

**<index1><sup>(num)</sup>**

First index number in the sorted list where to start reading. The supported range is given in the test command response.

If <index 1> exceeds the upper bound **<used>**, "+CME ERROR: invalid index" will be returned.

**<index2><sup>(num)</sup>**

Last index number in the sorted list where to stop reading. The supported range is given in the test command response.

If **<index2>** is not given via write command, only the entry located at **<index1>** will be displayed.

If both **<index1>** and **<index2>** are in the range indicated by the test command parameter **<used>**, the list of entries will be output and terminated with OK.

If **<index2>** exceeds the range indicated by the test command parameter **<used>**, the list of entries will be output but terminated with a "+CME ERROR: invalid index".

**<RealLocReq><sup>(num)</sup>**

Is a display of the "real" **<location>** of the entry required?

- |     |   |
|-----|---|
| [0] | Do not show an entry's "real" location number. Parameter <b>&lt;location&gt;</b> will not be displayed. |
| 1   | Show the "real" location number as parameter <b>&lt;location&gt;</b> at the end of each entry.          |

**<number><sup>(str)</sup>**

String type phone number in format specified by **<type>**.

The number parameter may be an empty string.



#### <type><sup>(num)</sup>

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. See also <type> of [AT+CPBW](#).

Possible values are:

- |     |  |
|-----|--|
| 145 | Dialing string <number> includes international access code character '+'   |
| 161 | National number. Network support of this type is optional.   |
| 209 | Dialing string <number> has been saved as ASCII string and includes non-digit characters other than "*", "#", "+" or "p". Note that phonebook entries saved with this type cannot be dialed. |
| 255 | Dialing string <number> is a command to control a Supplementary Service, i.e. "*", "#" codes are contained. Network support of this type is optional.  |
| 129 | Otherwise  |

#### <text><sup>(str)(+CSCS)</sup>

Text assigned to the phone number. The maximum length for this parameter is given in test command response <tlength>.

#### <used><sup>(num)</sup>

Value indicating the number of used locations in selected memory storage.

#### <location><sup>(num)</sup>

The location within phonebook memory at which the corresponding entry is located. This location may be used for other commands (e.g. [AT+CPBR](#) or [ATD<mem><n>](#))

#### <nlength><sup>(num)</sup>

Maximum length of phone number for "normal" locations. Depending on the storage, a limited number of locations with extended memory is available per phonebook. Please refer to AT command [AT+CPBW](#) for detail.

#### <tlength><sup>(num)</sup>

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 according to GSM 11.11, Annex B. In the worst case the number of UCS2 characters is at least one less than half the number of GSM characters.

### Notes

- The command can be used for the phonebooks "SM", "FD", "ME" (cf. [AT+CPBS](#)).
- 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.

### Examples

#### EXAMPLE 1

Using `AT^SPBG` without `<RealLocReq>`:

```
AT^SPBG=?
^SPBG: (1-33),20,17
AT^SPBG=1,33
^SPBG:1,"+999999",145,"Arthur"
^SPBG:2,"+777777",145,"Bill"
^SPBG:3,"+888888",145,"Charlie"
.....
```

The numbers at the beginning of each line are not the memory locations in the phonebook, but only serial numbers assigned to the entries' positions in the alphabetical list.

#### EXAMPLE 2

Using `AT^SPBG` with `<RealLocReq>`:

```
AT^SPBG=?
^SPBG: (1-33),20,17
AT^SPBG=1,33,1
^SPBG:1,"+999999",145,"Arthur",27
^SPBG:2,"+777777",145,"Bill",6
^SPBG:3,"+888888",145,"Charlie",15
.....
```

The numbers at the end of each line are the memory locations in the phonebook and can be used for dialing or editing phonebook entries:

```
AT+CPBR=27
+CPBR: 27,"+999999",145,"Arthur"
Read out phonebook location 27.
This entry can be edited with AT+CPBW or used for dialing with ATD<mem><n>.
```

T



## 10.10. AT^SPBS Step through the selected phonebook alphabetically

**AT^SPBS** can be used to scroll sequentially through the active phonebook records in alphabetical order by name. Three entries will be displayed at a time.

Every time the write command is executed, 3 rows of phonebook records are returned. Each triplet overlaps with the next one. The actual index depends on parameter `<value>`. This parameter determines whether the index will be increased or decreased.

If the index in one output line reaches the last index in the alphabetical list, the next output line will display the first list entry.

After the last record of the phonebook has been reached (see parameter `<used>` for **AT^SPBG**), the `<internal-counter>` switches over to the first.

There are two ways to use **AT^SPBS**:

If the optional parameter `<RealLocReq>` is omitted or (0) the sorted entries will be sequentially numbered. As these numbers are not identical with the location numbers stored in the various phonebooks **AT^SPBS** can be used for reading only. For example, it helps you find entries starting with matching characters. Do not use the serial numbers to dial out or modify entries.

If parameter `<RealLocReq>=1` is given by the write command, the response parameter `<location>` additionally appended to each entry indicates the actual location number. This number can be used for editing with **AT+CPBW** or dialing with **ATD<mem><n>**. The first index number of each entry is only the serial number of the sorted list.

See examples below.

### Syntax

Test Command

**AT^SPBS=?**

Response(s)

^SPBS: (list of supported `<value>`)  
OK

Write Command

**AT^SPBS=<value>[, <RealLocReq>]**

Response(s)

^SPBS: `<index-a>`, `<number>`, `<type>`, `<text>`[, `<location>`]  
^SPBS: `<index-b>`, `<number>`, `<type>`, `<text>`[, `<location>`]  
^SPBS: `<index-c>`, `<number>`, `<type>`, `<text>`[, `<location>`]  
OK  
ERROR  
+CME ERROR: `<err>`

PIN ASC0 MUX1 MUX2 MUX3 ☺ Last

+ + + + + - -



### Parameter Description

**<value>**<sup>(num)</sup>

- |   |   |
|---|---|
| 1 | To make a step forward in the alphabetically sorted phonebook.  |
| 2 | To make a step backward in the alphabetically sorted phonebook. |

**<index-a>**<sup>(num)</sup>

- |              |   |
|--------------|---|
| 1...maxindex | <p>The index in the sorted list of phonebook entries that identifies the first entry displayed. The value of <b>&lt;index-a&gt;</b> is determined by the value of the <b>&lt;internal-counter&gt;</b> and by parameter <b>&lt;value&gt;</b>.</p> <p>After a write command has terminated successfully with "OK", the value from parameter <b>&lt;index-a&gt;</b> is saved and retained as the new <b>&lt;internal-counter&gt;</b> value.</p> <p>Mind after the last record of phonebook, the first entry follows.</p> |
|--------------|---|

**<index-b>**<sup>(num)</sup>

- |              |   |
|--------------|---|
| 1...maxindex | <p>The index in the sorted list of phonebook entries that identifies the second entry displayed.</p> <p><b>&lt;index-b&gt;= (&lt;index-a&gt;+1).</b></p> <p>Mind after the last record of phonebook, the first entry follows.</p> |
|--------------|---|

**<index-c>**<sup>(num)</sup>

- |              |  |
|--------------|--|
| 1...maxindex | <p>The index in the sorted list of phonebook entries that identifies the third entry displayed.</p> <p><b>&lt;index-c&gt;= (&lt;index-b&gt;+1).</b></p> <p>Mind after the last record of phonebook, the first entry follows.</p> |
|--------------|--|

**<number>**<sup>(str)</sup>

String type phone number in format specified by **<type>**.  
the number parameter may be an empty string.



### <type><sup>(num)</sup>

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. See also <type> of [AT+CPBW](#).

Possible values are:

- |     |  |
|-----|--|
| 145 | Dialing string <number> includes international access code character '+'   |
| 161 | National number. Network support of this type is optional.   |
| 209 | Dialing string <number> has been saved as ASCII string and includes non-digit characters other than "*", "#", "+" or "p". Note that phonebook entries saved with this type cannot be dialed. |
| 255 | Dialing string <number> is a command to control a Supplementary Service, i.e. "*", "#" codes are contained. Network support of this type is optional.  |
| 129 | Otherwise  |

### <text><sup>(str)(+CSCS)</sup>

Text assigned to the phone number.

### <RealLocReq><sup>(num)</sup>

Is a display of the "real" <location> of the entry required?

- |     |   |
|-----|---|
| [0] | Do not show an entry's "real" location number. Parameter <location> will not be displayed |
| 1   | Show the "real" location number as parameter <location> at the end of the entry           |

### <location><sup>(num)</sup>

The location within phonebook memory at which the corresponding entry is located. This location may be used for other phonebook commands (e.g. [AT+CPBR](#), [AT+CPBW](#), [ATD<mem><n>](#)).

### <internal-counter><sup>(num)</sup>

- |                                   |   |
|-----------------------------------|---|
| 0 <sup>(&amp;F)</sup> ...maxindex | This parameter is only an internal parameter and cannot be modified directly. The internal counter will be reset to index 0 after a call to <a href="#">ATZ</a> or <a href="#">AT&amp;F</a> . |
|-----------------------------------|---|



## Notes

- The complete list of sorted entries can be retrieved using AT command [AT^SPBG](#).
- The command can be used for the phonebooks "SM", "FD", "ME" (cf. [AT+CPBS](#)).
- 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.

## Examples

### EXAMPLE 1

This example illustrates how to search down and up again using [AT^SPBS=1](#) and 2:

```
at&f
OK
at^spbs=1
^SPBS:1,"+999999",145,"Arthur"
^SPBS:2,"+777777",145,"Bill"
^SPBS:3,"+888888",145,"Charlie"

OK
at^spbs=1
^SPBS:2,"+777777",145,"Bill"
^SPBS:3,"+888888",145,"Charlie"
^SPBS:4,"0304444444",129,"Esther"

OK
at^spbs=1
^SPBS:3,"+888888",145,"Charlie"
^SPBS:4,"0304444444",129,"Esther"
^SPBS:5,"0303333333",129,"Harry"

OK
at^spbs=2
^SPBS:2,"+777777",145,"Bill"
^SPBS:3,"+888888",145,"Charlie"
^SPBS:4,"0304444444",129,"Esther"

OK
```

First, [AT&F](#) is issued to make sure that [AT^SPBS=1](#) starts from the first character in alphabetical order.

### EXAMPLE 2

This example shows that when the last index in the sorted list has been reached, the internal counter overflows to the first index.

```
at&f
OK
at^spbs=2
^SPBS:33,"+49301234567",145,"TomTailor"
^SPBS:1,"+999999",145,"Arthur"
^SPBS:2,"+777777",145,"Bill"
OK
```

Reset internal counter to 0.

Step down one entry starting from (internal counter)=0 - overflow occurs.



### EXAMPLE 3

Using [AT^SPBS](#) with [<RealLocReq>](#)=1 in order to obtain the entries' location numbers:

```
at^spbs=1,1
```

```
^SPBS:1,"+999999",145,"Arthur",27  
^SPBS:2,"+777777",145,"Bill",6  
^SPBS:3,"+888888",145,"Charlie",15
```

The numbers at the end of each line are the memory locations in the phonebook and can be used for dialing or editing phonebook entries:

```
at+cpbr=27
```

```
+CPBR: 27,"+999999",145,"Arthur"
```

Read out phonebook location 27.

This entry can be edited with [AT+CPBW](#) or used for dialing with [ATD<mem><n>](#).



## 11. Audio Commands



The AT Commands described in this chapter used to operate with MG21's audio interface.

Audio
ATL
ATM
AT+CLVL
AT+CMUT
AT+VTD
AT+VTS
AT^SNFA
AT^SNFD
AT^SNFG
AT^SNFI
AT^SNFM
AT^SNFO
AT^SNFPT
AT^SNFS
AT^SNFTTY
AT^SNFV
AT^SNFW
AT^SRTC



## 11.1. ATL Set monitor speaker loudness

ATL is implemented for V.250ter compatibility reasons only, and has no effect. In multiplex mode (refer AT+CMUX) the command is supported on logical channel 1 only.

### Syntax

Exec Command

ATL[<val>]

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	-	-	-	-

Reference(s)

V.250

### Parameter Description

<val><sup>(num)</sup>



## 11.2. ATM Set monitor speaker mode

ATM is implemented for V.250ter compatibility reasons only, and has no effect. In multiplex mode (refer AT+CMUX) the command is supported on logical channel 1 only.

### Syntax

Exec Command

ATM[<val>]

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	-	-	-	-

Reference(s)

V.250

### Parameter Description

<val><sup>(num)</sup>



## 11.3. AT+CHFA      Swap The Audio Channels

### Syntax

Test Command

AT+CHFA=?

Response(s)

+CHFA: (0 = NORMAL\_AUDIO, 1 = AUX\_AUDIO)  
OK

Read Command

AT+CHFA?

Response(s)

+CHFA: <n>  
OK

Write Command

AT+CHFA=[<n>]

Response(s)

OK  
+CME ERROR: <err>

### Parameter Description

<n><sup>(num)</sup>

0	Normal audio channel(default)
1	Aux audio channel

### Note

- This Command swaps the audio channels between the normal channel and the aux channel.
- For this command, please refer to actual model.



## 11.4. AT+CLVL Loudspeaker volume level

### Syntax

Test Command

AT+CLVL=?

Response(s)

+CLVL: (list of supported<level>s)  
OK

Read Command

AT+CLVL?

