Infrared Modem® Online Reference

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1 Introduction

The Ericsson Infrared Modem is part of the Ericsson Mobile Office SH 888.

This Manual describes the operation of the AT commands supported by the Infrared Modem. The information here is not relevant for day-to-day operation of the Infrared Modem, which is described in the User Manual supplied with the Ericsson Mobile Office SH 888.

The On-line Reference Manual is for advanced users who require detailed information in order to:

- develop new communications software
- add the Infrared Modem to an application's list of compatible modems
- adjust the settings of their mobile telephone and modem.

1.1 About this manual

This manual is designed to supplement the Ericsson Infrared Modem User Manual.

1.2 Using this manual

The standard text in this manual is modified to distinguish between the text displayed on the screen, typed instructions and examples of command dialog. The distinctions are as follows:

1) Typed commands and option values are written in bold text.

   For example: **S2=**<esc> Options: <esc> **0 - 127**.

2) Any key strokes are written in bold text in brackets, for example **<CR>**.

3) Examples of command dialogue, including keyboard entries and on-screen responses, are written in Courier text.
   For example:

```
AT+CBC=?
+CBC:(0,1),(0-100)
OK
```

4) The default setting used by a command is indicated by **bold** text. For example, Default = **1**.

1.3 Using the Ericsson Mobile Office Infrared Modem

The Infrared Modem connects your computer and GSM mobile phone by means of a digital infrared link. Although the functions performed by this unit are not technically those of a modem (neither Modulation nor Demodulation is performed by the unit), the term Modem is retained as a commonly accepted description.

Data functions

Transmission speed conforms to the ITU-T standard V.22bis which facilitates data transfer at 2,400, 4,800 and 9,600 bits/s. By implementing data compression the transmission speed can be increased to a theoretical maximum data throughput of 38,400 bits/s. between computers.

Facsimile functions

Facsimile operation, at 2,400, 4,800, 7,200 and 9,600 bits/s. conforms to Service Class 1 and the proposed Service Class 2 standards.

Short Message Service

The Infrared Modem supports the short message service (SMS) with messages up to 160 characters long, according to ETSI (GSM) 07.05 using the GSM character set.

Mobile Phone Manager

The Infrared Modem supports commands for access of the mobile phone book and short message service according to ETSI (GSM) 07.05 and 07.07.

1.4 Communications programs

Please refer to the User Manual for instructions on the installation and use of the Ericsson Infrared Modem software drivers.

Configuring third party communication programs

If you want to use a communication program which does not include the Ericsson Infrared Modem in the list of supported hardware, the following options are suggested:

Configure for V.25ter

The Infrared Modem supports the V.25ter command set. If your communication program can generate and support a V.25ter command, the Infrared Modem does not require the installation of a specific driver.

Locate a Mobile Phone Modem driver

A Mobile Phone Modem driver for your communication program may be available on either the Ericsson Infrared Mobile Phone Modem utilities disk or from one of the on-line services.

Configure the data communications program manually

To configure your data communications program manually:

1. Select a generic Mobile Phone Modem driver from the list of available Mobile Phone Modem drivers.

2. Set the Init string to `ATZ^M`.

3. Set the optional setup string to Asynchronous RLP:

```
AT+CBST=0,0,1
```

Configure your facsimile communications program manually

To manually configure your facsimile communications program, select a Fax Class 1 driver. The Infrared Modem supports Fax Class 2 facsimile which might be used if there are problems with the fax service or speed of the computer, or your fax application does not support Fax Class 1.

2 Result and error codes

2.1 Result codes

When you send a command from your PC to the Infrared Modem, the response is terminated by a result code which is shown on the computer screen. You use this code to confirm correct operation or to identify any problem with the command.

There are two types of result codes:

- final result codes related to the operation of AT commands
- result codes associated with call connections.

Final result codes from AT commands

The Infrared Modem always terminates each response to an AT command with a final result code:

OK The command(s) and any specified parameters were valid and the command has completed execution.

Note: *Some AT commands are not relevant to the Infrared Modem operations or can only be set to one parameter value. For completeness and to allow the parameter to be read, some of these commands are supported but not implemented. Calling a command of this type will produce the* ***OK*** *result code but will not cause any change to the Infrared Modem. These commands are included in the command descriptions in Chapters 4, 5 and 6.*

ERROR

An error has occurred during the command processing. This could arise because:

- there is a fault in the command syntax
- one or more parameters are outside the permitted range
- the command you issued is not implemented on the Infrared Modem
- the command is not appropriate to the service class the Infrared Modem is operating.

When an error is reported, the **ERROR** message is preceeded by a copy of the text response from the last valid AT command. This is shown in the following example:

Valid command	`AT+CBC=?`
Response	`+CBC:(0,1),(0-100)` `OK`
Invalid command	`AT+CBC=?;+FCLASS=3`
Response	`+CBC:(0,1),(0-100)` `ERROR`

Result codes from call connections

During on-line operation of the Infrared Modem, result codes inform you about the progress of call connections:

CONNECT <speed>	A connection has been established and the data rate <speed> is shown.
BUSY	The number you called is engaged.
NO DIALTONE	Unable to establish the initial connection.
NO CARRIER	Either a connection could not be established or an existing connection has been lost.
RING	There is an incoming call. This is not a consequence of local activity and is referred to as an unsolicited result code.

Format of the result codes

The result codes described above are in verbose format. You can command the Infrared Modem to display result codes in verbose or numeric format or you can switch them off completely.

To switch between verbose and numeric format, please refer to the use of the AT V command on page 52.

To switch the display of result codes on or off, please refer to the use of the AT Q command on page 51.

2.2 Error codes

The +CME ERROR result codes indicate an error relating to the functionality of the Infrared Modem or Mobile Phone and replaces the final result code ERROR when first enabled with the AT+CMEE command.

Report mobile phone failure (+CMEE)

+CME ERROR: 0	Phone failure.
+CME ERROR: 1	No connection to phone.
+CME ERROR: 2	Phone modem link reserved.
+CME ERROR: 3	Operation not permitted.
+CME ERROR: 4	Operation not supported.
+CME ERROR: 5	PH-SIM card PIN required.
+CME ERROR: 10	SIM card not inserted.
+CME ERROR: 11	SIM card PIN required.
+CME ERROR: 12	SIM card PUK required.
+CME ERROR: 13	SIM card failure.
+CME ERROR: 14	SIM card busy.
+CME ERROR: 15	SIM card wrong.
+CME ERROR: 16	Incorrect password.
+CME ERROR: 20	Memory full.
+CME ERROR: 21	Invalid index.
+CME ERROR: 22	Not found.

+CME ERROR: 23	Memory failure.
+CME ERROR: 24	Text string too long.
+CME ERROR: 25	Invalid character in text string.
+CME ERROR: 26	Dial string too long.
+CME ERROR: 27	Invalid character in dial string.
+CME ERROR: 100	Unknown.

Report operational/access failure (+CMS)

The +CMS ERROR result codes indicate an error relating to the Infrared Modem, Mobile Phone or Network relating to the Short Message Service (SMS) and replaces the final result code ERROR.

+CMS ERROR: 0 to +CMS ERROR: 127	GSM 04.11 Annex E-2 values.
+CMS ERROR: 128 to +CMS ERROR: 255	GSM 03.40 Section 9.2.3.22 values.
+CMS ERROR: 300	Mobile phone failure.
+CMS ERROR: 301	Short message service of mobile phone reserved.
+CMS ERROR: 302	Operation not allowed.
+CMS ERROR: 303	Operation not supported.
+CMS ERROR: 304	Invalid PDU mode parameter.
+CMS ERROR: 305	Invalid text mode parameter.

+CMS ERROR: 310	SIM card not inserted.
+CMS ERROR: 311	SIM card PIN necessary.
+CMS ERROR: 312	SIM card PIN necessary for PH-SIM.
+CMS ERROR: 313	SIM card failure.
+CMS ERROR: 314	SIM card busy.
+CMS ERROR: 315	SIM card wrong.
+CMS ERROR: 320	Memory failure.
+CMS ERROR: 321	Invalid memory index.
+CMS ERROR: 322	Memory full.
+CMS ERROR: 330	SMSC address unknown.
+CMS ERROR: 331	No network service.
+CMS ERROR: 332	Network timeout.
+CMS ERROR: 500	Unknown error.

2.3 Unsolicited result codes

Service report (+CR)

When a data connection is being established, the +CR messages are sent to the PC before the final result code CONNECT. Use the AT+CR command to enable these messages.

+CR: ASYNC	Asynchronous transparent.
+CR: SYNC	Synchronous transparent.
+CR: REL ASYNC	Asynchronous non-transparent.
+CR: REL SYNC	Synchronous non-transparent.

Cellular result codes (+CRC)

The +CRC messages replace the unsolicited result code RING and provide more information about the type of the incoming call. Use the AT+CRC command to enable these messages.

+CRING: ASYNC	Asynchronous transparent.
+CRING: SYNC	Synchronous transparent.
+CRING: REL ASYNC	Asynchronous non-transparent.
+CRING: REL SYNC	Synchronous non-transparent.
+CRING: FAX	Facsimile.
+CRING: VOICE	Normal voice.

3 AT Commands

3.1 Introduction to AT commands

This chapter describes how AT commands are used to exchange information with your mobile telephone and Infrared Modem. The AT commands are listed at the end of this chapter. For a description of each command, refer to Chapters 4, 5 and 6.

You use AT commands to:

- configure your mobile telephone and Infrared Modem
- request information about the current configuration or operational status of your mobile phone/modem
- test availability and request the range of valid parameters, when applicable, for an AT command.

3.2 Infrared Modem operating modes

The Infrared Modem can be set in any one of three modes of operation. These are:

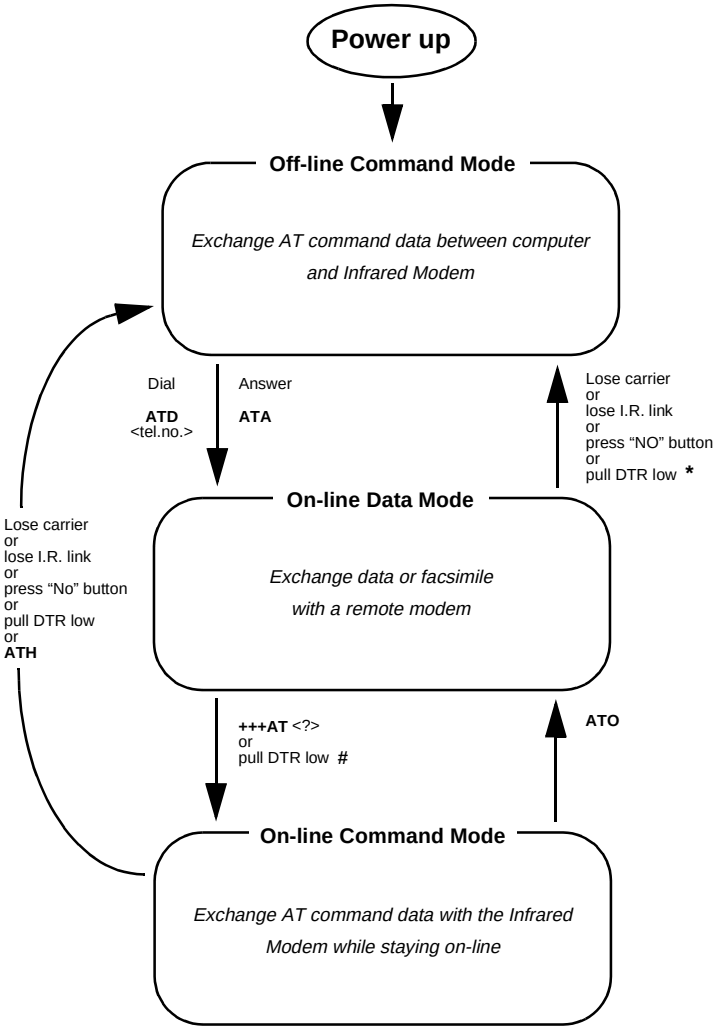
off-line command mode — the Infrared Modem is placed in off-line command mode when first powered up and is ready for entry of AT commands.

on-line data mode — allows “normal” operation of the Infrared Modem, exchanging data or facsimile with the remote modem.

on-line command mode — you can switch to on-line command mode when you want to send AT commands to the Infrared Modem while still remaining connected to the remote modem.

3.3 Changing the Infrared Modem operating mode

The following illustration summarises the methods that are used to switch between the three Infrared Modem operating modes:



&D previously set to 1.

* &D previously set to 2.

Operating in off-line command mode

In off-line command mode, the Infrared Modem accepts data as commands and not as normal communications traffic. You enter commands by typing at the PC keyboard.

Switching to on-line data mode

To enter on-line data mode, so that you can exchange data with the modem at the other end of the link, you enter the **ATD** command followed by the telephone number to make the call. Alternatively, typing **ATA** to answer an incoming call will also place the Infrared Modem in on-line mode.

Switching back to off-line command mode

Any of the following will return the Infrared Modem to off-line command mode from on-line data mode:

- loss of the connection (**NO CARRIER** error)
- loss of the I.R. link between the Infrared Modem and your computer
- pressing the “NO” button on your mobile phone
- pulling DTR low provided &D has previously been set to 2.

Note: *The &D command is described on page 41. The setting of &D determines the action taken when DTR is pulled low while you are in on-line data mode*

&D set to 1 - Infrared Modem switches to on-line command mode
&D set to 2 - Infrared Modem switches to off-line command mode.

Using AT commands during a data connection

If you wish to use AT commands while connected to a remote modem in on-line data mode and maintain connection with the remote modem, you must first enter on-line command mode.

There are two ways you can switch from on-line data mode to on-line command mode:

- Type the escape sequence **"+++**" followed by an appropriate AT command. This command must be selected from the options **AT**, **ATE**, **ATH**, **ATI**, **ATL**, **ATM**, **ATQ**, **ATV** and **ATX**. Using this method you can perform an AT function as you move in to on-line command mode. For example, if you switch using:

  +++ATH<CR>

  the Infrared Modem is switched to on-line command mode and the AT command is executed, causing the connection to be terminated (hang-up).
  If you type the escape sequence "**+++**" without any following command, the system waits one second, switches to on-line command mode and responds OK.

- Pull DTR low after previously setting &D to 1, (See page TBA).

Switching from on-line command mode to on-line data mode

To return to on-line data mode while in on-line command mode, type:

ATO<CR>

Switching from on-line command mode to off-line command mode

To return the Infrared Modem to off-line command mode from on-line command mode:

- use any of the methods described in "Switching back to off-line command mode" above
- type **+++ATH <CR>** to switch to on-line command mode and hang up at once.

3.4 Operating the AT commands

In command mode, there are four types of command you can issue:

- a set command to adjust the Infrared Modem's operating parameters
- an execute command which directs action without the need of any parameters
- a read command to view the current command settings
- a test command to view the available command parameters.

Not all AT commands support all four functions. The descriptions in Chapters 4 to 6 list the functions available for each AT command.

Entering a set command

The standard format for entering a set command is:

AT<command>=<parameters> **<CR>**

Where:	**AT**	Notifies the Infrared Modem that a command is being entered.
	<command>	The name of the command being entered.
	<parameters>	The values to be used by the command.
	<CR>	All command lines are terminated by pressing the **<CR>** (Return or Enter) key.

Note: *All command lines are completed by pressing the* ***<CR>*** *key on the computer keyboard. For the remainder of this manual, appropriate use of the* ***<CR>*** *key is assumed.*

To set the Infrared Modem to operate with autobaud over an asynchronous connection the command line would be:

AT+CBST=0,0,1

However, the commands also have default settings. These are values which are assumed to have been entered when no actual value is placed in the command line.
For example, the above command can be entered as:

AT+CBST=,,1

The default values used by the commands are indicated in the following descriptions by bold text.

When the parameter is a character string (for example “<name>”) then the value should be entered between quotes. For example “Peter”.

Optional parameters are shown in square brackets. For example [<value>].

Entering an execute command

Execute commands are very similar to set commands. They usually do not require any parameters and are used to obtain information about the mobile phone or Infrared Modem or to execute an event.

For example, to find out information about the mobile phone battery, enter the +CBC command:

AT+CBC

The Infrared Modem responds:

+CBC: 0,60

indicating that the mobile phone battery is connected (0) and that it has 60% charge remaining.

To answer an incoming call, you execute the A command:

ATA

Using read command to view the command settings

To check the current settings of a command, use the '?' option.
For example, to check the current settings of the +CBST command, enter:

AT+CBST?

If CBST has been set according to the previous example, the settings are displayed as:

+CBST: 0,0,1

Using test command to request command help

To test the availability of a command and the range of parameters, use the '=?' option with the command.

For example, to check the parameters available to the command line in the example above, enter:

AT+CBST=?

The line:

+CBST: (0,4,6,7,68,70,71),(0),(1)

is displayed indicating the range of valid entries that can be set for the parameters <data rate>, <bearer service> and <connection element>.

3.5 AT command list

General AT commands

Information commands

DTE-DCE interface commands

Result and error code control

Mobile phone control commands

Phone book commands

Configuration commands

Call control

Line interface

Short Message Service AT commands

Facsimile AT commands

General

Fax Service Class 1 commands

Fax Service Class 2 commands

4 General AT commands

4.1 Information commands

+CBC ***Mobile phone battery charge***

Description: Returns the connection status and charge level of the mobile phone battery.

Execute command: **+CBC**

Returns: +CBC: <status>,<charge%>

<status>	**0**	mobile phone is powered by the battery
	1	mobile phone has the battery connected but is not powered by it.
<charge%>	**0**	battery discharged
	1-100	percentage of charge remaining.