Response(s)

+CLVL: <level>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

AT+CLVL=<level>

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 🔔 Last

- + + + + - -

Reference(s)

GSM 07.07

### Parameter Description

<view><sup>(num)</sup>

Loudspeaker Volume Level

0...4<sup>(D)</sup>



### Notes

- The write command can only be used in audio mode 2 - 6.
- The values of the volume steps are specified with the parameters `<outCalibrate>[0],...<outCalibrate>[4]` of the `AT^SNFO` command.
- As an alternative to `AT+CLVL`, you can use `AT^SNFO` and `AT^SNFV`. The parameter `<level>` is identical with `<outStep>` used by both commands.
- Any change to `<level>` (or `<outStep>`) takes effect in audio modes 2 to 6. That is, when you change `<level>` (or `<outStep>`) and then select another mode with `AT^SNFS`, the same step will be applied. The only exception is audio mode 1 which is fixed to `<level>=4` (or accordingly `<outStep>=4`).
- `<level>` (or `<outStep>`) is stored non-volatile when the ME is powered down with `AT^SMSO` or reset with `AT+CFUN=1,1`.



## 11.5. AT+CMIC      Change The Microphone Gain Level

### **Syntax**

Test Command

AT+CMIC=?

Response(s)

+CMIC: (list of supported <channel>s) , (list of supported <gainlevel>s)

OK

Read Command

AT+CMIC?

Response(s)

+ CMIC: <gainlevel(Main\_Mic)>, <gainlevel(Aux\_Mic)>

OK

Write Command

AT+CMIC=<channel>,<gainlevel>

Response(s)

OK

ERROR

### **Parameter Description**

<channel><sup>(num)</sup>

0	Main Microphone
1	Aux Microphone



<gainlevel><sup>(num)</sup>

int: 0 – 15

0	0dB
1	+1.5dB
2	+3.0 dB
3	+4.5 dB
4	+6.0 dB
5	+7.5 dB
6	+9.0 dB
7	+10.5 dB
8	+12.0 dB
9	+13.5 dB
10	+15.0 dB
11	+16.5 dB
12	+18.0 dB
13	+19.5 dB
14	+21.0 dB
15	+22.5 dB

**Note**

- Please refer to actual model for channel number.



## 11.6. AT+CMUT Mute control

The **AT+CMUT** command mutes the microphone input. The command can be used in all audio modes (1 to 6), during a voice call only. See **AT^SNFS** for more details on the various audio modes. As alternative, you can use the **AT^SNFM** command.

During an active call, users should be aware that when they switch back and forth between different audio modes (for example handsfree on/off) the value of **<mute>** does not change, i.e. the microphone mode is retained until explicitly changed.

### Syntax

Test Command

AT+CMUT=?

Response(s)

+CMUT: (list of supported<mute>s)

OK

Read Command

AT+CMUT?

Response(s)

+CMUT: <mute>

OK

ERROR

+CME ERROR: <err>

Write Command

AT+CMUT=<mute>

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

Reference(s)

GSM 07.07

### Parameter Description

<mute><sup>(num)</sup>

0<sup>(P)</sup> Mute off

1 Mute on



## 11.7. AT+CRSL Ringer Sound Level

### Syntax

Test Command

AT+CRSL=?

Response(s)

+CRSL: (list of supported <level>s)

OK

+CME ERROR: <err>

Read Command

AT+CRSL?

Response(s)

+CRSL: <level>

OK

+CME ERROR: <err>

Write Command

AT+CRSL=<level>

Response(s)

OK

+CME ERROR: <err>

Reference(s)

GSM 07.07 [13]

### Parameter Description

<level><sup>(num)</sup>

integer type value (1-100) with manufacturer specific range (smallest value represents the lowest sound level)



## 11.8. AT+SIDET      Change The Side Tone Gain Level

### Syntax

Test Command

AT+SIDET=?

Response(s)

+SIDET: (list of supported <channel>s),(list of supported <gainlevel>s)  
OK

Read Command

AT+SIDET?

Response(s)

+SIDET: <gainlevel>,<gainlevel>  
OK

Write Command

AT+SIDET=<channel>,<gainlevel>

Response(s)

OK  
ERROR

### Parameter Description

<channel><sup>(num)</sup>

0	normal channel
1	aux channel

<gainlevel><sup>(num)</sup>

int: 0–16

### Note

- <gainlevel> value is related to channel specific.



## 11.9. AT+SIMTONE Generate Specifically Tone

### Syntax

Test Command

```
AT+ SIMTONE=?
```

Response(s)

```
+SIMTONE: (0 , 1), (20-20000), (0-5000), (0-5000), (0-500000)
```

```
OK
```

Write Command

```
AT+ SIMTONE=<mode>,<frequency>,<periodOn>,<periodOff>[,<duration>]
```

Response(s)

```
OK
```

```
ERROR
```

### Parameter Description

<mode><sup>(num)</sup>

0 Stop playing tone

1 Start playing tone

<frequency>

the frequency of tone to be generated

<periodon>

the period of generating tone

<periodoff>

the period of stopping tone

<duration>

duration of tones in milliseconds



## 11.10. AT+VTD Tone duration

This command refers to an integer `<duration>` that defines the length of tones transmitted with the AT+VTS command.

### Syntax

<p>Test Command</p> <p>AT+VTD=?</p> <p>Response(s)</p> <p>+VTD: (list of supported&lt;duration&gt;s)</p> <p>OK</p>															
<p>Read Command</p> <p>AT+VTD?</p> <p>Response(s)</p> <p>&lt;duration&gt;</p> <p>OK</p> <p>ERROR</p> <p>+CME ERROR: &lt;err&gt;</p>															
<p>Write Command</p> <p>AT+VTD=&lt;duration&gt;</p> <p>Response(s)</p> <p>OK</p> <p>ERROR</p> <p>+CME ERROR: &lt;err&gt;</p>															
<table border="1"> <thead> <tr> <th>PIN</th> <th>ASC0</th> <th>MUX1</th> <th>MUX2</th> <th>MUX3</th> <th>🔊</th> <th>Last</th> </tr> </thead> <tbody> <tr> <td>-</td> <td>+</td> <td>+</td> <td>+</td> <td>+</td> <td>-</td> <td>-</td> </tr> </tbody> </table>	PIN	ASC0	MUX1	MUX2	MUX3	🔊	Last	-	+	+	+	+	-	-	<p>Reference(s)</p> <p>GSM 07.07</p>
PIN	ASC0	MUX1	MUX2	MUX3	🔊	Last									
-	+	+	+	+	-	-									

### Parameter Description

`<duration>`<sup>(num)</sup>

Duration of the DTMF signal in 1/10 seconds with tolerance.

The minimum duration of DTMF signals is 300ms. DTMF tones below 300ms cannot be generated.

1<sup>(&F)(P)</sup> ...255



## 11.11. AT+VTS DTMF and tone generation

**AT+VTS** is intended to send ASCII characters or strings which cause the Mobile Switching Center (MSC) to transmit DTMF tones to a remote subscriber. The command can be used in alert state and during active voice calls and offers the following variants:

- **AT+VTS=<dtmfString>** allows to send a sequence of DTMF tones with a duration defined with AT+VTD.
- **AT+VTS=<dtmf>[,<duration>]** allows to send a single DTMF tone. In this case, the duration can be individually determined during the call.

### Syntax

Test Command

AT+VTS=?

Response(s)

+VTS: (list of supported<dtmf>s), (list of supported<duration>s)

OK

Read Command

AT+VTS=<dtmfString>

Response(s)

OK

ERROR

+CME ERROR: <err>

Write Command

AT+VTS=<dtmf>[, <duration>]

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 🔔 Last

- + + + + - -

Reference(s)

GSM 07.07

### Parameter Description

<dtmfString><sup>(str)</sup>

String of ASCII characters in the set 0-9,#,\*,A, B, C, D. Maximal length of the string is 29. The string must be enclosed in quotation marks ("...").

<dtmf><sup>(str)</sup>

ASCII character in the set 0...9,#,\*, A, B, C, D.



<view><sup>(num)</sup>

Tone duration in 1/10 seconds with tolerance. If not specified current setting of [AT+VTD](#) is used.

The minimum duration of DTMF signals is 300ms. DTMF tones below 300ms cannot be generated.

1...255

### **Note**

- When using DTMF during active voice calls use [AT^SM20](#) and set [<CallMode>](#) to 0.



## 11.12. AT^SNFA Set or query of microphone attenuation

**AT^SNFA** specifies the large-scale attenuation on the microphone path of the audio device currently selected with **AT^SNFS**. The write command is only available in audio modes 2 to 6.

### Syntax

Test Command

AT^SNFA=?

Response(s)

^SNFA: (list of supported <atten>s)

OK

Read Command

AT^SNFA?

Response(s)

^SNFA: <atten>

OK

ERROR

+CME ERROR: <err>

Write Command

AT^SNFA=<atten>

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -



## Parameter Description

<view>(num)

Multiplication factor for input samples. Parameter <atten> is identical with <inCalibrate> of AT^SNFI. Formula used to calculate microphone attenuation (negative gain):

Gain in dB =  $20 * \log(\text{<atten>/32768})$

0...32767(P)...65535

0	Microphone is muted. Please note that AT^SNFA cannot be used to mute the microphone. Therefore, any attempt to enter 0 will be rejected with error response. Value 0 is returned only by the read command AT^SNFA? after the microphone was muted with AT^SNFM=0 during an active call.
32767	No attenuation on the microphone path Values greater than 32767 will be suppressed to 32767.

## Notes

- This command is provided for compatibility with former products (e.g. M20) and is a subset of AT^SNFI. The parameter <inCalibrate> of AT^SNFI is identical with <atten> of AT^SNFA.
- To make the changes persistent use AT^SNFW.

## Example

```
^SYSSTART
at^snfa=?
^SNFA: (0-65535)
OK
at^snfa?
^SNFA: 32767
OK
at^snfs=4
OK
at^snfa=1
OK
at^snfa?
^SNFA: 1
OK
at^snfi?
^SNFI: 5,1
OK
at^snfi=5,45
OK
at^snfa?
^SNFA: 45
OK
```



### 11.13. AT^SNFD Set audio parameters to manufacturer default values

**AT^SNFD** sets the active audio parameters to manufacturer defined default values. These default values can be changed and stored by the user and also by download with a new set of parameters. The restored values are:

**AT^SNFA:** <atten>

**AT^SNFI:** <inBbcGain>, <inCalibrate>

**AT^SNFO:** <outBbcGain>, <outCalibrate>[0 to 4], <sideTone>

**AT^SNFS:** <audMode>

#### Syntax

Test Command

```
AT^SNFD=?
```

Response(s)

```
OK
```

Exec Command

```
AT^SNFD
```

Response(s)

```
OK
```

```
ERROR
```

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

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

#### Note

- Remember that the factory set audio mode 1 is fixed to <outStep>=4. Consequently, **AT^SNFD** restores <audMode> together with <outStep>=4, but does not affect the values of <outStep> currently selected in audio modes 2 - 6. This means, if <audMode>=1, the read commands **AT^SNFO**, **AT^SNFV** and **AT+CLVL** will always deliver <outStep>=4. In all other modes the <outStep> value is retained until explicitly changed.



## 11.14. AT^SNFG Generate Tone

The AT^SNFG write command generates a 'local tone' via the selected audio output device. Beside the duration up to 3 combinations of frequency and amplitude can be used to compose a local tone.

### Syntax

Test Command

AT^SNFG=?

Response(s)

^SNFG:(list of supported <duration>s), (list of supported <frequency>s), (list of supported <amplitude>s)[, ...]  
OK

Write Command

AT^SNFG=<duration>[, <frequency>, <amplitude>[, <frequency>, <amplitude>[, <frequency>, <amplitude>]]]

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 🔔 Last

- + + + + - -



## Parameter Description

**<duration><sup>(num)</sup>**

in Milliseconds.

0...65535

0 Mutes the currently played tone immediately.

65535 Activates a tone with infinite duration.

**<frequency><sup>(num)</sup>**

in Hertz

200...3400

to be input in 1 Hz steps. Audible bandwidth is limited due to the voice band filters.

**<amplitude><sup>(num)</sup>**

of the tone generator belonging to a frequency.

0...100

The output level at the speaker is dependent of the [<outBbcGain>](#) value (see [AT^SNFO](#)).

If more than one tone should be played, each amplitude level will be divided by the number of running tones to avoid overdriving of the internal amplifier. For example, if three tones with amplitude of 30 units should be generated each amplitude is reduced to 10. Setting of amplitude to 100 corresponds with using of current [<outB-bcGain>](#) value (see [AT^SNFO](#)), 0 is mute.

## Notes

- Response of the command is always "OK" as long as the input parameters are valid.
- If more than one pair of [<frequency>](#) and [<amplitude>](#) is used then the amplitude for each frequency is divided by the number of pairs.
- Tone priorities  
Ring tones (incoming call/short message), Supervisory tones, Call Progress tones, RTC tones and DTMF tones always have higher priority than a local tone. This means a local tone will be played only if no module tone with a higher priority is being played. A local tone will be stopped and ended when a tone or melody from the module starts to play.
- To suspend a local tone from playing use "AT^SNFG=0".
- Switching the tone generator on and off will trigger [AT+CIND](#) indicator "sounder" depending on current [AT+CMER](#) settings.
- If there is a voice call active then the local tone is mixed into the voice signal. In case of a multi party call the local tones are not available.



## 11.15. AT^SNFI Set microphone path parameters

AT^SNFI controls the microphone path amplification. Read and write options of this command refer to the active audio mode. The write command works only in audio modes 2 to 6.

### Syntax

Test Command

AT^SNFI=?

Response(s)

^SNFI: (list of supported <inBbcGain>s) , (list of supported <inCalibrate>s)

OK

Read Command

AT^SNFI?

Response(s)

^SNFI: <inBbcGain>, <inCalibrate>

OK

ERROR

+CME ERROR: <err>

Write Command

AT^SNFI=<inBbcGain>, <inCalibrate>

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -



### Parameter Description

`<inBbcGain>`<sup>(num)(^SNFW)</sup>

ADC gain adjustable in seven 6 dB steps and one 3 dB step from 0 dB to 39 dB (0=0dB ... 6=36dB, 7=39dB).  
0...7

`<inCalibrate>`<sup>(num)(^SNFW)</sup>

Multiplication factor for input samples. Formula to calculate the negative gain (attenuation) of the input signal:  
Gain in dB =  $20 * \log(\text{inCalibrate} / 32768)$   
0...32767

### Notes

- The range of `<inCalibrate>` is up to 65535 but will be suppressed to 32767. Values above `<inCalibrate>`=65535 will cause a failure.
- The parameter `<inCalibrate>` of `AT^SNFI` is identical with `<atten>` of `AT^SNFA`.
- For use after restart, changed values can be stored with `AT^SNFW`.
- Attention! 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!