Example:
```
AT+CBC
+CBC: 1,0
OK
```

Test command: **+CBC=?** Always returns **(0,1),(0-100)**

Example:
```
AT+CBC=?
+CBC: (0,1),(0-100)
OK
```

+CGMI Request mobile phone manufacturer identification

Description: Returns the manufacturer identification for the mobile phone.

Execute command: **+CGMI**

Example:
```
AT+CGMI
ERICSSON
OK
```

Test command: **+CGMI=?**

Example:
```
AT+CGMI=?
OK
```

+CGMM Request mobile phone model identification

Description: Returns the model identification of the mobile phone.

Execute command: **+CGMM**

Example:
```
AT+CGMM
1100801
OK
```

Test command: **+CGMM=?**

Example:
```
AT+CGMM=?
OK
```

.

S2 Escape sequence character

Description: Defines the character to be used as the escape sequence character when switching from on-line data mode to on-line command mode. The response to the command is modified to reflect the change.

Set command: **S2=**[<esc>]

Options: <esc>

0 - 127 The ASCII value of the escape sequence character. Default = **43 ("+")**

128-255 Setting S2 to a value in this range will disable the escape sequence.

Example:
```
ATS2=43
OK
```

Read command: **S2?** Returns the current setting.

Example:
```
ATS2?
43
OK
```

Test command: **S2=?** Always returns **(0-255)**.

Example:
```
ATS2=?
S2: (0-255)
OK
```

+CGMR Request mobile phone revision identification

Description: Returns the revision identification of the mobile phone.

Execute command: **+CGMR**

Example:
```
AT+CGMR
9712080907
OK
```

Test command: **+CGMR=?**

Example:
```
AT+CGMR=?
OK
```

+CPAS Mobile phone activity status

Description: Returns the activity status of the mobile phone.

Execute command: **+CPAS**

Returns: +CPAS: <pas>

<pas>

0	Ready.
1	Unavailable.
2	Status unknown.
3	Ringing.
4	Call in progress.
5	Asleep.

Example:
```
AT+CPAS
+CPAS: 0
OK
```

. Test command: **+CPAS=?** Always returns **(0-5)**.

Example:
```
AT+CPAS=?
+CPAS: (0-5)
OK
```

+CSQ ***Mobile phone signal quality***

Description: Returns the signal strength and channel bit error rate at the mobile phone.

Execute command: **+CSQ**

Returns: +CSQ: <rssi>,<ber>

<rssi>	**0**	-113 dBm or less.
	1	-111 dBm.
	2-30	-109 dBm to -53 dBm.
	31	-51 dBm or greater.
<ber>	**99**	

Example:
```
AT+CSQ
+CSQ: 19,99
OK
```

. Test command: **+CSQ=?** Always returns **(0-31),(99)**.

Example:
```
AT+CSQ=?
+CSQ: (0-31),(99)
OK
```

+GCAP Request Infrared Modem capabilities list

Description: Returns a list of valid Infrared Modem command prefixes.

Execute command: **+GCAP**

Returns:

+FCLASS	Fax class 1 and 2 commands.
+CGSM	GSM commands.

Example:

```
AT+GCAP
+GCAP: +FCLASS,+CGSM
OK
```

. Test command: **+GCAP=?**

Example:

```
AT+GCAP=?
OK
```

+GMI Request Infrared Modem manufacturer identification

Description: Returns the manufacturer identification for the Infrared Modem.

Execute command: **+GMI**

Example:
```
AT+GMI
Ericsson
OK
```

Test command: **+GMI=?**

Example:
```
AT+GMI=?
OK
```

+GMM Request Infrared Modem model identification

Description: Returns the model identification of the Infrared Modem.

Execute command: **+GMM**

Example:
```
AT+GMM
Ericsson SH 888 Infrared Modem
OK
```

Test command: **+GMM=?**

Example:
```
AT+GMM=?
OK
```

+GMR Request Infrared Modem revision identification

Description: Returns the revision identification of the Infrared Modem.

Execute command: **+GMR**

Example:
```
AT+GMR
9710221434
OK
```

Test command: **+GMR=?**

Example:
```
AT+GMR=?
OK
```

I *Request Infrared Modem identification value*

Description: This command provides compatibility with Microsoft Windows 95.

Execute command: **I**[<n>]

Options: <n>

0	Return the model identification.
1	Returns the revision identification.
5	Returns active settings. Default = **0**.
	All other numbers up to 255 return OK. Other numbers return ERROR.

Examples:

```
ATI0
Ericsson SH 888 Infrared Modem
OK

ATI1
971208 0907 PRGCXC125101
OK

ATI5
ACTIVE SETTINGS
E:1 Q:0 V:1 X:4 &C:1 &D:0 &Y:0
S0:000 S2:043 S3:013 S4:010 S5:008
S7:050
+CBST:0,0,1 +CRLP:61,61,48,6
+CPMS:"SM","SM" +CPBS:"SM"
+CR:0 +CRC:0 +CMEE:0
```

```
STORED PROFILE 0:
E:1 Q:0 V:1 X:4 &D:0
S0:000 S2:043 S3:013 S4:010 S5:008
S7:050
+CBST:0,0,1 +CRLP:61,61,48,6
+CPMS:"SM","SM" +CPBS:"SM"
+CR:0 +CRC:0 +CMEE:0

STORED PROFILE 1:
E:1 Q:0 V:1 X:4 &D:0
S0:000 S2:043 S3:013 S4:010 S5:008
S7:050
+CBST:0,0,1 +CRLP:61,61,48,6
+CPMS:"SM","SM" +CPBS:"SM"
+CR:0 +CRC:0 +CMEE:0

OK
```

4.2 DTE-DCE interface commands

&C Circuit 109 (DCD) control

Description: Determines the behaviour of the carrier detect. Further information is available from the *I109 command.

Set command: **&C**[<n>]

Options: <n>

0	DCD always on.
1	DCD follows the connection. Default = **1**.

Example:
```
AT&C1
0K
```

&D Circuit 108 (DTR) response

Description: Controls all actions initiated by data terminal ready from DTE.

Set command: **&D**[<n>]

Options: <n> for DTR On to Off transitions:

0	Ignore.
1	When in on-line data mode then switch to on-line command mode. All other states, as for n = 2.
2	Disconnect and switch to off-line command mode. Default = **0**.

Example:
```
AT&D2
0K
```

E *Command echo*

Description: Enables or disables the command line echo.

Set command: **E=**[<n>] or **E**[<n>]

Options:

<n>	**0**	No echo of command mode characters.
	1	Echo command mode characters. Default = **1**.

Examples:

```
ATE
OK

ATE=1
OK
```

Read command: **E?** Returns the current setting.

Example:

```
ATE?
E: 1
OK
```

Test command: **E=?** Always returns **(0,1)**.

Example:

```
ATE=?
E: (0,1)
OK
```

+IFC DTE-DCE local flow control

Description: Defines the flow control between the Infrared Modem and the computer when in on-line data mode. No flow control is enabled in any of the command modes.

Set command: **+IFC=**[<by_te>,[<by_ta>]]

Options:

<by_te>

0	No flow control on DTE.
1	Xon/Xoff flow control on DCE. Control characters are removed by the DCE interface.
2	RTS flow control on DCE.
3	Xon/Xoff flow control on DCE. Control characters are passed to the remote DCE/DTE. Default = **2**.

<by_ta>

0	No flow control on DCE.
1	Xon/Xoff flow control on DTE.
2	CTS flow control on DCE. Default = **2**.

Example:

```
AT+IFC=2,2
OK
```

Read command: **AT+IFC?** Returns the current setting.

Example:

```
AT+IFC?
+IFC: 2,2
OK
```

Test command: **AT+IFC=?** Always returns **(0-3),(0-2)**.

Example:

```
AT+IFC=?
+IFC: (0-3),(0-2)
OK
```

S3 Command line termination character

Description: Defines the character to be used as the line termination character. This is used both for the detection of an end of command and in formatting of responses. The response to the command is modified to reflect the change.

Set command: **S3=**[<cr>]

Options: <cr> **0 - 127** The ASCII value of the Command Line Termination Character.
Default = **13**.

Example:
```
ATS3=13
OK
```

Read command: **S3?** Returns the current setting.

Example:
```
ATS3?
013
OK
```

Test command: **S3=?** Always returns **(0-127)**.

Example:
```
ATS3=?
S3: (0-127)
OK
```

S4 Response formatting character

Description: Defines the character to be used as the line formatting character. The response to the command is modified to reflect the change.

Set command: **S4=**[<lf>]

Options: <lf> **0 - 127** The ASCII value of the line formatting character. Default = **10**.

Example:
```
ATS4=10
OK
```

Read command: **S4?** Returns the current setting.

Example:
```
ATS4?
010
OK
```

Test command: **S4=?** Always returns **(0-127)**.

Example:
```
ATS4=?
S4: (0-127)
OK
```

S5 Command line editing character

Description: Defines the character to use as command line editing character.

Set command: **S5=**[<bs>]

Options: <bs> **0 - 127** The ASCII value of the Line Editing Character.
Default = **8**.

Example:
```
ATS5=8
OK
```

Read command: **S5?** Returns the current setting.

Example:
```
ATS5?
008
OK
```

Test command: **S5=?** Always returns **(0-127)**.

Example:
```
ATS5=?
S5: (0-127)
OK
```

4.3 Result and error code control

+CEER Extended error report

Description: Returns the text description of the last error encountered in an unsuccessful connection.

Execute command: **+CEER**

Returns: <report> Text string containing reason of last call clearing or unsuccessful call set-up (originating or answering).

Example:
```
AT+CEER
+CEER: Phone failure
OK
```

.Test command: **+CEER=?**

Example:
```
AT+CEER=?
OK
```

+CR Service reporting control

Description: Enables or disables display of intermediate bearer capability reports during the handshake phase.

Set command: **+CR=**[<mode>]

Options: <mode> **0** Disable reporting.
1 Enable reporting.
Default = **0**.

Example:
```
AT+CR=0
OK
```

Read command: **+CR?** Returns the current setting.

Example:
```
AT+CR?
+CR: 0
OK
```

Test command: **+CR=?** Always returns **(0,1)**.

Example:
```
AT+CR=?
+CR: (0,1)
OK
```

+CMEE Report mobile phone failure

Description: Enables or disables mobile phone failure reporting.

Set command: **+CMEE=**[<n>]

Options: <n> **0** Disable +CMEE error reporting.
1 Enable +CMEE error reporting.
Default = **0**.

Example:
```
AT+CMEE=0
OK
```

Read command: **+CMEE?** Returns the current setting.

Example:
```
AT+CMEE?
+CMEE: 0
OK
```

Test command: **+CMEE=?** Always returns **(0,1)**.

Example:
```
AT+CMEE=?
+CMEE: (0,1)
OK
```

+CRC Cellular result codes

Description: Determines whether or not the extended format of report for an incoming call should be used.

Set command: **+CRC=**[<mode>]

Options: <mode> **0** Disable extended result codes.
1 Enable extended result codes.
Default = **0**.

Example:
```
AT+CRC=0
OK
```

Read command: **+CRC?** Returns the current setting.

Example:
```
AT+CRC?
+CRC: 0
OK
```

Test command: **+CRC=?** Always returns **(0,1)**.

Example:
```
AT+CRC=?
+CRC: (0,1)
OK
```

Q *Result code suppression*

Description: Enables or disables the display of result codes. When the result code is disabled, the Infrared Modem does not issue any final result codes but continues to provide normal text in response to commands.

Set command: **Q=**[<n>] or **Q**[<n>]

Options: <n>

0	Enable result codes.
1	Disable result codes.

Default = **0**.

Example:

```
ATQ0
OK
```

Read command: **Q?** Returns the current setting.

Example:

```
ATQ?
Q: 0
OK
```

Test command: **Q=?** Always returns **(0,1)**.

Example:

```
ATQ=?
Q: (0,1)
OK
```

V *Result code format*

Description: Select either verbose or numeric response codes.

Set command: **V=**[<n>] or **V**[<n>]

Options: <n>

0	Display numeric result codes.
1	Display verbose result codes.

Default = **1**.

Example:
```
ATV1
OK
```

Read command: **V?** Returns the current setting.

Example:
```
ATV?
V: 1
OK
```

Test command: **V=?** Always returns **(0,1)**.

Example:
```
ATV=?
V: (0,1)
OK
```

4.4 Mobile phone control commands

+CAOC Advice of charge

Description: Returns the current call meter value in hexadecimal format.

Execute command: **+CAOC**

Example:
```
AT+CAOC
+CAOC: 00001E
OK
```

Test command: **+CAOC=?**

Example:
```
AT+CAOC=?
OK
```

+CCFC Call forwarding

Description: Allows control of the call forwarding supplementary service. Registration, erasure, activation, deactivation and status query are all supported.

Set command: **+CCFC=**<reason>,<mode>[,<number>[,<type>[,,<class>[,<subaddr>[,<satype>[,<time>]]]]]]

Options:

<reason>	**0**	Unconditional.
	1	Mobile busy.
	2	No reply.
	3	Not reachable.
	4	All call forwarding.
	5	All conditional call forwarding.
<mode>	**0**	Disable.
	1	Enable.
	2	Query status.
	3	Registration.
	4	Erasure.
<number>		String type phone number of forwarding address in format specified by <type>.
<type>		Type of octet address in integer format.
<subaddr>		String type subaddress of format specified by <satype>.
<satype>		Type of octet subaddress in integer format.
<class>	**1**	Voice.
	2	Data.
	4	Fax.

	<time>	If no reply is enabled or queried it provides the time in seconds to wait before a call is forwarded. Default value is 20.

Example:

```
AT+CCFC=2,0
OK
```

Test command: **+CCFC=?** Always returns **(0-5)**.

Example:

```
AT+CCFC=?
+CCFC: (0-5)
OK
```

+CCWA Call waiting

Description: Allows control of the call waiting supplementary service.

Set command: **+CCWA=[**<n>[,<mode>[,<class>]]]

Options:

<n>	**0**	Disable the result code representation.
	1	Enable the result code representation.
<mode>	**0**	Disable.
	1	Enable.
	2	Query status.
<class>	**1**	Voice.

Example:

```
AT+CCWA=1
OK
```

Read command: **+CCWA?** Returns the current setting.

Example:

```
AT+CCWA?
+CCWA: 1
OK
```

Test command: **+CCWA=?** Always returns **(0-1)**.

Example:

```
AT+CCWA=?
+CCWA: (0-1)
OK
```

+CFUN Set mobile phone functionality

Description: Sets the power status of the mobile phone to either on or off.

Set command: **+CFUN=**<fun>

Options: <fun> **0** Switch off the mobile phone.
1 Switch on the mobile phone.
Default = **1**.

Example:
```
AT+CFUN=0
OK
```

Read command: **+CFUN?** Returns the current setting.

Example:
```
AT+CFUN?
+CFUN: 1
OK
```

Test command: **+CFUN=?** Always returns **(0,1)**.

Example:
```
AT+CFUN=?
+CFUN: (0,1)
OK
```

Note that when the keylock is activated on the phone, you cannot turn it off by means of the +CFUN command.

+CGSN Request ME product serial no identification

Description: Returns a string containing the IMEI number of the ME.

Execute command: **+CGSN**

Returns: <imei> A string containing the IMEI number of the ME.

Example:
```
AT+CGSN
004601010000720
OK
```

Test command: **+CGSN=?**

Example:
```
AT+CGSN=?
OK
```

+CHLD Call related supplementary services

Description: Temporarily disconnects a call, but retains the connection to the network and to a service that allows multiparty conversation.

Execute command: **+CHLD=**<n>

Options: <n>

0	Releases all held calls or sets User Determined User Busy (UDUB) for a waiting call.
1	Releases all active calls (if any exist) and accepts the other (held or waiting) call.
1X	Release a specific active call X.
2	Places all active calls (if any exist) on hold and accepts the other (held or waiting) call.
2X	Places all active calls on hold except call X with which communication is supported.
3	Adds a held call to the conversation.
4	Connects the held and waiting call and disconnects the user.

Example:

```
AT+CHLD=0
OK
```

Test command: **+CHLD=?** Always returns **(0-4,11-16,21-26)**

Example:

```
AT+CHLD=?
+CHLD: (0-4,11-16,21-26)
OK
```

Note that X is the numbering (starting with 1) of the call given by the sequence of setting up or receiving calls (active, held or waiting) as seen by the served subscriber.

+CHUP Call hang-up

Description: Terminates the current call. Command is used to provide an assured means of terminating an alternating mode call.

Execute command: **+CHUP**

Example:
```
AT+CHUP
OK
```

Test command: **+CHUP=?**

Example:
```
AT+CHUP=?
OK
```

+CIMI Read International Mobile Subscriber Identity (IMSI)

Description: Execution command which causes the TA to return <imsi>. This identifies the individual SIM which is attached to the ME.

Execute command: **+CIMI**

Returns: <imsi> The IMSI, an integer string without double quotes.

Example:
```
AT+CIMI
240012500011016
OK
```

. Test command: **+CIMI=?**

Example:
```
AT+CIMI=?
OK
```

+CLCK Facility lock

Description: Locks or unlocks a ME or network facility. These operations require a password.