## 11.16. AT^SNFM Set microphone audio path and power supply

The AT^SNFM read command returns the microphone mute and supply voltage status.

The AT^SNFM write command can be used to switch the microphone's audio path (muted / not muted) or to control the power supply of the VMIC line for the microphone input of the analog audio interface.

The microphone can be muted or activated by changing <MicSwitch> in all audio modes (1 to 6), during a voice call only. As an alternative, you can use the AT+CMUT command to mute the microphone.

### Syntax

Test Command

AT^SNFM=?

Response(s)

^SNFM: (list of supported <MicSwitch>s) , (list of supported <MicVccCtl>s)  
OK

Read Command

AT^SNFM?

Response(s)

^SNFM: <MicSwitch>, <MicVccState>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

AT^SNFM=[<MicSwitch>][, <MicVccCtl>]

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -



### Parameter Description

#### <MicSwitch><sup>(num)</sup>

Microphone mute control parameter.

Evaluated only during voice calls and if <MicVccCtl> is omitted, e.g. `AT^SNFM=1`.

Command does not depend on audio mode.

- |                  |                           |
|------------------|---------------------------|
| 0                | Mutes the microphone.     |
| 1 <sup>(P)</sup> | Activates the microphone. |

#### <MicVccCtl><sup>(num)</sup>

Microphone supply voltage control parameter.

CME error is given if <MicSwitch> is not omitted. Enter for example `AT^SNFM=,1` or `AT^SNFM=,2`.

- |                  |  |
|------------------|--|
| 0                | Supply voltage is always switched off.   |
| 1                | Supply voltage is always switched on.  |
| 2 <sup>(P)</sup> | Supply voltage state during voice calls is controlled by the ME. The current value is determined by the parameter data set of the selected audio mode. |

#### <MicVccState><sup>(num)</sup>

Microphone supply voltage control status.

- |   |  |
|---|--|
| 0 | Supply voltage was set to a constant value.  |
| 2 | Supply voltage state is controlled by the ME and depends on the parameter data set of the selected audio mode. |

### Notes

- The programmable power supply of the VMIC line gives you greater flexibility in connecting audio accessories.
- The change of the microphone supply voltage control parameter <MicVccCtl> takes no effect when the call is active. After having established a new call it takes effect.
- During an active call, users should be aware that when they switch back and forth between different audio modes (for example handsfree on/off) the value of <MicSwitch> does not change, i.e. the microphone mode is retained until explicitly changed.



## 11.17. AT^SNFO Set audio output (= loudspeaker path) parameter

**AT^SNFO** controls the earpiece path amplification. The read and write commands refer to the active audio mode. The write command works only in audio modes 2 to 6.

### Syntax

Test Command

AT^SNFO=?

Response(s)

^SNFO: (list of supported <outBbcGain>s), <outCalibrate>[0], <outCalibrate>[1], <outCalibrate>[2], <outCalibrate>[3], <outCalibrate>[4], (list of supported <outStep>s), (list of supported <sideTone>s)  
OK

Read Command

AT^SNFO?

Response(s)

^SNFO: <outBbcGain>, <outCalibrate>[0], <outCalibrate>[1], <outCalibrate>[2], <outCalibrate>[3], <outCalibrate>[4], <outStep>, <sideTone>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

AT^SNFO=<outBbcGain>, <outCalibrate>[0], <outCalibrate>[1], <outCalibrate>[2], <outCalibrate>[3], <outCalibrate>[4], <outStep>, <sideTone>

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + - -

### Parameter Description

<outBbcGain><sup>(num)(^SNFW)</sup>

Negative DAC gain (attenuation) adjustable in four 6 dB steps from 0 dB to -18 dB (0=0 dB, 3=-18 dB)

0...3



**<outCalibrate>**<sup>(num)(^SNFW)</sup>

Formula to calculate the value of the 5 volume steps selectable with parameter **<outStep>**:

Attenuation =  $20 * \log (2 * \text{outCalibrate}[n] / 32768)$

0...32767

**<outStep>**<sup>(num)</sup>

Volume steps 0 - 4, each defined with outCalibrate[n]

0...[4]

**<sideTone>**<sup>(num)(^SNFW)</sup>

Multiplication factor for the sidetone gain. Formula to calculate how much of the original microphone signal is added to the earpiece signal: Sidetone gain in dB =  $20 * \log (\text{sideTone} / 32768)$ .

0...32767

### Notes

- **<outCalibrate>** specifies the amount of volume of each **<outStep>**. The range of each **<outCalibrate>** is up to 65535, but will be suppressed to 32767. A value above **<outCalibrate>**= 65535 will cause an error.
- The range of **<sideTone>** is up to 65535, but will be suppressed to 32767. A value above **<sideTone>**= 65535 will cause an error.
- Any change to **<outStep>** takes effect in audio modes 2 to 6. That is, when you change **<outStep>** and then select another mode with **AT^SNFS**, the same step will be applied. Nevertheless, the sound quality and the amount of volume are not necessarily the same, since all remaining audio parameters can use different values in either mode.
- Audio mode 1 is fixed to **<outStep>**=4. In this mode, any attempt to change **<outStep>** or other parameters returns an error.
- The value of **<outStep>** is stored non-volatile when the ME is powered down with **AT^SMSO** or reset with **AT+CFUN=x,1**. Any other parameters changed with **AT^SNFO** need to be saved with **AT^SNFW** for use after restart. See also **AT^SNFD** for details on restoring factory defaults.
- The values of **<outStep>** can also be changed with **AT^SNFV** and **AT+CLVL**.
- 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!



## 11.18. AT^SNFPT Set progress tones

**AT^SNFPT** controls the Call Progress Tones generated at the beginning of a mobile originated call setup. Please note that the setting is stored volatile, i.e. after restart or reset, the default value 1 will be restored.

### Syntax

Test Command

```
AT^SNFPT=?
```

Response(s)

```
^SNFPT: (list of supported <pt>s)  
OK
```

Read Command

```
AT^SNFPT?
```

Response(s)

```
^SNFPT: <pt>  
OK  
ERROR  
+CME ERROR: <err>
```

Write Command

```
AT^SNFPT=<pt>
```

Response(s)

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

PIN	ASC0	MUX1	MUX2	MUX3	🔊	Last
-	+	+	+	+	-	-

### Parameter Description

<pt><sup>(num)</sup>

0	Disables Call Progress Tones
1 <sup>(P)</sup>	Enables Call Progress Tones (audible tones shortly heard on the phone when ME starts to set up a call.)



## 11.19. AT^SNFS Select audio hardware set

The `AT^SNFS` write command serves to set the audio mode required for the connected equipment.

### Syntax

Test Command

```
AT^SNFS=?
```

Response(s)

```
^SNFS: (list of supported <audMode>s)
```

```
OK
```

Read Command

```
AT^SNFS?
```

Response(s)

```
^SNFS: <audMode>
```

```
OK
```

```
ERROR
```

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

Write Command

```
AT^SNFS=<audMode>
```

Response(s)

```
OK
```

```
ERROR
```

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

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -



## Parameter Description

<audMode><sup>(num)(^SNFW)</sup>

- |                  |   |
|------------------|---|
| 0                | Audio mode 0: Test mode with activated audio loop. It is not possible to switch to this mode using <a href="#">AT^SNFS</a> . Use <a href="#">AT^SCFG="Audio/Loop"</a> instead (see description for <a href="#">AT^SCFG</a> parameter <al> for details).   |
| 1 <sup>(P)</sup> | Audio mode 1: Standard mode optimized for the reference handset, that can be connected to the analog audio interface. To adjust the volume use the knob of the reference handset. In audio mode 4, this handset can be used with user defined parameters.<br><br>Note: The default parameters are determined for type approval and are not adjustable with AT commands.<br><br><a href="#">AT^SNFD</a> restores <audMode> 1 |
| 2                | Audio mode 2: Customer specific mode for a basic handsfree (speakerphone) device (Car Kit Portable).  |
| 3                | Audio mode 3: Customer specific mode for a mono-headset.  |
| 4                | Audio mode 4: Customer specific mode for a user handset.  |
| 5                | Audio mode 5: Customer specific mode.   |
| 6                | Audio mode 6: Customer specific mode.   |



## 11.20. AT^SNFTTY Signal TTY/CTM audio mode capability

MG21 offers basic support for equipment using the CTM standard (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.

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 MG21 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 CTM device to be connected to one of the three audio interfaces of MG21. Traditional TTY devices that do not incorporate CTM functionality can be connected through an external TTY-to-CTM adapter.

Related documents: Refer to the relevant standards, such as 3GPP TS 26.226 (ETSI TS 126 226) and 3GPP TS 23.228 (ETSI TS 123 226). 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 MG21.

Requirements for using TTY/CTM features:

- The TTY/CTM functionality requires audio mode 5 or 6 which is set by AT^SNFS. Recommended is AT^SNFS=6, with AT^SNFI=1,32767. When the appropriate audio settings are enabled you may select either AT^SNFTTY=1 or 2.



## Syntax

Test Command

AT^SNFTTY=?

Response(s)

^SNFTTY: (list of supported <audioState>s)  
OK

Read Command

AT^SNFTTY?

Response(s)

^SNFTTY: <audioState>  
OK  
ERROR  
+CME ERROR: <err>

Write Command

AT^SNFTTY=<audioState>

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + - -

## Parameter Description

<audioState><sup>(num)</sup>

- |                  |   |
|------------------|---|
| 0 <sup>(P)</sup> | Audio path is in normal speech mode.                |
| 1                | Audio path is in TTY/CTM mode (external CTM modem). |
| 2                | Audio path is in TTY/CTM mode (internal CTM modem). |



## 11.21. AT^SNFV Set loudspeaker volume

`AT^SNFV` can be used to set the volume of the loudspeaker to the value `<outCalibrate>` addressed by `<outStep>`. The read and write commands refer to the active audio mode. The write command works only in audio modes 2 to 6.

### Syntax

Test Command

```
AT^SNFV=?
```

Response(s)

```
^SNFV: (list of supported <outStep>s)  
OK
```

Read Command

```
AT^SNFV?
```

Response(s)

```
^SNFV: <outStep>  
OK  
ERROR  
+CME ERROR: <err>
```

Write Command

```
AT^SNFV=<outStep>
```

Response(s)

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

PIN	ASC0	MUX1	MUX2	MUX3	☞	Last
-	+	+	+	+	-	-

### Parameter Description

`<outStep>`<sup>(num)</sup>

The actual volume of each step is defined by the parameter `<outCalibrate>`, which can be set with `AT^SNFO`.  
0...4(P)



### Notes

- Any change to `<outStep>` takes effect in audio modes 2 to 6. That is, when you change `<outStep>` and then select another mode with `AT^SNFS`, the same step will be applied. Nevertheless, the actual volume can be quite different, depending on the values of `<outCalibrate>` set in each mode. The only exception is audio mode 1 which is fixed to `<outStep>=4`.
- `<outStep>` is stored non-volatile when the ME is powered down with `AT^SMSO` or reset with `AT+CFUN=1,1`.  
`<outStep>` is not stored by `AT^SNFW`.
- `<outStep>` can also be changed by `AT^SNFO` and `AT+CLVL`.



## 11.22. AT^SNFW Write audio setting in non-volatile store

**AT^SNFW** causes the TA to write the currently selected audio parameters to non-volatile store. The saved audio profile includes the following parameters:

**AT^SNFA:** <atten>

**AT^SNFI:** <inBbcGain>, <inCalibrate>

**AT^SNFO:** <outBbcGain>, <outCalibrate>[0 to 4], <sideTone>

**AT^SNFS:** <audMode>

### Syntax

Test Command

AT^SNFW=?

Response(s)

OK

Exec Command

AT^SNFW

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -



### 11.23. AT^SRTC Ring tone configuration

The `AT^SRTC` read command returns the current `<type>` and current `<volume>`. The read command can be used while test playback is off or on. In the latter case, see execute command for details.

The `AT^SRTC` execute command is intended only for testing. It starts to play a melody from the audio output currently selected with `AT^SNFS`. To deactivate test playback use `AT^SRTC` again. During test playback, you can enter the write command to select another melody and adjust the volume. Also, you can enter the read command to check the type and volume of the current ring tone, and to view the status of playback (on / off).

The `AT^SRTC` write command chooses the type and volume of ring tones. The selected `<type>` and `<volume>` are stored non-volatile. The only exception is `<type>=0` which is not stored because it is intended only to quickly mute the tone currently played. So `<type>=0` only stops immediately the audible ring tone, but does not terminate the RING URC.

#### Syntax

Test Command

```
AT^SRTC=?
```

Response(s)

```
^SRTC:(list of supported) <type>s, (list of supported) <volume>s  
OK
```

Read Command

```
AT^SRTC?
```

Response(s)

```
^SRTC: <type>, <volume>, <status>  
OK  
ERROR  
+CME ERROR: <err>
```

Exec Command

```
AT^SRTC
```

Response(s)

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



Write Command

```
AT^SRTC=[<type>][, <volume>]
```

Response(s)

```
^SRTC: <type>, <volume>
```

```
OK
```

```
ERROR
```

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

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### ***Parameter Description***

<type><sup>(num)</sup>

Type of ring tone. You have a choice of 7 different ring tones and melodies. All will be played from the audio output selected with the [AT^SNFS](#) command. <type>=0 is only intended for muting.

0	Mutes the currently played tone immediately.
1	Sequence 1
2	Sequence 2
3 <sup>(D)</sup>	Sequence 3
4	Sequence 4
5	Sequence 5
6	Sequence 6
7	Sequence 7



### <volume><sup>(num)</sup>

Volume of ring tone, varies from low to high

0 <sup>(D)</sup>	Mute
1	Very low
2	Identical with 1
3	Low
4	Identical with 3
5	Middle
6	Identical with 5
7	High

### <status><sup>(num)</sup>

Status of test ringing. Indicates whether or not a melody is currently being played back for testing

0	Switched off
1	Switched on

#### **Note**

- Before first using ring tones note that the following settings apply:

We have chosen to let you decide your own preferences when you start using ring tones. Therefore, factory setting is `AT^SRTC=3,0,0` (ring tones are muted). To activate ring tones for the very first time, first enter the write command and simply change the volume. After applying a firmware update the volume and type selected before the firmware update will be preserved.



## 12. Hardware related Commands



The AT Commands described in this chapter used to operate with MG21's hardware interface and configure the GPIO pins.

Hardware	GPIO
AT+CADC	AT^SCPIN
AT+CALA	AT^SGIO
AT+CBC	AT^SPIO
AT+CCLK	AT^SSIO
AT^SBV	
AT^SCTM	
AT^SRADC	
AT^SSPI	
AT^SSYNC	
AT^SWDAC	



## 12.1. AT+CALA Alarm Configuration

**AT+CALA** allows to set an alarm time for the MG21. When the alarm time is reached and the alarm is executed the ME returns an Unsolicited Result Code (URC) and the alarm time is reset to "00/01/01,00:00:00".

The alarm can adopt two functions, depending on whether or not you switch the GSM engine off after setting the alarm:

- **Reminder message:** You can use the alarm function to generate reminder messages. For this purpose, set the alarm as described below and do not switch off or power down the ME. When executed the message comes as "+CALA" URC which optionally may include a user defined `<text>`.
- **Alarm mode:** You can use the alarm function to restart the ME when powered down. For this purpose, set the alarm as described below. Then power down the ME via `AT^SMSO`. When the alarm time is reached the ME will wake up to Alarm mode, notified by the "`^SYSSTART ALARM MODE`" URC and, if configured, by an additional "+CALA" URC with a user defined `<text>`.

During Alarm mode the ME is deregistered from the GSM network and only a limited number of AT commands is available.

To return the ME to full operation (normal operating mode) it is necessary to restart the ME by driving the ignition line (IGT pin of application interface) to ground or by using `AT+CFUN=x,1`. Transition to Normal mode is indicated by the "`^SYSSTART`" URC if `AT+IPR` is set to a fixed bit rate.

**AT+CALA** test command returns the supported array index values `<n>`, the supported alarm types `<type>` and the maximum length of the text `<length>`.

**AT+CALA** read command returns the current alarm settings.

### Syntax

Test Command

AT+CALA=?

Response(s)

+CALA: (list of supported`<n>`s), (list of supported`<type>`s), (list of supported`<length>`s)

OK

ERROR

+CME ERROR: `<err>`

Read Command

AT+CALA?

Response(s)

+CALA: `<time>`, `<n>`, `<type>`, `<text>`

+CALA: ...

OK

ERROR

+CME ERROR: `<err>`

Write Command



AT+CALA=<time>, <n>[, <type>[, <text>]]

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + + -

Reference(s)

GSM 07.07

### Unsolicited Result Codes

#### URC 1

+CALA: [<text>]

Indicates reminder message.

#### URC 2

^SYSSTART ALARM MODE

+CALA: <text>

Indicates ME wake-up into Alarm mode.

#### URC 3

+CALA: Unexpected Error

Indicates Unexpected CALA functionality error. When such an error occurs all alarm timers will be stopped and reset to default values.

### Parameter Description

<time><sup>(str)</sup>

Format is "yy/MM/dd, hh:mm:ss". For example, 6th of July 2005, 22:10:00 equals to "05/07/06,22:10:00". See also [AT+CCLK](#).

If you attempt to set <time> to a date and time which is older than the ME's current time, one "+CALA" URC will be returned, and no alarm timer will be set.

To clear a given alarm before its scheduled time simply enter an empty string for parameter <time>.

<n><sup>(num)</sup>

Integer type value indicating the array index of the alarm.

0 .. 4



**<type><sup>(num)</sup>**

Integer type value indicating the type of the alarm.

0 Alarm indication: text message via serial interface

**<text><sup>(str)</sup>**

String type value indicating the text to be displayed when alarm time is reached; maximum length is **<tlength>**. By factory default, **<text>** is undefined.

Note: **<text>** will be stored to the non-volatile flash memory when the device enters the Power Down mode via **AT^SMSO**. Once saved, it will be available upon next power-up, until you overwrite it by typing another text. This eliminates the need to enter the full string when setting a fresh alarm.

**<text>** should not contain characters which are coded differently in ASCII and GSM (e.g. umlauts), see also "Supported character sets" and "GSM alphabet tables".

**<tlength><sup>(num)</sup>**

Integer type value indicating the maximum length of **<text>**. The maximum length is 16.

### Notes

- After the alarm was executed the parameter **<time>** of **AT+CALA** will be reset to "00/01/01,00:00:00", but **<text>** will be preserved as described above.
- If ME is totally disconnected from power supply the most recently saved configuration of **+CALA: <time>,<n> [,<type>[,<text>]]** will be presented when ME is powered up.
- When an alarm is set on a given ASC interface only this interface will be allowed for further **AT+CALA** read/write operations. Using the read/write **AT+CALA** command on another interface will result an ERROR until the last alarm timer was executed or deleted.

### Examples

#### EXAMPLE 1

You may want to configure a reminder message for July 31, 2005, at 9.30h, including the message "Good Morning".

```
AT+CALA="05/07/31,09:30:00",0,0,"Good Morning"  
OK
```

Do not switch off the GSM engine. When the alarm occurs the ME returns the following URC:

```
+CALA: Good Morning
```



## EXAMPLE 2

To set a fresh alarm using the same message as in Example 1, simply enter date, time and alarm index. `<type>`, `<text>`, `<length>` can be omitted:

```
AT+CALA="05/07/31,08:50:00",0  
OK
```

When the alarm is executed the URC comes with the same message:

```
+CALA: Good Morning
```

## EXAMPLE 3

To enable the ME to wake up into Alarm mode, e.g. on July 20, 2005, at 8.30h, enter

```
AT+CALA="05/07/20,08:30:00",0  
OK
```

Next, power down the ME:

```
AT^SMSO  
^SMSO: MS OFF  
OK  
^SHUTDOWN
```

When the alarm is executed the ME wakes up to Alarm mode and displays a URC. If available, this line is followed by the individual `<text>` most recently saved. If no individual message was saved only the first line appears.

```
^SYSSTART ALARM MODE  
+CALA: Good Morning
```



## 12.2. AT+CBC

## Battery Charge

### Syntax

Test Command

AT+CBC=?

Response(s)

+CBC: (list of supported <bcs>s),(list of supported <bcl>s),(voltage)  
OK

Exec Command

AT+CBC

Response(s)

+CBC: <bcs>, <bcl>,<voltage>  
OK  
+CME ERROR: <err>

Reference(s)

GSM 07.07

### Parameter Description

<bcs><sup>(num)</sup>

Controls the presentation mode of the URC "^SALS" which indicates the line number used by an incoming call:

0	ME is not charging
1	ME is charging
2	Charging has finished

<bcl><sup>(num)</sup>

battery connection level

1...100                    battery has 1-100 percent of capacity remaining vent

<voltage>

battery voltage(mV)

### Note

- Support for this Command will be hardware dependant and only be used when battery is set to vibrator



## 12.3. AT+CCLK Real Time Clock

### Syntax

Test Command

AT+CCLK=?

Response(s)

OK

Read Command

AT+CCLK=?

Response(s)

+CCLK: <time>

OK

Write Command

AT+CCLK=<time>

Response(s)

OK

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + + -

Reference(s)

GSM 07.07

### Parameter Description

<time><sup>(str)</sup>

Format is "yy/mm/dd,hh:mm:ss", where the characters indicate the two last digits of the year, followed by month, day, hour, minutes, seconds; for example 6th of July 2005, 22:10:00 hours equals to "05/07/06,22:10:00" Factory default is "03/01/01,00:00:00"

### Notes

-  <time> is retained if the device enters the Power Down mode via [AT^SMSO](#).
-  <time> will be reset to its factory default if power is totally disconnected. In this case, the clock starts with <time>= "03/01/01,00:00:00" upon next power-up.



## 12.4. AT<sup>^</sup>SBV Battery/Supply Voltage

**AT<sup>^</sup>SBV** 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 MG21 is in IDLE mode or Limited Service (deregistered). The displayed value is averaged over the last measuring period before the **AT<sup>^</sup>SBV** command was executed.

The measurement is related to the reference points of BATT+ and GND. For details on the reference points please refer to the Hardware Interface Description [2].

### Syntax

Test Command

```
AT^SBV=?
```

Response(s)

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

Exec Command

```
AT+ SBV?
```

Response(s)

```
^SVB: <value>  
OK  
ERROR  
+CME ERROR: <err>
```

Write Command

```
AT^SALS=<view>[, <line>]
```

Response(s)

```
OK  
ERROR
```

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + + -

### Parameter Description

<value><sup>(num)</sup>

Supply (or battery) voltage in mV



## 12.5. AT^SCTM Critical Operating Temperature Monitoring

**AT^SCTM** allows to monitor the operating temperature range of the MG21 device. Refer to "Hardware Interface Description" for specifications on critical temperature ranges.

**AT^SCTM** write command controls the presentation of URCs to report critical operating temperature limits. Use parameter **<UrcMode>** to enable (1) and disable (0) URC presentation.

Important: Even if setting is **<UrcMode>=0** URC presentation is enabled during the two minute guard period after the module was switched on. After expiry of the two minute guard period, the presentation will be disabled, i.e. no URCs with alert levels "1" or "-1" will be generated. During this period MG21 will not switch off, even if the critical temperature limit is exceeded. This allows the user to set up emergency calls before MG21 switches off.

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**.

Level "2" or "-2" URCs are followed by immediate shutdown, except in cases described in Section "Deferred shutdown" (see below). 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. URCs indicating alert levels "1" or "-1" are intended to enable the user to take appropriate precautions, such as protect MG21 from exposure to extreme conditions, or save or back up data etc.

**AT^SCTM** read command returns:

- The URC presentation mode.
- Information about the current temperature range of the MG21 device.
- The board temperature (in degree Celsius) if parameter **<tempCtrl>=1**.

### Syntax

Test Command

**AT^SCTM=?**

Response(s)

**^SCTM:(list of supported <UrcMode>s)[, (list of supported <tempCtrl>s)]**

**OK**

Read Command

**AT^SCTM?**

Response(s)

**^SCTM: <UrcMode>, <UrcCause>[, <temp>]**

**OK ERROR**

**+CME ERROR: <err>**



Write Command

AT^SCTM=<UrcMode>[, <tempCtrl>]

Response(s)

OK  
ERROR  
+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3 Last

- + + + + + -

### Unsolicited Result Code

URCs will be automatically sent to the TE when the temperature reaches or exceeds the critical level, or when it is back to normal.

^SCTM\_B: <UrcCause>

URC for MG21 device temperature warning.

### Parameter Description

<UrcMode><sup>(num)</sup>

URC presentation mode

0 <sup>(&amp;F)(P)</sup>	Disable URC presentation (except for <UrcCause> equal to -2 or +2).
1	Enable URC presentation.

<UrcCause><sup>(num)</sup>

-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)

<tempCtrl><sup>(num)</sup>

0 <sup>(&amp;F)(P)</sup>	Suppress output of <temp> in read command.
1	Output <temp> in read command.



<temp><sup>(num)</sup>

Board temperature in Celsius. Is comprised between the lowest temperature warning level and the uppermost temperature warning level.

### Examples

#### EXAPMLE 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.

#### EXAPMLE 2

Now, after inserting an empty card tray the following URCs appear:

^SCTM_B: 0	Module back to normal temperature.
------------	------------------------------------

### 12.5.1. Deferred shutdown

In the following cases, automatic shutdown will be deferred if a critical temperature limit is exceeded:

- while an emergency call is in progress
- during a two minute guard period after powerup. This guard period has been introduced in order to allow for the user to make an emergency call. The start of any one of these calls extends the guard period until the end of the call. Any other network activity may be terminated by shutdown upon expiry of the guard time.

While in a "deferred shutdown" situation, the engine continues to measure the temperature and to deliver alert messages, but deactivates the shutdown functionality. Once the guard period is expired or the call is terminated, full temperature control will be resumed. If the temperature is still out of range, the ME switches off immediately (without another alert message).

CAUTION! Automatic shutdown is a safety feature intended to prevent damage to the module. Extended usage of the deferred shutdown facilities provided may result in damage to the module, and possibly other severe consequences.



## 12.6. AT^SRADC Configure and Read ADC Measurement

The **AT^SRADC** controls the module's Analog-to-Digital Converter. The ADC can be used to measure the voltage of external devices connected to the ADC inputs. The **AT^SRADC** configures the parameters required for ADC measurement and returns the measurement result(s). The value(s) can be delivered once on request by using the single measurement mode, or periodically by specifying the measurement interval.

Note that the MG21 Module uses an unbalanced input with one pin.