Set command: **+CLCK=**<fac>,<mode>[,<passwd>[,<class>]]

Options:	<fac>	**"CS"**	Lock Control Surface, e.g.phone, keyboard.
		"PS"	Lock Phone to SIM card.
		"SC"	Lock SIM Card.
		"P2"	SIM PIN2
		"AO"	Bar All Outgoing calls.
		"OI"	Bar Outgoing International Calls.
		"OX"	Bar Outgoing international calls eXcept to home country.
		"AI"	Bar All Incoming calls.
		"IR"	Bar Incoming calls when Roaming outside the home PLMN.
		"AB"	All Barring services.
		"AG"	All outGoing barring services.
		"AC"	All inComing barring services.
	<mode>	**0**	Unlock.
		1	Lock.
		2	Query status.
	<passwd>		String type password defined in +CPWD command.
	<class>	**1**	Voice.
		2	Data.
		3	Fax.

Test command: **+CLCK=?** Always returns **(“CS”,“PS”,“SC”, “P2”,“AO”,“OI”,“OX”,“AI”,“IR”, “AB”,“AG”,“AC”)**

Example:

```
AT+CLCK=?
+CLCK: ("CS","PS","SC","P2","AO","OI",
"OX","AI","IR","AB","AG","AC")
OK
```

+CLIP Calling line identification presentation

Description: Calling line identification presentation allows the subscriber to get the calling line identity of the calling party when receiving a mobile terminated call.

Set command: **+CLIP=**<n>

Options: <n> **0** Disable.
1 Enable.

Example:
```
AT+CLIP=0
OK
```

Read command: **+CLIP?** Returns the current setting.

Returns: +CLIP: <n>, <status>

<status> **0** CLIP not provisioned.
1 CLIP provisioned.
2 Unknown, e.g. no network.

Example:
```
AT+CLIP?
+CLIP: 0,1
OK
```

Test command: **+CLIP=?** Always returns **(0-1)**.

Example:
```
AT+CLIP=?
+CLIP: (0-1)
OK
```

+CLIR Calling line identification restriction

Description: Calling line identification restriction allows the calling subscriber to enable or disable the presentation of the calling line identity to the called party.

Set command: **+CLIR=[**<n>]

Options: <n>

0	Presentation according to the subscription of the CLIR service.
1	CLIR invocation.
2	CLIR suppression.

Example:
```
AT+CLIR=0
OK
```

Read command: **+CLIR?** Returns the current setting.

Returns: +CLIR: <n>,<status>

<status> CLIR service status in the network.

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

Example:
```
AT+CLIR?
+CLIR: 0,0
OK
```

Test command: **+CLIR=?** Always returns **(0-2)**.

Example:
```
AT+CLIR=?
+CLIR: (0-2)
OK
```

+CMOD Set call mode

Description: Sets the call mode for further dialling commands or the next answering command.

Set command: **+CMOD=**<mode>

Options: <mode> **0** Single mode.
1 Alternating voice/fax.

Example:
```
AT+CMOD=0
OK
```

Read command: **+CMOD?** Returns the current setting.

Example:
```
AT+CMOD?
+CMOD: 1
OK
```

Test command: **+CMOD=?** Always returns **(0,1)**.

Example:
```
AT+CMOD=?
+CMOD: (0-1)
OK
```

+CNUM Subscriber number

Description: Command returns MSISDN information relating to the subscriber.

Execute command: **+CNUM**

Returns: +CNUM: [<alphax>],<numberx>,<type>[,speed>,<service>[,<itc>]]

<alphax> Optional alphanumeric string associated with <numberx>.

<numberx> String type phone number of format specified by <typex>.

<type> Type of octet address in integer format.

<speed>

0	Auto selection of baud setting.
4	2400bps V22bis.
6	4800bps V32.
7	9600bps V32.
68	2400bps V.110 (ISDN).
70	4800bps V.110 (ISDN).
71	9600bps V.110 (ISDN). Default = **0**.

<service>

0	Asynchronous modem.
1	Synchronous modem.
2	PAD Access (asynchronous).
3	Packet Access (synchronous).
4	Voice.
5	Fax.

<itc>	**0**	3.1 kHz.
	1	UDI.

Example:

```
AT+CNUM
+CNUM: "MSISDN","0706410741",128,8,4
OK
```

Test command: **+CNUM=?**

Example:

```
AT+CNUM=?
OK
```

+COPS Set operator selection

Description: Allows the automatic or manual selection of the GSM network operator.

Set command: **+COPS=**[<mode>[,<format>[,<oper>]]]

Options:

<mode>	**0**	Automatic (<oper> field is ignored).
	1	Manual (<oper> field is present).
	3	Set only <format>, do not attempt registration/ deregistration (<oper> field is ignored).
	4	Manual/automatic (<oper> field is present).
<format>	**0**	Long alphanumeric format. 16 characters.
	1	Short alphanumeric format. 8 characters.
	2	Numeric. GSM Location Area Identification number which consists of a three BCD digit country code and a two BCD digit network code.
<oper>		String type as specified by <format>.

Example:

```
AT+COPS=0
OK
```

Read command: **+COPS?** Returns the current setting.

Example:

```
AT+COPS?
+COPS: 0,0,"S TELIA MOBITEL"
OK
```

Test command: **+COPS=?**

Returns: +COPS: (<status>,<long>,<short>,<numeric>)

<status>	**0**	Unknown.
	1	Available.
	2	Current.
	3	Forbidden.
<long>		Long alphanumeric format.
<short>		Short alphanumeric format.
<numeric>		GSM Location Area Identification Number which consists of a three BCD digit country code and a two BCD digit network code.

Example:

```
AT+COPS=?
+COPS: (2,"S TELIA MOBITEL","S TELIA",
"24001")
OK
```

+CPIN Send Password

Description: Sends the password to the ME, this is necessary to make the ME operational.

Execute command: **+CPIN**=<pin>[,<newpin>]

Options:
- <pin>
- <newpin>

Numeric string type values. The range for SIM PIN and PH-SIM is 4-8 digits. SIM PUK consists of 8 digits.

Example:
```
AT+CPIN=1234
OK
```

Read command: **+CPIN?**

Returns: +CPIN: <code>

<code>
- **READY** ME has no pending request for any password.
- **SIM PIN** ME requires SIM PIN to be entered.
- **SIM PUK** ME requires SIM PUK to be entered.
- **SIM PIN 2**
- **SIM PUK 2**
- **PH-SIM PIN** ME requires a Phone-to-SIM card password to be entered (phone lock).
- **BLOCKED**

Example:
```
AT+CPIN?
+CPIN: READY
```

Test command: **+CPIN=?**

Example:

```
AT+CPIN=?
+CPIN (READY,SIM PIN,SIM PUK,SIM PIN 2,
SIM PUK 2,PH-SIM PIN,BLOCKED)
OK
```

+CPWD Set/change new password

Description: Action command sets a new password for the facility lock function defined by command Facility Lock +CLCK.

Set command: **+CPWD=**<fac>,<oldpwd>, <newpwd>

Options:	<fac>	**"CS"**	Lock Control Surface, e.g.phone, keyboard.
		"PS"	Lock Phone to SIM card.
		"SC"	Lock SIM Card.
		"P2"	SIM PIN2
		"AO"	Bar All Outgoing calls.
		"OI"	Bar Outgoing International calls.
		"OX"	Bar Outgoing international calls eXcept to home country.
		"AI"	Bar All Incoming calls.
		"IR"	Bar Incoming calls when Roaming outside the home PLMN.
		"AB"	All Barring services.
		"AG"	All outGoing barring services.
		"AC"	All inComing barring services.
	<oldpwd>		same as password specified for the facility from the ME user interface.
	<newpwd>		create a new password, length determined with <pwdlength>.
	<pwdlength>		integer type maximum length of the password.

Test command: **+CPWD=?**

Example:

```
AT+CWPD=?
+CPWD: ("PS",8),("SC",8),("P2",8),
("AO",8),("OI",8),("OX",8),("AI",8),
("IR",8),("AB",8),("AG",8),("AC",8)
OK
```

+CREG Set network registration

Description: Allows network registration of an unsolicited result code.

Set command: **+CREG=**[<n>]

Options: <n>

0	Disable network registration of unsolicited result code.
1	Enable network registration of unsolicited result code. That is, it sends an unsolicited result code for every change in the status.

Example:
```
AT+CREG=0
OK
```

Read command: **+CREG?** Returns the current setting.

Returns: +CREG: <n>,<stat>

<stat>

0	Not registered.
1	Registered, home network.
2	Not registered, currently searching for a new operator to register to.
3	Registration denied.
4	Unknown.
5	Registered, roaming.

Example:
```
AT+CREG?
+CREG: 0,1
OK
```

Test command: **+CREG=?** Always returns **(0-1)**.

Example:
```
AT+CREG=?
+CREG: (0-1)
OK
```

+CSCS Select terminal character set

Description: Defines the character set to be used.

Set command: **+CSCS=**[“<chset>”]

Options: “<chset>” **“GSM”** Default **GSM** alphabet.

Example:
```
AT+CSCS="GSM"
OK
```

Read command: **+CSCS?** Returns the current setting.

Example:
```
AT+CSCS?
+CSCS: "GSM"
OK
```

Test command: **+CSCS=?** Always returns **(“GSM”)**.

Example:
```
AT+CSCS=?
+CSCS: ("GSM")
OK
```

+CSSN Supplementary service notifications

Description: Allows supplementary service related network initiated notification result codes to be presented.

Set command: **+CSSN=**[<n>[,<m>]]

Options:

<n>	**0**	Disable +CSSI result code presentation.
	1	Enable +CSSI result code presentation.
<m>	**0**	Disable +CSSU result code presentation.
	1	Enable +CSSU result code presentation.

Example:
```
AT+CSSN=1,1
OK
```

Read command: **+CSSN?** Returns the current setting.

Example:
```
AT+CSSN?
+CSSN: 1,1
OK
```

Test command: **+CSSN=?** Always returns **(0-1),(0-1)**.

Example:
```
AT+CSSN=?
+CSSN: (0-1),(0-1)
OK
```

+VTS DTMF and tone generation

Description: Allows the transmission of DTMF tones and arbitrary tones.

Execute command: **+VTS=**<DTMF>[,<DTMF>[,...]][,<duration>]

Options:

<DTMF>	Single ASCII character in the set 0-9, #, *, A-D.
<duration>	Duration of tone in ms digit in the range 5-100.

Example:

```
AT+VTS="3"
OK

AT+VTS="*,1,2,*,C,#"
OK
```

Test command: **+VTS=?**

Example:

```
AT+VTS=?
OK
```

4.5 Phone book commands

+CPBR Read mobile phone phonebook entries

Description: Returns the phonebook entries from index1 to index2 as stored on the SIM card or in the Mobile Phone memory. Use the AT+CPBS command (see next page) to select one of these memories. The default is the SIM memory.

Set command: **+CPBR=**<index1>,[<index2>]

Options:

<index1>	First entry to be read.
<index2>	Last entry to be read. This option is only entered when a range of numbers is required.

Example:

```
AT+CPBR=1,2
+CPBR: 1,“046193000“,145,“ERICSSON“
+CPBR: 2,“046193500“,145,“ERICSSON FAX“
OK
```

Test command: **+CPBR=?** Always returns **(1-100),20,18**.

The returned values are the number of entries available in the current phone book memory, the maximum length of the phone number and the maximum length of the text. These values can vary between different SIM cards and mobile phones.

Example:

```
AT+CPBR=?
+CPBR: (1-100),20,18
OK
```

+CPBS Select mobile phone phonebook memory storage

Description: Define the location of the phonebook memory storage used by the phonebook commands.

Set command: **+CPBS=**“<storage>”

Options: <storage> **“ME”** Mobile phone phonebook.
“SM” SIM card phonebook.
Default = **“SM”**.

Example:
```
AT+CPBS="SM"
OK
```

Read command: **+CPBS?** Returns the current setting.

Example:
```
AT+CPBS?
+CPBS: "SM"
OK
```

Test command: **+CPBS=?** Always returns **(“ME”,“SM”)**.

Example:
```
AT+CPBS=?
+CPBS: ("ME","SM")
OK
```

+CPBW Write mobile phone phonebook entries

Description: Store entries in the phonebook.

Set command: **+CPBW=**[<index>],[<"number">,[<type>,[<"text">]]]

Options:

<index>		Location number for the storage of the phone details. If omitted then the first free location is assigned.
<"number">		Phone number. This erases the entry stored at position 10 in the phone book.
<type>	**128-255**	Type of ISDN/Phone numbering plan:
	129	Nationality unknown.
	145	International.
	161	National. If a '+' is included in the phone number <number> then a default of **145** is used, in all other cases a default value of **129** is applied. This stores the entry at the first free position in the phone book.
<"text">		Name or description of the phone number.

Examples:

```
AT+CPBW=10,"046193000",129,"Ericsson"
OK
```

The new entry overwrites position 10 in the phonebook.

```
AT+CPBW=10
OK

AT+CPBW=,"046193000",129,"Ericsson"
OK
```

Test command: **+CPBW=?** Always returns **(1-100),20,(128-255),18**

Example:

```
AT+CPBW=?
+CPBW: (1-100),20,(128-255),18
OK
```

4.6 Configuration commands

&F *Set to factory configuration*

Description: Resets the settings to the predefined factory configurations. Configurations which would adversely effect an open connection or a current data transmission are not loaded until the connection ceases.

Command: **&F=**[<pr>] or **&F**[<pr>]

Options: <pr> **0** Reset all the settings to the factory defaults.

Example:
```
AT&F
OK
```

Test command: **&F=?** Always returns **(0)**.

Example:
```
AT&F=?
&F: (0)
OK
```

Z *Reset to user defined configuration*

Description: Perform a 'soft reset', i.e. terminate any ongoing operation and connection and restore one of the configurations stored in nonvolatile memory as the active profile.

Set command: **Z=**[<pr>] or **Z**[<pr>]

Options:

<pr>		Reset all settings to profile Y command.
	0	Profile 0.
	1	Profile 1.

Examples:

```
ATZ0
OK

ATZ1
OK

ATZ
OK
```

Test command: **Z=?** Always returns **(0,1)**.

Example:

```
ATZ=?
Z: (0,1)
OK
```

&W ***Store user profile***

Description: Stores the current user profile to non volatile storage.

Execute command: **&W=**[<pr>] or **&W**[<pr>]

Options: <pr>
- **0** Stores current settings in User Profile 0.
- **1** Stores current settings in User Profile 1.

Example:
```
AT&W1
OK
```

Test command: **&W=?** Always returns **(0,1)**.

Example:
```
AT&W=?
&W: (0,1)
OK
```

&Y Select power on profile

Description: Selects the User Profile to load settings from, after power-up or software reset.

Set command: **&Y**=[<pr>] or **&Y**[<pr>]

Options: <pr>

0	Load settings from User Profile 0.
1	Load settings from User Profile 1.

Example:
```
AT&Y1
OK
```

Read command: **&Y?**

Example:
```
AT&Y?
&Y: 0
OK
```

Test command: **&Y=?** Always returns **(0,1)**.

Example:
```
AT&Y=?
&Y: (0,1)
OK
```

4.7 Call control

A ***Answer***

Description: Answer and initiate connection to an incoming call. If the command is used during speech connection, a fax connection is established (teleservice 61, speech then fax).

Execute command: **A**

Examples:

```
ATA
CONNECT 9600
```

D ***Dial***

Description: Initiate a phone connection which may be data, facsimile (+FCLASS>0) or voice (phone number terminated by semicolon). The phone number used to establish the connection will consist of digits and modifiers or a stored number specification.

Execute command:	**D**	Dial the phone number entered on the phone display.
Other options:	**D**<n>	Dial the phone number specified in the command as <n>.
	D=ME<i>	Dial the phone number stored in the mobile phone which is located by the index <i>.
	D=SIM<i>	Dial the phone number stored in the SIM card which is located by the index <i>.
	DL	Redial the last phone number dialled.
Modifiers:	**W**	The W modifier is ignored but is included only for compatibility purposes.
	,	The comma modifier is ignored but is included only for compatibility purposes.
	;	Informs the Infrared Modem that the number is a voice rather than a fax or data number.

	T	The T modifier is ignored but is included only for compatibility purposes.
	P	The P modifier is ignored but is included only for compatibility purposes.
Dial examples:	`ATD046194427` `<response>`	See below for possible responses.
	`ATD=ME1` `<response>`	Dial the number stored in index 7 of the mobile phone.
	`ATD=SIM1` `<response>`	Dial the number stored in index 5 of the SIM card.
	`ATD046193000;`	Voice dial, immediately returns `OK`.
	`ATDL`	Redial the last number dialled.
Responses:	`CONNECT` <speed>	Data connection established at the rate given in <speed>.
	`NO CARRIER`	Unable to establish a connection or the connection attempt was aborted by the user.
	`ERROR`	An unexpected error occurred while trying to establish the connection.
	`NO DIALTONE`	The mobile phone is being used for a voice call or is not within coverage of the network.
	`BUSY`	The phone number called is engaged.

H *Hook control*

Description: Terminates a connection.

Execute command: **H**[<n>]

Options: <n> **0** Disconnect data connection.

Examples:
```
ATH
NO CARRIER
```

O *Return to on-line data mode*

Description: Switch to the on-line data mode from the on-line command mode during an active call. Returns ERROR when not in on-line command mode.

Execute command: **O**

Examples:
```
ATO
CONNECT 9600
```

P *Select pulse dialling*

Description: Implemented for compatibility only. Would normally cause the next D command to use pulses/tones when dialling the number.

Set command: **P**

Example:
```
ATP
0K
```

Test command: **P=?**

Example:
```
ATP=?
0K
```

T *Select tone dialling*

Description: Implemented for compatibility only. Would normally cause the next D command to use pulses/tones when dialling the number.