### Syntax

Test Command

```
AT^SRADC=?
```

Response(s)

```
^SRADC:(list of supported <ch>s), (list of supported <op>s), (list of supported <it>s)
```

```
OK
```

Read Command

```
AT^SRADC?
```

Response(s)

```
^SRADC: <ch>, <op>, <it>
```

```
OK
```

Write Command

Single measurement. Implies automatic channel open and close (<op>=1 and 0) and no interval (<it>=0).

```
AT^SRADC=<ch>
```

Response(s)

```
^SRADC: <ch>, <count>, <value>
```

```
OK
```

```
ERROR
```

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

Write Command

Periodic measurement. Requires <op>=1 and <it>=100ms...30000ms

```
AT^SRADC=<ch>, <op>, <it>
```

Response(s)

```
OK
```

```
ERROR
```

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

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -





<count><sup>(num)</sup>

- 1...11                      Number of measured samples
- In single measurement mode: <count> is always 1.
- In periodic measurement mode: <count> is the number of <value>s indicated by the URC "**^SRADC**". The higher the sample rate set with <it>, the more measured values are reported within the URC "**^SRADC**".

### Notes

- If power saving is enabled with **AT+CFUN**, take into account that the periodic mode lets the ME consume current each time the measurement is performed. This reduces the effect of power saving and thus decreases the operation time.
- If an AT command is input on the same interface where the periodic measurement mode is on, up to 5 "**^SRADC**" URCs are queued up and sent after AT command completion. If more than 5 URCs occur before the AT command is completed their measurement values are lost. In this case, one additional URC with a negative <count> and the single value "32767" is sent along with the first 5 buffered URCs. The negative <count> indicates the number of lost measurement values (not the number of URCs). See example below.

### Examples

#### EXAMPLE 1

Single measurement

```
AT^SRADC=0                      Open the first ADC channel for single measurement.
^SRADC: 0,1,78
OK
```

#### EXAMPLE 2

Periodic measurement at low sample rate (5s):

```
AT^SRADC=0,1,5000              Start periodic measurement mode on the first ADC channel. Samples are
^SRADC: 0,1,76                  taken every 5s. Every 5s the URC "^SRADC" appears to report the
^SRADC: 0,1,78                  measured volt-ages. The second parameter represents the number of
^SRADC: 0,1,76                  measured samples, in this case only one.
^SRADC: 0,1,76
AT^SRADC=0,0                    Stop the periodic measurement
OK
```





## 12.7. AT<sup>SSPI</sup> Serial Protocol Interface

**AT<sup>SSPI</sup>** enables MG21 to be connected to external I<sup>2</sup>C devices. The write command configures and activates the I<sup>2</sup>C interface and changes from command mode into data mode. User data can be transmitted in ASCII mode or Transparent mode. The ME will detect the mode depending on the start character of a given Read or Write Request frame.

If **AT&C** equals 1 (power-up and factory default) the DCD line of the connected serial port is high as long as the ME is in I<sup>2</sup>C data mode.

### Syntax

Test Command

AT<sup>SSPI</sup>=?

Response(s)

<sup>SSPI</sup>:(list of supported <basicConfiguration>s), (list of supported <StopStartPeriod>s)

OK

Read Command

AT<sup>SSPI</sup>?

Response(s)

<sup>SSPI</sup>: <connectionState>, <basicConfiguration>, <StopStartPeriod>

OK

ERROR

+CME ERROR: <err>

Write Command

AT<sup>SSPI</sup>=[<basicConfiguration>[, <StopStartPeriod>]]

Response(s)

CONNECT

(indicates that ME has entered data mode)

ERROR

+CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - +



### Parameter Description

#### <connectionState><sup>(num)</sup>

Parameter returned by the **AT+SSPI?** read command.

Indicates whether or not the I<sup>2</sup>C channel is used. When the channel is open and the ME is in data mode on one interface, the read command can only be used on the other interface.

- |                         |   |
|-------------------------|---|
| [0] <sup>(&amp;F)</sup> | Not connected.<br>All following parameters in the read command response are the factory set-tings<br>^SSPI: 0,0010,0000.  |
| 1                       | Connected (channel open, ME in data mode).<br>All following parameters in the read command response are the values currently used,<br>for example ^SSPI: 1,0000,00ff. |

#### <basicConfiguration><sup>(num)</sup>

Parameter **<basicConfiguration>** is a 16 bit word which contains four subparameters to control the following functions:

Subparameter	Bit	Hexadecimal	Selected function
Interface type	D15 - D12	0	I <sup>2</sup> C bus (default)
Port	D11 - D8	0	Internal port
Data transfer rate	D7 - D4	0 1	I <sup>2</sup> C at 100 kbps I <sup>2</sup> C at 400 kbps (default)
Protocol	D3 - D0	0	Data transmission protocol for ASCII mode and Transparent mode

#### <StopStartPeriod><sup>(num)</sup>

This parameter specifies the time (in milliseconds) from a valid stop condition until the beginning of the next start condition. Resolution is 1 TDMA frame period, i.e. 4,616 milliseconds.

- |                                 |                       |
|---------------------------------|-----------------------|
| [0] <sup>(&amp;F)</sup> ...FFFF | Unsigned 16 bit value |
|---------------------------------|-----------------------|

### 12.7.1. Transmitting Data over AT Interface

This section provides information on the protocol used for data transmission to or from I<sup>2</sup>C devices and explains the data mode. It is assumed that you are familiar with the I<sup>2</sup>C specification. Throughout this section the following document conventions are used to mark the direction of send and receive: Read or Write Request: AT → I<sup>2</sup>C device driver Response: AT ← I<sup>2</sup>C device driver

The I<sup>2</sup>C bus expects all data as 2-digit HEX values 0...9, a...f, A...F. For data input (Read or Write Requests from I<sup>2</sup>C master to I<sup>2</sup>C slave) you can choose either ASCII mode or Transparent mode. It is possible to change



the mode for every Read or Write Request frame. The ME will detect the mode depending on the start character of a Read or Write Request frame, either < for ASCII mode or [ for Transparent mode. For data output (Responses from I<sup>2</sup>C slave to I<sup>2</sup>C master) the mode depends on the frame content: Response frames with data body are sent in ASCII mode unless Transparent mode was used at least one time during a session. The first Read or Write Request frame given in Transparent mode enables Transparent mode for all subsequent Response frames with data body, regardless of the mode used for the Requests to follow. Response frames without data body (status information) are always sent in ASCII mode and employ the same start and close characters, such as {1+}, {!0000} etc. Read Requests, Write Requests and Responses with data body are mode specific and employ different start and close characters. All valid special characters are listed in the tables below.

#### ASCII mode:

Every data byte has to be coded as 2 ASCII characters. Every ASCII character determines 4 bits = 1 nibble. The internal I<sup>2</sup>C driver converts the given ASCII data into HEX values.

#### Transparent mode:

Every data byte is directly transmitted and interpreted by the ME. Data is transmitted in a transparent manner, similar to the way of handling circuit switched data in data online mode. This eliminates the need for the I<sup>2</sup>C driver to convert any data. Transparent mode minimizes the overhead on the serial interface when large amounts of data are to be transmitted. Therefore, the module uses Transparent frames only for frames with data content, but not for status information.

#### Open I<sup>2</sup>C channel

To change from command mode to data mode use the [AT^SSPI](#) write command. The CONNECT response indicates that the ME has entered data mode.

#### Close I<sup>2</sup>C channel and return to AT command mode:

ASCII mode: Send ASCII character # (0x23) or escape sequence +++ inside or outside a frame.  
Transparent mode: Send escape sequence +++ or toggle the DTR line (depending on [AT&D](#) settings) inside or outside a frame. The ASCII character # (0x23) character can be sent outside a frame.



Table 18.2: Frame characters and channel close characters specific to ASCII mode

Direction AT - Driver	Function in protocol	Special character	Hex value	Description
→	Start a Request	<	0x3C	Indicates beginning of Write or Read Request frame.
→	Terminate a Request	>	0x3E	Indicates end of Write or Read Request frame.
→	Repeated Start Message	*	0x2A	Triggers a Repeated Start condition.
→	Channel Close	# or +++	0x23	Causes the transfer to be aborted and takes the ME back to AT command mode. # or escape sequence +++ can be sent any time inside or outside a frame.

Table 18.3: Frame characters and channel close characters specific to Transparent mode

Direction AT - Driver	Function in protocol	Special character	Hex value	Description
→	Start a Request	[	0x5B	Indicates beginning of Write or Read Request frame.
→	Terminate a Request	]	0x5D	Indicates end of Write or Read Request frame.
←	Start a Response	[	0x5B	Indicates beginning of Response frame with data body.
←	Terminate a Response	]	0x5D	Indicates end of Response frame with data body.
→	Repeated Start Message	*	0x2A	Triggers a Repeated Start condition.
←	Length indicator	\$	0x24	Indicator for the following 2 length bytes in Response frame.
→	Channel Close	# or +++		Causes the transfer to be aborted and takes the ME back to AT command mode. Escape sequence +++ and DTR toggling can be used any time inside or outside a frame. # can be used outside a frame only.

Table 18.4: Response characters valid for ASCII mode and Transparent mode:

Direction AT - Driver	Function in protocol	Special character	Hex value	Description
←	Start a Response	{	0x7B	Indicates beginning of Response frame. ASCII mode: with or without data body. Transparent mode: without data body
←	Terminate a Response	}	0x7D	Indicates end of Response frame. ASCII mode: with or without data body. Transparent mode: without data body
←	Protocol error	!	0x21	Reports to the AT interface that the Request frame does not comply with the protocol definition (syntax error).
←	Transmission OK (in I <sup>2</sup> C protocol referred to as ACK)	+	0x2B	Notifies the AT interface that data were successfully transmitted or the I <sup>2</sup> C Slave Address was recognized.
←	Transmission error (in I <sup>2</sup> C protocol referred to as NAK)	-	0x2D	Notifies the AT interface that data transmission failed or the I <sup>2</sup> C Slave Address was not recognized.



### 12.7.2. Structure of Messages on the I<sup>2</sup>C Bus

Read Requests, Write Requests and Responses are handled in separate frames transmitted one after the other. This is because the I<sup>2</sup>C bus has only two bus lines, I<sup>2</sup>C DAT for the serial data and I<sup>2</sup>C CLK for the serial clock. After each Read or Write Request sent to a connected I<sup>2</sup>C device, wait for the Response before sending the next Request. This section describes the elements of Read Request, Write Request and Response frames.

Notation of protocol data (except Message ID) and user data in ASCII mode:

- Hex (0...9, a...f, A...F)
- Without "0x" (for example 0x01 → 01)
- Each hex value consists of 2 characters (1 → 01)
- Without delimiters such as comma, semicolon, space etc. (for example 0xAE 0x01 → AE0145)

Notation of protocol data (except Message ID) and user data in Transparent mode:

- Length of data as 16 bit value, MSB first
- Raw data 8 bit clean

Message ID:

- The Message ID identifies different messages. It is only relevant on protocol level (between AT interface and I<sup>2</sup>C device driver), i.e. it is not sent to the I<sup>2</sup>C slave device.
- Characters: only 0...9, A...Z, a...z.
- Length of the Message-ID: only 1 character.

Slave Address:

- Each Read or Write Request contains a 7-bit I<sup>2</sup>C Slave Address that identifies each single device connected to the bus. The 8th bit of this byte is the LSB that determines the data direction: If the LSB is "0" the I<sup>2</sup>C master will write information to the selected slave = Write Request, If the LSB is "1" the I<sup>2</sup>C master will read information sent from the slave = Read Request.



Table 18.5: Structure of Request and Response frames on the I<sup>2</sup>C bus in ASCII mode

Frame	Format
Write Request	<p>&lt;ID SlaveAddress Data&gt;</p> <p>ID: Message ID given as 1 character SlaveAddress: 2 characters, LSB = 0 Data: n bytes, each a 2-character ASCII value</p>
Read Request	<p>&lt;ID SlaveAddress ReadLength&gt;</p> <p>ID: Message ID given as 1 character SlaveAddress: 2 characters, LSB = 1 ReadLength: Number of bytes to be read</p>
Response	
Write OK	{ID +.}
Read of x bytes OK	{ID + Data}
NAK if Read or Write transmission fails	{ID - 0}
Protocol error near x <sup>th</sup> byte	{ID ! xxxx}

Table 18.6: Structure of Request and Response frames on the I<sup>2</sup>C bus in Transparent mode

Frame	Format
Write Request	<p>'[', ID, LenHi, LenLo, SlaveAddress, DataByte1, DataByte2, ..., ']'</p> <p>ID: Message ID given as 1 character LenHi, LenLo: Hi byte and Lo byte of the 16 bit data length stating number of Slave Address bytes + number of data bytes contained in Write Request SlaveAddress: 2 bytes, LSB = 0 DataByte... : n bytes</p>
Write Request with Repeated Start condition	<p>'[', ID, LenHi, LenLo, SlaveAddress, DataByte1, DataByte2, ..., '*', LenHi, LenLo, SlaveAddress, DataByte1, DataByte2, ..., ']'</p> <p>*: Allows to issue more Write Requests without the need to send close characters, start characters and Message IDs in between.</p>
Read Request	<p>'[', ID, LenHi, LenLo, SlaveAddress ReadLength ']'</p> <p>ID: Message ID given as 1 character LenHi, LenLo: Hi byte and Lo byte of the 16 bit data length stating number of Slave Address bytes + ReadLength bytes contained in Read Request SlaveAddress: 2 bytes, LSB = 1 ReadLength: 16 bits stating the number of bytes to be read in Response</p>
Response	
Write OK	{ID +}
Read of x bytes OK	<p>'[', ID, '+', '\$', LenHi, LenLo, DataByte1, DataByte2, ..., ']'</p> <p>ID: Message ID given as 1 character \$: Length indicator for the following 2 bytes LenHi, LenLo: Hi byte and lo byte of the 16 bit data length DataByte... : n bytes</p>
NAK if Read or Write transmission fails	{ID - 0}
Protocol error near x <sup>th</sup> byte	{ID ! xxxx}



### 12.7.3. Example: Using I<sup>2</sup>C Bus

This example shows how to activate the I<sup>2</sup>C interface and explains the used parameters.

```
AT^SSPI=0010,0000  
CONNECT
```

The first group of characters forms the `<basicConfiguration>`, where the first "0" sets I<sup>2</sup>C, the second "0" is the internal port, the digit "1" sets 400 kbps bit rate on the I<sup>2</sup>C bus, and the next "0" selects the protocol to be used both for ASCII mode and Transparent mode. This is followed by a comma and the value "0000" for `<StopStartPeriod>`.