Set command: **T**

Example:
```
ATT
0K
```

Test command: **T=?**

Example:
```
ATT=?
0K
```

X *Call progress monitoring control*

Description: Define whether the dial tone detection and busy tone detection are to be used during a call setup.

Set command: **X=**[<n>] or **X**[<n>]

Options: <n>

0	Busy and dial tone detection off. No line speed reported on connection.
1	Busy and dial tone detection off. Report line speed on connection.
2	Busy detection on and dial tone detection off. Report line speed on connection.
3	Busy detect off and dial tone detection on. Report line speed on connection.
4	Busy detect and dial tone detection on. Report line speed on connection. Default = **4**.

Examples:

```
ATX4
0K
```

Read command: **X?** Returns the current setting.

Example:

```
ATX?
X: 4
0K
```

Test command: **X=?** Always returns **(0-4)**.

Example:
```
ATX=?
X: (0-4)
OK
```

4.8 Line interface

+CBST ***Select bearer service type***

Description: Define the type of bearer service (name), data rate (speed) and connection element (ce) used when initiating a call.

To configure the Infrared Modem to operate with an ISDN connection, the speed value must be 68 or greater.

Set command: **+CBST=**[<speed>,[<name>,[<ce>]]]

Options:

<speed>	**0**	Auto selection of baud setting.
	4	2400bps V22bis.
	6	4800bps V32.
	7	9600bps V32.
	68	2400bps V.110 (ISDN).
	70	4800bps V.110 (ISDN).
	71	9600bps V.110 (ISDN). Default = **0**.
<name>	**0**	Asynchronous connection.
<ce>	**1**	Non transparent.

Example:

```
AT+CBST=0,0,1
OK
```

Read command: **+CBST?** Returns the current setting.

Example:

```
AT+CBST?
+CBST: 0,0,1
OK
```

Test command: **+CBST=?** Always returns **(0,4,6,7,68,70,71),(0),(1)**

Example:

```
AT+CBST=?
+CBST: (0,4,6,7,68,70,71),(0),(1)
OK
```

+CRLP Radio link protocol

Description: Define the Radio Link Protocol parameters.

Set command: **+CRLP=**[<iws>,[<mws>,[<t1>,[<n2>]]]]

Options:

<iws>	**0 - 61**	IWF to MS window size. Default = **61**.
<mws>	**0 - 61**	MS to IWF window size. Default = **61**.
<t1>	**38 - 255**	Acknowledgement timer in units of 10ms. Default = **48**.
<n2>	**0 - 255**	Retransmission attempts. Default = **6**.

Example:

```
AT+CRLP=61,61,48,6
OK
```

Read command: **+CRLP?** Returns the current setting.

Example:

```
AT+CRLP?
+CRLP: 61,61,48,6
OK
```

Test command: **+CRLP=?** Always returns **(0,61),(0,61),(38-255),(0-255)**

Example:

```
AT+CRLP=?
+CRLP: (0,61),(0,61),(38-255),(0-255)
OK
```

S0 Automatic answer control

Description: Defines the automatic answering feature of the Infrared Modem. A non-zero value specifies the number of rings before the call is answered.

Note that the call is always answered in the current Fax Class, regardless of whether the incoming call is voice, data or fax.

Set command: **S0=**[<rcnt>]

Options: <rcnt>

0	Disable automatic answer.
1 - 7	Answer after the specified number of rings. Default = **0**.

Example:
```
ATS0=0
OK
```

Read command: **S0?** Returns the current setting.

Example:
```
ATS0?
000
OK
```

Test command: **S0=?** Always returns **(0-7)**

Example:
```
ATS0=?
S0: (0-7)
OK
```

S6 Blind dial delay control

Description: Defines the number of seconds to wait before call addressing when a dial-tone is not detected. This command is ignored by the Infrared Modem and is only included for compatibility.

Set command: **S6=**[<dly>]

Options: <dly> **2 - 255**

Example:
```
ATS6=2
OK
```

Read command: **S6?** Returns the current setting.

Example:
```
ATS6?
002
OK
```

Test command: **S6=?** Always returns **(2-255)**

Example:
```
ATS6=?
S6: (2-255)
OK
```

S7 Connection completion timeout

Description: Defines the maximum time allowed between completion of dialling and the connection being established. If this time is exceeded then the connection is aborted.

Set command: **S7=**[<tmo>]

Options: <tmo> **1 - 255** Timeout value in seconds. Default = **50**.

Example:
```
ATS7=50
OK
```

Read command: **S7?** Returns the current setting.

Example:
```
ATS7?
050
OK
```

Test command: **S7=?** Always returns **(1-255)**.

Example:
```
ATS7=?
S7: (1-255)
OK
```

S8 Comma dial modifier delay control

Description: Implemented for compatibility only.

Set command: **S8=**[<dly>]

Options: <dly> **1 - 255** The value of the dial modifier delay in seconds. Default = **2**.

Example:
```
ATS8=2
OK
```

Read command: **S8?** Returns the current setting.

Example:
```
ATS8?
002
OK
```

Test command: **S8=?** Always returns **(1-255)**.

Example:
```
ATS8=?
S8: (1-255)
OK
```

S10 Automatic disconnect delay control

Description: This parameter specifies the amount of time that the DCE will remain connected to the line after the absence of received line signal. This command is ignored by the Infrared Modem and is only included for compatibility.

Set command: **S10=**[<val>]

Options: <val> **1-254**

Example:
```
ATS10=2
OK
```

Read command: **S10?**

Example:
```
ATS10?
002
OK
```

Test command: **S10=?** Always returns **(1-254)**

Example:
```
ATS10=?
S10: (1-254)
OK
```

L *Monitor speaker loudness control*

Description: Set the volume of the speaker. This command is ignored by the Infrared Modem and is only included for compatibility.

Set command: **L=**[<vol>]

Options: <vol> **0-3** **0** is off, **3** is loudest.

Examples:
```
ATL0
OK
```

Read command: **L?**

Example:
```
ATL?
L: 0
OK
```

Test command: **L=?** Always returns **(0-3)**

Example:
```
ATL=?
L: (0-3)
OK
```

M *Monitor speaker control*

Description: Define the activity of the speaker. This command is ignored by the Infrared Modem and is only included for compatibility.

Set command: **M=**[<speaker>]

Options: <speaker> **0-3** **0** is off during the entire call.

Examples:
```
ATM0
OK
```

Read command: **M?**

Example:
```
ATM?
M: 0
OK
```

Test command: **M=?** Always returns **(0-3)**

Example:
```
ATM=?
M: (0-3)
OK
```

5 Short Message Service commands

+CMGD Delete SMS message

Description: Delete the message stored at the memory location index.

Set command: **+CMGD=**<index>

Options: <index> Memory location.

Example:
```
AT+CMGD=1
OK
```

Test command: **+CMGD=?**

Example:
```
AT+CMGD=?
OK
```

+CMGF SMS Message format

Description: Configure the format to be used to send, list, read and write messages.

Set command: **+CMGF=**[<mode>]

Options: <mode> **0** PDU mode.

Example:
```
AT+CMGF=0
OK
```

Read command: **+CMGF?** Returns the current setting.

Example:
```
AT+CMGF?
+CMGF: 0
OK
```

Test command: **+CMGF=?** Always returns **(0)**.

Example:
```
AT+CMGF=?
+CMGF: (0)
OK
```

+CMGL List SMS messages

Description: Returns those messages from memory storage 1 which conform to the specified status (stat).

Set command: **+CMGL=**[<stat>] or **+CMGL**[<stat>]

Options:

<stat>	**0**	Received unread messages.
	1	Received read messages.
	2	Stored unsent messages.
	3	Stored sent messages.
	4	All messages.
		Default = **0**.

Examples:

```
AT+CMGL=4
+CMGL: 1,3,154
<PDU>
OK

AT+CMGL
OK
```

Test command: **+CMGL=?** Always returns **(0-4)**.

Example:

```
AT+CMGL=?
+CMGL: (0-4)
OK
```

+CMGR Read SMS messages

Description: Returns the message held in the specified memory location together with the status of the message and entire message data unit <pdu>.

Set command: **+CMGR=**<index>

Options: <index> Memory location.

Returns: message

<status>	**0**	Received unread**.**
	1	Received read.
	2	Stored unsent.
	3	Stored sent.
<pdu>		The message in pdu format.

Example:

```
AT+CMGR=1
+CMGR: 3,154
OK
```

Test command: **+CMGR=?**

Example:

```
AT+CMGR=?
OK
```

+CMGS Send SMS messages

Description: Sends a message to the phone network. On successful delivery a message reference number is returned. Sending can be cancelled by sending the **ESC** character.

Set command: **+CMGS=**<length><**CR**><message><**CTRL-Z**/**ESC**>

Options:

<length>	The number of octets coded in the TP layer data unit. Terminated by **CR** character.
<message>	The message in PDU format. Terminate by **<CTRL-Z>** to send the message. Terminate by **<ESC>** to cancel the message.