Note: If omitted all above parameters are assumed by default. Therefore, instead of `AT^SSPI=0010,0000` it is sufficient to only enter `AT^SSPI=`

The CONNECT response shows that the module has entered data mode and is ready to transmit data.

The following example shows how to send a Write Request and a Read Request in ASCII mode.

```
AT^SSPI=0010,0000  
CONNECT
```

```
<aAE000102030405060708090A0B0C0D0E0F>
```

```
{a+}
```

```
<bAF0010>
```

```
{b+000102030405060708090A0B0C0D0E0F}
```

```
#
```

```
OK
```

Start the I<sup>2</sup>C interface. See first example for parameter description.

The ME is in data mode, ready to send and receive data in ASCII mode or Transparent mode.

Request frame in ASCII mode, where a = ID, AE = Slave Address and Write Request. User data bytes are given as 2 character ASCII values.

Response frame, where a = ID.

Request frame, where b = ID, AF = Slave Address and Read Request, 0010 = number of expected bytes.

Response frame, where b = ID.

To quit data mode and return to command mode enter the Close character # or the escape sequence +++.

The response OK confirms that the ME is back to command mode and ready to accept any AT commands.



The following example shows how to send a Write Request and a Read Request in Transparent mode. The example column on the left visualizes only commands and responses handled on the AT interface, while the transferred Write and Read Requests are shown as C code in the comment column on the right.

```
AT^SSPI=0010,0000  
CONNECT
```

Start the I<sup>2</sup>C interface. See first example for parameter description. The ME is in data mode, ready to send and receive data in ASCII mode or Transparent mode. Request frame in ASCII.

Send a Write Request frame in Transparent mode, here given as C code:

```
int I2CData[]={0x5B 0x61 0x00 0x12 0x00 0xAE 0x00 0x01 0x02  
0x03 0x04 0x05 0x06 0x07 0x08 0x09 0x0A 0x0B 0x0C 0x0D 0x0E  
0x0F 0x5D};  
for(i=0;i<sizeof(I2CData);i++)  
{  
    putchar(I2CData[i]);  
}
```

Content of the Write Request:

0x5B = start character (from this point, all responses with data body will be sent in Transparent mode)

0x61 = ID,

0x00 0x12 = 16 bits stating number of Slave Address bytes + number of data bytes of this Request,

0x00 0xAE = 16 bit Slave Address including LSB 0 for Write Request,

Data bytes,

0x5D: Stop character of Write Request.

```
{a+}
```

Response frame without user data, therefore sent as ASCII. a=ID (equals 0x61 in Hex format).

Send a Read Request frame, here given as C code:

```
int I2CData[]={0x5B 0x62 0x00 0x04 0x00 0xAF 0x00 0x0A 0x5D};  
for(i=0;i<sizeof(I2CData);i++)  
{  
    putchar(I2CData[i]);  
}
```

Content of the Read Request:

0x5B = start character,

0x62 = ID,

0x00 0x04 = 16 bits stating number of Slave Address bytes + number of data bytes of this Request,

0x00 0xAF = 16 bit Slave Address including LSB 1 for Read Request,

0x00 0x0A = ReadLength = 16 bits stating the number of bytes to be read in Response.

0x5D: Stop character of Read Request.

```
[b+$00010203040506070809]
```

Response frame with data body transmitted in Transparent mode, where b = ID (equals 0x62 in Hex format).

```
+++
```

Send escape sequence to quit data mode and return to command mode.

```
OK
```

The OK response confirms that the ME is back to command mode and ready to accept any AT commands.



## 12.8. AT<sup>^</sup>SSYNC      Configure SYNC Pin

The AT<sup>^</sup>SSYNC controls the usage of the module's GPIO5/LED line. Depending on the connected device the pin can either operate a status LED or is available as GPIO.

### Syntax

Test Command

```
AT^SSYNC=?
```

Response(s)

```
^SSYNC:list of supported <mode>s  
OK
```

Read Command

```
AT^SSYNC?
```

Response(s)

```
^SSYNC:<mode>  
OK
```

Write Command

```
AT^SSYNC=<mode>
```

Response(s)

```
OK
```

PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
-----	------	------	------	------	---	------

-	+	+	+	+	-	-
---	---	---	---	---	---	---

### Parameter Description

<view><sup>(num)</sup>

Operation mode of the GPIO5/LED pin. Setting is stored non-volatile.

0<sup>(D)</sup>

GPIO mode:

Status LED function is disabled. The GPIO5/LED line is available as GPIO and can be configured using the GPIO related AT commands.

1

LED mode on:

Enables the GPIO5/LED pin to drive a status LED installed in your application as specified in Hardware Interface Description.

The coding of the LED is described in Section ME status indicated by status LED patterns (see below).



### 12.8.1. ME status indicated by status LED patterns

The following table lists the possible patterns of status LED behavior, and describes the ME operating status indicated by each pattern if `AT^SSYNC` parameter `<mode>=1`.

During the transition from one LED pattern to another the "on" and/or "off" periods of the LED may vary in length. This is because an event that triggers the change may occur any time and, thus, truncate the current LED pattern at any point.

Table 18.1: Modes of the LED and indicated ME functions

LED behavior	ME operating status if <code>AT^SSYNC=1</code>
Permanently off	ME is in one of the following modes: <ul style="list-style-type: none"><li>- POWER DOWN mode</li><li>- NON-CYCLIC SLEEP mode</li><li>- CYCLIC SLEEP mode with no temporary wake-up event in progress <sup>1)</sup></li></ul>
600 ms on / 600ms off	Limited Network Service: No SIM card inserted or no PIN entered, or network search in progress, or ongoing user authentication, or network login in progress.
75 ms on / 3 s off	IDLE mode: The mobile is registered to the GSM network (monitoring control channels and user interactions). No call is in progress.
75 ms on / 75 ms off / 75 ms on / 3 s off	One or more GPRS PDP contexts activated.
500 ms on / 25 ms off	Packet switched data transfer is in progress.
Permanently on	Depending on type of call: Voice call: Connected to remote party. Data call: Connected to remote party or exchange of parameters while setting up or disconnecting a call.

<sup>1)</sup> When a temporary wake-up event (for example a call, a URC, a packet switched transfer) occurs in CYCLIC SLEEP mode the LED flashes according to the patterns listed above.



## 12.9. AT^SWDAC PWM Signal Configuration for DAC

The **AT^SWDAC** controls the PWM (Pulse Width Modulation) signals generated by means of the PWM\_OUT pins of the MG21 Module.

First PWM channel of MG21 Module: PWM\_OUT1 (GPIO 7).

Second PWM channel of MG21 Module: PWM\_OUT2 (GPIO 6).

### Syntax

Test Command

AT^SWDAC=?

Response(s)

^SWDAC:(list of supported <ch>s), (list of supported <dc>s), (list of supported <oc>s), (list of supported <fq>s)  
OK

Read Command

AT^SWDAC?

Response(s)

Current settings of first and second PWM channel:

^SWDAC: <ch>, <dc>, <oc>, <fq>

^SWDAC: <ch>, <dc>, <oc>, <fq>

OK

ERROR

+CME ERROR: <err>

Write Command

AT^SWDAC=<ch>, <dc>[, <oc>[, <fq>]]

Response(s)

OK ERROR +CME ERROR: <err>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### Parameter Description

<ch><sup>(num)</sup>

Select PWM channel

- |   |   |
|---|---|
| 0 | First PWM channel<br>(PWM_OUT1 (GPIO 7) at MG21 Module.)  |
| 1 | Second PWM channel<br>(PWM_OUT2 (GPIO 6) at MG21 Module.) |



<OC><sup>(num)</sup>

Open or close DAC

0	Close DAC
1	Open DAC

<fq><sup>(num)</sup>

PWM frequency

0	300 Hz
1	1000 Hz
2	8,125 Hz
3	16,250 Hz
4	32,500 Hz
5	65,000 Hz

### Note

Possible PWM\_OUT pin configuration defined in Section “GPIO configuration table” (AT^SPIO section).

### Example

This example shows how to open the PWM\_OUT1 output and change the duty cycle while using the same frequency.

AT^SWDAC=0,50,1,2	Initial opening of PWM_OUT1, while setting PWM signal to 8,125 Hz at 50% duty cycle.
OK	
AT^SWDAC=0,75	Change duty cycle of the open PWM_OUT1 output.
OK	
AT^SWDAC=0,80	Change duty cycle of the open PWM_OUT1 output.
OK	
AT^SWDAC=0,0,0	Close PWM_OUT1.
OK	



## 12.10. AT^SCPIN Pin Configuration

The **AT^SCPIN** write command serves to add (or remove) and configure pins.

### Syntax

Test Command

AT^SCPIN=?

Response(s)

^SCPIN:(list of supported **<mode>**s), (list of supported **<pin\_id>**s), (list of supported **<direction>**s), (list of supported **<startValue>**s)

OK

Write Command

AT^SCPIN=**<mode>**, **<pin\_id>**, **<direction>**[, **<startValue>**]

Response(s)

OK

ERROR

+CME ERROR: **<err>**

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

### Parameter Description

**<mode>**<sup>(num)</sup>

0 Close pin

1 Open pin



### <pin\_id><sup>(num)</sup>

Pin identifier

1	GPIO1
2	GPIO2
3	GPIO3
4	GPIO4
5	GPIO5
6	GPIO6
7	GPIO7
8	GPIO8
9	GPIO9
10	GPIO10

### <direction><sup>(num)</sup>

Parameter <direction> is mandatory when opening a pin, but can be omitted when closing a pin

0	Input
1	Output

### <startValue><sup>(num)</sup>

Can be set only for outputs.

[0]	Low
1	High

### Notes

- Possible GPIO pin configuration defined in Section “GPIO configuration table” (AT<sup>^</sup>SPIO section).
- For closing a pin with the write command (<mode>=0), the parameter <direction> is not needed.
- Before changing the configuration of a pin be sure to close the pin.



## 12.11. AT^SGIO Get IO state of a specified pin

### Syntax

Test Command

```
AT^SGIO=?
```

Response(s)

```
^SGIO:(list of supported <io_id>s)  
OK
```

Write Command

```
AT^SGIO=<io_id>
```

Response(s)

```
^SGIO: <value>  
OK  
ERROR  
+CME ERROR: <err>
```

PIN	ASC0	MUX1	MUX2	MUX3	↻	Last
-----	------	------	------	------	---	------

-	+	+	+	+	-	-
---	---	---	---	---	---	---

### Parameter Description

<io\_id><sup>(num)</sup>

This is an already configured <pin\_id>.

<llc\_pdu\_length\_U><sup>(num)</sup>

State read on this <io\_id>.

0                      Low for <pin\_id>

1                      High for <pin\_id>

### Note

- Possible GPIO pin configuration defined in Section “GPIO configuration table” (AT^SPIO section).



## 12.12. AT^SPIO General Purpose IO Driver Open/Close

The **AT^SPIO** write command opens and closes the general purpose IO driver. The command must be executed before any other GPIO command can be used. After closing the driver, all pins used (i.e. opened) will be put into high impedance state (inputs) with no internal pull up or down.

The command does not reserve any general purpose IO pin, only the drivers required for GPIO pin management will be loaded.

### Syntax

Test Command

```
AT^SPIO=?
```

Response(s)

```
^SPIO:(list of supported <mode>s)
```

```
OK
```

Write Command

```
AT^SPIO=<mode>
```

Response(s)

```
OK
```

```
ERROR
```

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

PIN	ASC0	MUX1	MUX2	MUX3	⚙️	Last
-	+	+	+	+	-	-

### Parameter Description

<view><sup>(num)</sup>

0 Close General purpose IO driver

1 Open General purpose IO driver

### Notes

- Unused GPIO pins have an internal pull up resistor. Do not connect them or connect high level.
- GPIO10 pin is open drain. Therefore an external pull up resistor is needed for high level.



### 12.12.1. GPIO configuration table

Some GPIO lines are shared with other interfaces, such as I<sup>2</sup>C, PWM (Pulse Width Modulation) interfaces and a status LED. The following table shows the configuration variants. All variants are mutually exclusive, i.e. a pin configured as GPIO is locked for alternative use and vice versa.

GPIO pin	GPIO handler	I <sup>2</sup> C	PWM/DAC	Status LED
GPIO1	yes	no	no	no
GPIO2	yes	no	no	no
GPIO3	yes	no	no	no
GPIO4	yes	no	no	no
GPIO5	yes	no	no	yes
GPIO6	yes	no	yes	no
GPIO7	yes	no	yes	no
GPIO8	yes	no	no	no
GPIO9	yes	yes	no	no
GPIO10	yes	yes	no	no



## 12.13. AT^SSIO Set IO state of a specified pin

### Syntax

Test Command

```
AT^SSIO=?
```

Response(s)

```
^SSIO:(list of supported <io_id>s), (list of supported <value>s)  
OK
```

Write Command

```
AT^SSIO=<io_id>, <value>
```

Response(s)

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

PIN	ASC0	MUX1	MUX2	MUX3	⚙️	Last
-	+	+	+	+	-	-

### Parameter Description

<io\_id><sup>(num)</sup>

This is an already configured <pin\_id>.

<value><sup>(num)</sup>

State to be set for this <io\_id>.

0                      Low for <pin\_id>

1                      High for <pin\_id>

### Note

- Possible GPIO pin configuration defined in Section “GPIO configuration table” (AT^SPIO section).}}



## 13. Security Commands



The AT Commands described in this chapter used to determine various security related settings.

Security
AT+CPIN
AT+CPIN2
AT+SPIC
AT^SPIC
AT+CLCK
AT^SLCK
AT+CPWD
AT^SPWD
AT+CPSPWD



### 13.1. AT+CPIN PIN Authentication

The **AT+CPIN** write command can be used to enter one of the passwords listed below. The read command can be used to check whether or not the ME is waiting for a password, or which type of password is required.

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 requested by the ME **AT+CPIN** may also be used for the SIM PIN2 or SIM PUK2.

If no PIN1 request is pending (for example if PIN1 authentication has been done and the same PIN1 is entered again) MG21 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 "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>

PIN ASC0 MUX1 MUX2 MUX3  Last

- + + + + - -

Reference(s)

GSM 07.07



## Parameter Description

`<pin>`<sup>(str)</sup>

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>`<sup>(text)</sup>

If the requested code was a PUK: specify a new password or restore the former disabled password. See Section "What to do if PIN or password authentication fails?" for more information about when you may need to enter the PUK (AT+CPIN section).

`<code>`<sup>(text)</sup>

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. This is only applicable when an attempt to access a PIN2 related feature was acknowledged with +CME ERROR: 17 ("SIM PIN2 required"), for example when the client attempts to edit the FD phonebook). In this case the read command <code>AT+CPIN?</code> also prompts for SIM PIN2. Normally, the <code>AT+CPIN2</code> command is intended for SIM PIN2.
SIM PUK2	ME is waiting for PUK2 to unblock a disabled PIN2. As above, this is only necessary when the preceding command was acknowledged with +CME ERROR: 18 ("SIM PUK2 required") and only if the read command <code>AT+CPIN?</code> also prompts for SIM PUK2. Normally, the <code>AT+CPIN2</code> command is intended for SIM PUK2.

## 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. MG21 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").
- To check the number of remaining attempts to enter the passwords use the `AT^SPIC` command.
- See `AT+CPWD` and `AT^SPWD` for information on passwords.
- See `AT+CLCK` and `AT^SLCK` for information on lock types.

### 13.1.1. 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+CPIN2`. 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 authentication, 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+CPIN2=PUK2,new PIN2`.

You can use the `ATD` command followed by the GSM code `**052*PUK2*newPIN2*newPIN2#`;

#### 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 `AT+CMEE`, Section CME/CMS Error Code Overview. For further instructions and examples see `AT+CLCK`, `AT^SLCK`, `AT+CPWD` and `AT^SPWD`.

For a complete list of Star-Hash codes please refer Section "Star-Hash (\*#) Network Commands".



## 13.2. AT+CPIN2 PIN2 Authentication

**AT+CPIN2** controls network authentication of the MG21.

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

The write command allows the MG21 to store the entered password. This may be for example the SIM PIN2 to benefit from the features listed below, or the SIM PUK2 to replace a disabled PIN2 with a new one. Note that PIN2 can only be entered if PIN1 authentication was done.

If the MG21 is requesting SIM PUK2, use `<pin>` to enter the PUK2, followed by `<new pin>` to specify the new PIN2.

### Syntax

Test Command

AT+CPIN2=?

Response(s)

OK

Read Command

AT+CPIN2?

Response(s)

+CPIN2: `<code>`

OK

ERROR

+CME ERROR: `<err>`

Write Command

AT+CPIN2=`<pin>`[, `<new pin>`]

Response(s)

OK

ERROR

+CME ERROR: `<err>`

PIN	ASC0	MUX1	MUX2	MUX3	🔒	Last
+	+	+	+	+	-	-

Reference(s)

GSM 07.07

### Parameter Description

`<pin>`<sup>(str)</sup>

Password (string type), usually SIM PIN2 or, if requested, SIM PUK2.

`<new pin>`<sup>(str)</sup>

If the requested code was SIM PUK2: new password (PIN2).



See Section "What to do if PIN or password authentication fails?" (AT+CPIN section).

`<code>`<sup>(text)</sup>

READY	ME is not pending for any password.
SIM PIN2	ME is waiting for SIM PIN2. This <code>&lt;code&gt;</code> is returned only when PIN2 authentication has not yet been done or has failed ("+CME ERROR: 17").
SIM PUK2	ME is waiting for SIM PUK2. This <code>&lt;code&gt;</code> is returned only when PIN2 authentication has failed and ME is pending for SIM PUK2 (i.e. "+CME ERROR: 18").

### Note

- Functions accessible only after PIN2 authentication:
  - `AT+CACM`: Accumulated call meter (ACM) reset or query
  - `AT+CAMM`: Accumulated call meter maximum (ACMmax) set or query
  - `AT+CLCK`: Facility lock to "FD" (Fixed dialing phonebook) `AT^SLCK`: Facility lock to "FD" (Fixed dialing phonebook)
  - `AT+CPWD`: Change "P2"password
  - `AT^SPWD`: Change "P2"password
  - `AT+CPUC`: Price per unit and currency table
  - `AT+CPIN2`: Enter SIM PIN2 or SIM PUK2 if requested.

For example, SIM PIN2 will be needed when you attempt to edit the "FD" phonebook and ME returns "+CME ERROR: 17" or "+CPIN: SIM PIN2".

Once the required `<pin>` has been entered correctly, PIN2 authentication code changes to READY. After 300s, a repetition of the authentication process is required (PIN2 authentication code changes from READY to SIM PIN2).

### Examples

#### EXAMPLE 1

Change PIN2

```
AT+CPWD="P2","0000","8888"      (where "0000" = old PIN2 and "8888" = new PIN2)
OK
```

#### EXAMPLE 2

Unblock a disabled PIN2



```
AT+CPIN2?  
+CPIN2: SIM PUK2  
OK  
AT+CPIN2=12345678,8888
```

PIN2 has been disabled, PUK2 must be entered to define a new PIN2  
where "12345678" is the PUK2, and "8888" the new PIN2.

### EXAMPLE 3

Write into "FD" phonebook

```
AT+CPBS="FD"  
OK  
AT+CPBW=2,"+493012345678",145,"Charly"  
+CME ERROR: 17  
AT+CPIN2=8888  
OK  
AT+CPBW=2,"+493012345678",145,"Charly"  
OK
```

access denied due to missing PIN2 authentication



### 13.3. AT+SPIC Times Remain To Input SIM PIN/PUK

#### **Syntax**

Exec Command

AT+SPIC

Response(s)

Times remain to input SIM PIN

+SPIC: <pin1>,<puk1>,<pin2>,<puk2>

OK

#### **Parameter Description**

<pin1>

Times remain to input chv1

<puk1>

Times remain to input puk1

<pin2>

Times remain to input ch

<puk2>

Times remain to input puk2



### 13.4. AT^SPIC Display PIN counter

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

The execute command returns the number of attempts still available for entering the currently required password, for example the PIN, PUK, PH-SIM PUK etc.

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

To check whether or not you need to enter a password use the read commands **AT+CPIN?**, **AT+CPIN2?** and **AT^SPIC?**. If the response to **AT+CPIN?** is "READY" the counter of the execute command **AT^SPIC** relates to PIN2. See last example. If the responses to **AT+CPIN?** and **AT+CPIN2?** both read "READY", no password is currently required, and the referrer of the execute command **AT^SPIC** is explicitly undefined.

#### Syntax

Test Command

```
AT^SPIC=?
```

Response(s)

```
OK
```

Read Command

```
AT^SPIC?
```

Response(s)

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

Exec Command

```
AT^SPIC
```

Response(s)

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



Write Command

```
AT^SPIC=<facility>
```

Response(s)

```
^SPIC: <counter>
```

```
OK
```

```
ERROR
```

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

PIN	ASC0	MUX1	MUX2	MUX3	🔔	Last
-	+	+	+	+	-	-

### ***Parameter Description***

**<counter>**<sup>(num)</sup>

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

**<facility>**<sup>(str)</sup>

Password for which the corresponding PIN counter is to be displayed.

- |      |  |
|------|--|
| “SC“ | SIM PIN or SIM PUK. If the SIM PIN has been deactivated after three failed attempts, the counter for SIM PUK will be returned instead.   |
| “PS“ | "Phone code" or "device code" (cf. <a href="#">AT+CLCK</a> and <a href="#">AT+CPWD</a> ). If incorrectly entered three times, the Master Phone Code is required to lift the lock and the number of remaining attempts for the master phonecode will be returned. |
| “P2“ | SIM PIN2 or SIM PUK2. If the SIM PIN2 has been deactivated after three failed attempts, the counter for SIM PUK2 will be returned instead.   |
| “PN“ | Network Personalisation  |



`<code>`<sup>(text)</sup>

Identification of the currently required password.

SIM PIN	ME is waiting for SIM PIN1.
SIM PUK	ME is waiting for SIM PUK1 if PIN1 was disabled after three failed attempts to enter PIN1.
SIM PIN2	ME is waiting for PIN2, when the attempt to access PIN2 requiring features was acknowledged with "+CME ERROR: 17" (e.g. if the user attempts to edit the FD phonebook).
SIM PUK2	ME is waiting for PUK2 to unblock a disabled PIN2. Necessary if preceding command was acknowledged with "+CME ERROR: 18".
PH-SIM PIN	ME is waiting for phone-to-SIM card password if "PS" lock is active and user inserts other SIM card than the one used for the lock. ("PS" lock is also referred to as phone or antitheft lock).
PH-SIM PUK	ME is waiting for Master Phone Code, if the above "PS" lock password was incorrectly entered three times.
PH-NET PUK	ME is waiting for network personalisation unblocking password

### Notes

- Whenever the required password changes, `<counter>` changes to reflect that change. Please refer to the examples below.
- For passwords associated to the phone lock ("PS" lock set by user or factory) or other factory set locks, such as "PF", "PN", "PU", "PP", "PC" the number of attempts is subject to a timing algorithm explained in [AT+CPIN](#). If these passwords are incorrectly entered the counter first returns 3, 2 and 1 remaining attempt(s), but then gives the total number of attempts which amounts to 63 (see example below).
- See also Chapters [AT+CLCK](#), [AT+CPIN](#), [AT+CPIN2](#), [AT+CPWD](#), [AT^SLCK](#) for further information on locks and passwords.



## Examples

### EXAMPLE 1

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

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



## EXAMPLE 2

Though a mobile is locked to a specific SIM card (phone lock), the user attempts to operate it with another SIM card. The user correctly enters the SIM PIN of the SIM card currently inserted, but then fails to give the "PS" lock password (PH-SIM PUK):

```
at+cpin=9999
OK
at+cpin?
+CPIN: PH-SIM PIN           ME is waiting for the phone lock password.
OK
at^spic
^SPIC: 3                   3 attempts left.
OK
at+cpin=4711
+CME ERROR: incorrect password
at^spic?
^SPIC: 2                   2 attempts left.
OK
at+cpin=4712
+CME ERROR: incorrect password
at^spic
^SPIC: 1                   1 attempt left.
OK
at^spic?
^SPIC: PH-SIM PIN         Displayed counter refers to phone lock password.
OK

At+cpin=4713
+CME ERROR: incorrect password
at^spic
^SPIC: 63
OK
at^spic?
^SPIC: PH-SIM PUK         Displayed counter refers to master phone code.
OK
at+cpin=4714
+CME ERROR: incorrect password
at^spic
^SPIC: 63
OK
```



### EXAMPLE 3

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

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

+CREG: 1                                The mobile ist properly registered to the network.
at+cpin?
+CPIN: READY                             The AT+CPIN? read command confirms that SIM PIN1 authentication was
                                          successful.

at^spic
^SPIC: 3                                  As SIM PIN1 authentication was successful, the counter relates to SIM
                                          PIN2 and correctly indicates that the user has 3 attempts to enter SIM
                                          PIN2.

OK
AT^SPIC?                                  Likewise, the read command notifies that the ME is waiting for SIM PIN2.

^SPIC: SIM PIN2
OK
at+clck="SC",0,456789                     First attempt to enter a wrong SIM PIN1.
+CME ERROR: incorrect password
at^spic
^SPIC: 3                                  SIM PIN1 authentication is still valid, and the counter relates to SIM PIN2.
at+clck="SC",0,456789                     Second attempt to enter a wrong SIM PIN1.
+CME ERROR: incorrect password
at^spic
^SPIC: 3                                  SIM PIN1 authentication is still valid, and the counter relates to SIM PIN2.
at+clck="SC",0,456789                     Third attempt to enter a wrong SIM PIN1.
+CME ERROR: incorrect password

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

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



## 13.5. 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

ERROR

+CME ERROR: **<err>**

PIN ASC0 MUX1 MUX2 MUX3 🔔 Last

+ + + + + - -

Reference(s)

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

### Parameter Description

**<facility>**<sup>(str)</sup>

■ Phone security locks set by client or factory

Primarily intended for the client to take safety precautions, "SC", "PS" and "FD" can be configured individually. "PS" may also be factory set.

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.

“PS“                      Phone locked to SIM card  
ME requests password when other than current SIM card is inserted.  
"PS" lock is frequently referred to as "phone lock", or "device lock". Accord-ingly, the



password may be called "phone code" or "device code". The "PS" password is not associated with the PUK of the SIM card. If incorrectly entered three times, the Master Phone Code is required to lift the lock. This is an 8-digit device code associated to the IMEI number of the mobile which can only be obtained from the manufacturer of the module. Once the Master Phone Code has been accepted, the mobile is operational, and the "PS" lock is no longer active. If needed it must be set once again.

**<password>**: User defined password. It is needed before the first use of **<facility>** "PS" and, therefore, must first be specified with **AT+CPWD** or **AT^SPWD**, if it has not been predefined by factory settings. If set by factory (e.g. for a prepaid mobile), the password is supplied by the provider or operator.

"FD"

SIM Fixed Dialing lock

If "FD" lock is enabled numbers MMI \*# codes can be used only if they start with matching numbers or characters stored in the "FD" phonebook. The capacity of the "FD" phonebook is depending on the SIM card.

Numbers stored to the "FD" phonebook must not contain the call modifiers "I", "i", "\*31#", "#31#".

**<password>**: SIM PIN 2.

Any attempt to dial a string not specified in the "FD" phonebook will be denied, causing an error result code. The type of result code varies depending on the type of service: "+CME ERROR: call barred" for voice calls, GPRS connections and \*# codes for Supplementary Services.

"NO CARRIER" for fax calls and circuit switched data calls.

"+CMS ERROR: operation not allowed" for SMS.

If "FD" lock is enabled the following applies:

- Handling of Supplementary Services:

The "FD" lock is effective only for AT+CCFC <mode> 3 (registering the CF destination number). All other Supplementary Services and functions provided by AT+CCFC are not restricted by the "FD" lock.

- GPRS commands can be used only if the "FD" phonebook 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: call barred".

#### Factory defined SIM locks:

Typical examples of factory set SIM locks are prepaid phones or network locks, used to restrict the operation of a mobile to a specific provider or operator. The client should be aware that each of these lock types can only be unlocked if the associated password is available. For example, a mobile can be locked to accept only SIM cards from the respective provider, or even one single SIM card. Once a different SIM card is inserted



the ME will prompt the client to enter a specific code. This is not the PUK of the SIM card, but usually an 8-digit code which needs to be requested from the provider.

The locks can only be set by the manufacturer and need to be agreed upon between the parties concerned, e.g. provider, operator, distributor etc. on the one side and the manufacturer on the other side.

Parameter `<class>` is not applicable to SIM locks.

`<password>` and instructions for unlocking must be obtained from the network provider.

“PF“ Lock Phone to the very First SIM card

“PN“ Network Personalisation

“PU“ Network subset Personalisation

“PP“ Service Provider Personalisation

“PC“ Corporate Personalisation

#### ■ 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><sup>(num)</sup>

[0] <sup>(&amp;F)(P)</sup>	unlock
1	lock
2	query status

#### <status><sup>(num)</sup>

0	lock is inactive
1	lock is active

#### <password><sup>(str)</sup>

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](#) or [AT^SPWD](#).

#### <class><sup>(num)</sup>

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 some of 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 set-ting 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: unknown" (+CME ERROR: 100). If then the **AT+CLCK** command is issued once again execution is denied with "+CME ERROR: operation temporary not allowed" (+CME ERROR: 256). For details regarding the delay see Section "What to do if PIN or password authentication fails?" (AT+CPIN section)
- 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.

### Examples

#### EXAMPLE 1

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.



## 13.6. AT^SLCK Facility lock

**AT^SLCK** provides the "Facility lock" function as defined for the GSM 07.07 command **AT+CLCK**. The command can be used to lock, unlock or interrogate a network or ME **<facility>**.

**AT^SLCK** is, in every respect, identical with **AT+CLCK**, except that the command syntax and response prefix is "**^SLCK**" instead of "**+CLCK**". For further details please refer to **AT+CLCK**.

The command can be aborted when network facilities are being set or interrogated.

### Syntax

Test Command

**AT^SLCK=?**

Response(s)

**^SLCK:**list of supported **<facility>s**  
OK

Write Command

**AT^SLCK=<facility>, <mode>[, <password>][, <class>]**

Response(s)

if **<mode>** is not equal 2 and command successful:

OK

if **<mode>= 2** and command successful:

**^SLCK:** <status>, <class>

[**^SLCK:** <status>, <class>]

[**^SLCK:** ...]

OK

If error is related to ME functionality

ERROR

+CME ERROR: **<err>**

PIN ASC0 MUX1 MUX2 MUX3  Last

+   +   ±   ±   ±   -   -

Reference(s)

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



## 13.7. 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** and **AT^SLCK** for more information on the various lock features.

Specifically the command can be used to

- change PIN1 or PIN2,
- change the password supplied from your provider for the "call barring" supplementary service,
- set individual phone security passwords,
- enter the unblocking key (Master Phone Code) to restore a disabled "PS" password.

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 error is related to ME functionality:

+CME ERROR: **<err>**

PIN	ASC0	MUX1	MUX2	MUX3	🔒	Last
-----	------	------	------	------	---	------

+	+	+	+	+	-	-
---	---	---	---	---	---	---

Reference(s)

GSM 07.07



## Parameter Description

<facility><sup>(str)</sup>

### ■ 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. The password for lock facility "PS" may also be factory set.

"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 "What to do if PIN or password authentication fails?" (AT+CPIN section)

<password length>: 4 to 8 digits.

"PS" Phone locked to SIM card. ME requests password when other than current SIM card is inserted.

"PS" lock is frequently referred to as "phone lock", or "device lock". Accordingly, the password may be called "phone code" or "device code". The "PS" password is not associated with the PUK of the SIM card. It must be defined before the first use of <facility> "PS" with [AT+CLCK](#).

<password length>: 4 digits.

If incorrectly entered three times, the Master Phone Code is required to lift the lock. This Unblocking procedure is performed with [AT+CPWD](#) using the following parameters: <facility>="PS", <old password>= Master Phone Code (to be obtained from the module manufacturer), and <new password>= the new phone code ("PS" password for lock facility), if desired.

Mind that successful PIN authentication is a prerequisite for use of AT command [AT+CPWD](#). If Pin authentication has not been completed, input of the Master Phone code password is possible only with AT command [AT+CPIN](#) or [ATD](#). For further detail please refer to Section "What to do if PIN or password authentication fails?" (AT+CPIN section)

Once the Master Phone Code has been accepted, the mobile is operational, and the "PS" lock is no longer active. If needed it must be set once again with [AT+CLCK](#).

"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+CPIN2](#) or [ATD](#). For further detail please refer to Section "What to do if PIN or password authentication fails?" (AT+CPIN section)



<password length>: 4 to 8 digits.

■ Factory defined SIM locks:

Typical examples of factory set SIM locks are prepaid phones or network locks, used to restrict the operation of a mobile to a specific provider or operator. The client should be aware that each of these lock types can only be unlocked if the associated password is available. For example, a mobile can be locked to accept only SIM cards from the respective provider, or even one single SIM card. Once a different SIM card is inserted the ME will prompt the client to enter a specific code. This is not the PUK of the SIM card, but usually an 8-digit code which needs to be requested from the provider.

The locks can only be set by the manufacturer and need to be agreed upon between the parties concerned, e.g. provider, operator, distributor etc. on the one side and the manufacturer on the other side.

“PF“	Lock Phone to the very First SIM card
“PN“	Network Personalisation
“PU“	Network subset Personalisation
“PP“	Service Provider Personalisation
“PC“	Corporate Personalisation

■ 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.

<password length>: The Network 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 pro-vider.

“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><sup>(num)</sup>



- 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>](#).

[<old password>](#)<sup>(str)</sup>

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 pass-word issued by the provider. See notes above or contact provider.

[<new password>](#)<sup>(str)</sup>

New password. Mandatory, if [<old password>](#) was an unblocking key (such as the Master Phone Code).

### Note

- When changing PIN2 ([<facility>="P2"](#)) it is recommended to check the new state of PIN2 by using the [AT+CPIN2](#) command.

### Examples

#### EXAMPLE 1

To change PIN2

```
AT+CPWD="P2","0000","8888"  
OK
```

(where "0000" = old PIN2 and "8888" = new PIN2)  
PIN2 Password has been changed to "8888"

#### EXAMPLE 2

To set password used to enable or disable barring of all outgoing calls:

```
AT+CPWD="AO","0000","3333"  
OK
```

Requests the network to change the password for supplementary service "call barring".

Usually this request will affect all barring services, even though the request is issued for Supplementary Service BAOC ("Barring of all outgoing calls") only. Refer to the respective network provider for detail.



### EXAMPLE 3

#### Handling of the "PS" lock password

AT+CMEE=2	Enable text output of CME Error information
AT+CPWD="PS","1111","2222"	AT+CPWD="PS", "1111", "2222" (where "1111" = old password and "2222" = new password)
OK	Password for facility "PS" is now "2222"
AT+CPWD="PS","1111","2222"	Repeat command to provoke error "incorrect pass-word"
+CME ERROR: incorrect password	("1111" is no longer the correct password)

### EXAMPLE 4

To specify a new "PS" lock password, after the old password was disabled (e.g. after three failed attempts to change the "PS" password): use the master phone code.

CAUTION: THIS TEST SHOULD BE PERFORMED ONLY IF THE CORRECT MASTER PHONE CODE FOR THE INDIVIDUAL ME USED IS DEFINITELY AVAILABLE! Otherwise the module used will be rendered use-less until the correct master phone code is entered!:

AT+CPWD="PS","12345678","1111"	where 12345678 is the Master Phone Code and 1111 is the new password. You may also use <code>&lt;new password&gt;</code> to restore the former disabled pass-word.
OK	

Alternatively, without giving a new password:

AT+CPWD="PS","12345678"	(where 12345678 is the Master Phone Code). Deac-tivates the present phone lock.
OK	



## 13.8. AT^SPWD Change Password

The **AT^SPWD** command provides the same functions as **AT+CPWD**. The major difference between both commands is that, apart from the different prefixes "**^SPWD**" and "**+CPWD**", the **AT^SPWD** command includes additional functions dedicated to the Customer SIM Lock. Please note that this feature is only supported by specifically pre-configured MG21 modules and, therefore, not part of the standard "MG21 AT Command Set". All other functions and parameters of **AT^SPWD** are described in **AT+CPWD** section.

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 also AT commands **AT+CLCK** and **AT^SLCK** for more detail on the various lock features.

### Syntax

Test Command

**AT^SPWD=?**

Response(s)

**^SPWD:**list of supported ( **<facility>**, **<password length>**)

OK

Write Command

**AT^SPWD=<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 error is related to ME functionality:

**+CME ERROR: <err>**

PIN	ASC0	MUX1	MUX2	MUX3	🔒	Last
+	+	+	+	+	-	-

### Note

- When changing the PIN2 (**<facility>**="P2") it is recommended to check the new state of PIN2 using the **AT+CPIN2** command.



## 13.9. AT+CPSPWD Change PS Super Password

### Syntax

Write Command

```
AT+CPSPWD=<oldpwd>,<newpwd>
```

Response(s)

```
OK  
ERROR
```

### Parameter Description

<oldpwd><sup>(str)</sup>

string type (string should be included in quotation marks). Old password and length should be 8.

<newpwd><sup>(str)</sup>

string type (string should be included in quotation marks). New password and length should be 8.

### Notes

- Default value of <oldpwd> is "12345678".
- If module is locked to a specific SIM card through +CLCK and password lost or SIM state is PH-SIM PUK, you can use the super password to unlock it.
- It is not supported temporarily.



## 14. Miscellaneous Commands



The AT Commands described in this chapter are related to various areas.

Misc.	
A/	
ATS3	
ATS4	
ATS5	
AT+CALM	



## 14.1. A/ Repeat Previous Command Line

Repeat previous AT command line.

In general, after beginning a command line with character "a" or "A" a second character "t", "T" or "/" has to follow. "/" acts as line terminating character. In case of using a wrong second character, it is necessary to start again with character "a" or "A".

### Syntax

Exec Command						
A/						
Response(s)						
PIN	ASC0	MUX1	MUX2	MUX3	☺	Last
-	+	+	+	+	-	-
Reference(s)						V.250



## 14.2. AT3

## Command Line Termination

**AT3** determines the character recognized by the MG21 to terminate an incoming command line. It is also generated for result codes and information text, along with character value set via **AT4**.

### Syntax

Read Command

AT3?

Response(s)

<n>

OK

Write Command

AT3=<n>

Response(s)

OK

ERROR

PIN	ASC0	MUX1	MUX2	MUX3	☞	Last
-	+	+	+	+	-	-

Reference(s)

V.250

### Parameter Description

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

Command line termination character.

It is not recommended to change this value.

000...13<sup>(&F)</sup> ...127

### Note

- If changing this setting the new value has no effect for "**ASHUTDOWN**" URC.



### 14.3. ATS4 Response Formatting

**ATS4** determines the character generated by the MG21 for result code and information text, along with the command line termination character set via **ATS3**.

#### Syntax

Read Command <b>ATS4?</b> Response(s) <n> OK	
Write Command <b>ATS4=&lt;n&gt;</b> Response(s) OK ERROR	
PIN ASC0 MUX1 MUX2 MUX3  Last - + + + + - -	Reference(s) V.250

#### Parameter Description

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

Response formatting character.  
 It is not recommended to change this value.  
 000...10<sup>(&F)</sup> ...127

#### Note

- If changing this setting the new value has no effect for "**^SHUTDOWN**" URC.



## 14.4. AT55 Command Line Editing

**AT55** determines the character value used by the MG21 to delete the immediately preceding character from the AT command line (i.e. equates backspace key).

### Syntax

Read Command

AT55?

Response(s)

<n>

OK

Write Command

AT55=<n>

Response(s)

OK

ERROR

PIN	ASC0	MUX1	MUX2	MUX3	☞	Last
-	+	+	+	+	-	-

Reference(s)

V.250

### Parameter Description

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

Command line editing character.

It is not recommended to change this value.

000...8<sup>(&F)</sup>...127



## 14.5. AT+CALM      Alert Sound Mode

### Syntax

Test Command

AT+CALM=?

Response(s)

+CALM: (list of supported [<mode>s](#))

OK

+CME ERROR: [<err>](#)

Read Command

AT+CALM=?

Response(s)

+CALM: [<mode>](#)

OK

+CME ERROR: [<err>](#)

Write Command

AT+CALM=[<mode>](#)

Response(s)

OK

+CME ERROR: [<err>](#)

Reference(s)

GSM 07.07

### Parameter Description

[<mode>](#)<sup>(num)</sup>

- |   |  |
|---|--|
| 0 | normal mode                                    |
| 1 | silent mode (all sounds from ME are prevented) |