Returns: <mr> Message reference.

Example:

```
AT+CMGS=35
 > <35 byte pdu><CTRL-Z>
+CMGS: 13
OK
```

Test command: **+CMGS=?**

Example:

```
AT+CMGS=?
OK
```

+CMGW Write SMS messages to storage

Description: Store a message in the memory store 2. On storing the message the location index number is returned.

Set command: **+CMGW=**<length>,[<stat>],<**CR**><message><**CTRL-Z**>

Options:	<length>		The number of octets coded in the TP layer data unit.
	<stat>	**2**	Store unsent messages.
	<message>		The message in PDU format. Terminated by the **<CTRL-Z>** character.
Returns:	<index>		The memory location of the stored message.

Example:
```
AT+CMGW=35
 > <35 byte pdu><CTRL-Z>
+CMGW: 13
OK
```

Test command: **+CMGW=?**

Example:
```
AT+CMGW=?
OK
```

+CMSS Send SMS message from storage

Description: Sends a message from the memory storage 2 to the phone network. On successful delivery a message reference number is returned.

Set command: **+CMSS=**<index>

Options: <index> Memory location.

Returns: <mr> Message reference.

Example:
```
AT+CMSS=1
+CMSS: 14
OK
```

Test command: **+CMSS=?**

Example:
```
AT+CMSS=?
OK
```

+CMTI SMS Message received indication

Description: Enables the +CMTI unsolicited result codes. (See +CNMI command).

Unsolicited result: **+CMTI:** “<mem>”,<index>

Options:	mem	“ME”	Mobile phone message storage.
		“SM”	SIM card message storage.
	<index>		Memory location.
Example:	`AT+CMTI = 2,1,0,0,0`		Before using +CMTI, switch on the options to forward result codes to the computer and provide indication of SMS delivery. (See +CNMI command)
	`+CMTI: "ME",212`		Unsolicited result.

+CNMI New SMS message indicator

Description: Configures the message communication between the Infrared Modem and the computer.

Set command: **+CNMI=**[<mode>,[<mt>,[<bm>,[<ds>,[<bfr>]]]]]

Options:	<mode>	**0**	Buffer result codes in Infrared Modem.
		1	Discard indication when Infrared Modem-computer link is reserved. Otherwise, forward to the computer.
		2	Buffer result codes when Infrared Modem-computer link is reserved and flush to computer after reservation. Otherwise, forward to the computer. Default = **0**.
	<mt>	**0**	No SMS-DELIVER indications are forwarded to the computer.
		1	Indication of SMS-DELIVER is forwarded to the computer. Default = **0**.
	<bm>	**0**	No Cell Broadcast Message indications are forwarded to the computer.
	<ds>	**0**	No SMS-STATUS-REPORTS are forwarded to the computer.

	bfr	**0**	When in mode 1 or 2 the result codes are flushed to the computer.
		1	When in mode 1 or 2 the result codes are cleared. Default = **0**.

Example:
```
AT+CNMI=0,0,0,0,0
OK
```

Read command: **+CNMI?** Returns the current setting.

Example:
```
AT+CNMI?
+CNMI: 0,0,0,0,0
OK
```

Test command: **+CNMI=?** Always returns **(0-2),(0,1),(0),(0),(0,1)**.

Example:
```
AT+CNMI=?
+CNMI: (0-2),(0,1),(0),(0),(0,1)
OK
```

+CPMS Preferred SMS message storage

Description: Defines the message storage areas and returns the functionality of the message storage in the form:

+CPMS=<used1>,<total1>,<used2>,<total2>

Where:

<used1>	Number of messages in 1.
<total1>	Number of locations in 1.
<used2>	Number of messages in 2.
<total2>	Number of locations in 2.

Memory 1 storage is used to list, read and delete messages (+CMGL, +CMGR and +CMGD) whilst memory 2 is used to write and send messages (+CMGW and +CMSS).

Set command: **+CPMS=**"<mem1>",["<mem2>"]

Options:

<mem1>	"ME"	Mobile phone message storage 1.
	"SM"	SIM card message storage 1.
<mem2>	"ME"	Mobile phone message storage 2.
	"SM"	SIM card message storage 2.

Example:

```
AT+CPMS="SM","SM"
+CPMS: 1,15,1,15
OK
```

Read command: **+CPMS?** Returns the current setting.

Example:

```
AT+CPMS?
+CPMS: "SM","SM"
OK
```

Test command: **+CPMS=?** Always returns **(ME,SM),(ME,SM)**.

Example:
```
AT+CPMS=?
+CPMS: ("ME","SM"),("ME","SM")
OK
```

+CSCA SMS service centre address

Description: Updates the SMSC address which is used to originate mobile Short Message Service transmissions.

Set command: **+CSCA=**"<sca>",[<tosca>]

Options:

<sca> Telephone number.

<tosca> **128 - 255** Type of phone numbering plan:

129 Nationality unknown.
145 International.
161 National.

If a '+' is included in the phone number (number) then a default of 145 is used. In all other cases a default value of 129 is applied.

Example:

```
AT+CSCA="46705008999",145
OK
```

Read command: **+CSCA?** Returns the current setting.

Example:

```
AT+CSCA?
+CSCA: "46705008999",145
OK
```

Test command: **+CSCA=?** Always returns **(128-255)**.

Example:

```
AT+CSCA=?
+CSCA: (128-255)
OK
```

+CSMS Select SMS message service

Description: Defines the message service and returns the functionality of the message service in the form:

Response: **+CSMS:[**<service>,]<mt>,<mo>,<bm>

Where:

<service>		defined service, only returned by read command
<mt>	1	Mobile terminated support.
<mo>	1	Mobile originated support.
<bm>	1	Broadcast message support.

Set command: **+CSMS=**<service>

Options:

<service>	**0**	GSM 03.40 and 03.41 specific.

Example:

```
AT+CSMS=0
+CSMS: 1,1,0
OK
```

Read command: **+CSMS?** Returns the current setting.

Example:

```
AT+CSMS?
+CSMS: 0,1,1,0
OK
```

Test command: **+CSMS=?** Always returns **(0)**.

Example:

```
AT+CSMS=?
+CSMS: (0)
OK
```

6 Fax commands

6.1 General fax AT commands

Some fax commands can only be used during connection to a remote facsimile and return ERROR otherwise. Most fax commands return ERROR when the appropriate Fax Class is not selected beforehand. (See +FCLASS command).

+FCLASS Capabilities Identification and Control

Description: Sets the service class.

Set command: **+FCLASS=**<class>

Options:

<class>	**0**	Data modem
	1	Service Class 1 fax modem
	2	Service Class 2 fax modem

Example:
```
AT+FCLASS=1
OK
```

Read command: **+FCLASS?** Returns the current service class setting.

Example:
```
AT+FCLASS?
1
OK
```

Test command: **+FCLASS=?** Provides the service classes available as a list of comma separated values.

Example:
```
AT+FCLASS=?
(0,1,2)
OK
```

6.2 Fax Service Class 1 commands

+FTS Stop transmission and wait

Description: Stops the transmission for the specified period.

Set command: **+FTS=**<time>

Options: <time> **0 - 255** The silence period in units of 10ms.

Example:
```
AT+FTS=56
OK
```

Test command: **+FTS=?** Always returns **(0-255)**.

Example:
```
AT+FTS=?
(0-255)
OK
```

+FRS Receive silence

Description: Waits for silence on the line for the specified period.

Set command: **+FRS=**<time>

Options: <time> **0 - 255** The silence period in units of 10ms. Entering a character will abort the silence period.

Example:
```
AT+FRS=2
OK
```

Test command: **+FRS=?** Always returns **(0-255)**.

Example:
```
AT+FRS=?
(0-255)
OK
```

+FTM Facsimile transmit

Description: Set the facsimile transmit speed.

Set command: **+FTM=**<speed>

Options:

<speed>	**24**	V.27ter 2,400 bps
	48	V.27ter4,800 bps
	72	V.29 7,200 bps
	96	V.29 9,600 bps

Example:

```
AT+FTM=96
CONNECT
```

Test command: **+FTM=?** Always returns **(24,48,72,96)**.

Example:

```
AT+FTM=?
(24,48,72,96)
OK
```

+FRM Facsimile receive

Description: Selects facsimile receive mode.

Set command: **+FRM=**<speed>

Options:

<speed>	**24**	V.27ter 2,400 bps
	48	V.27ter 4,800 bps
	72	V.29 7,200 bps
	96	V.29 9,600 bps

Example:

```
AT+FRM=72
CONNECT
```

Test command: **+FRM=?** Always returns **(24,48,72,96)**.

Example:

```
AT+FRM=?
(24,48,72,96)
OK
```

+FTH Transmit HDLC

Description: HDLC transmit speed.

Set command: **+FTH=**<speed>

Options: <speed> **3** V.21 Ch2 300 bps.

Example:
```
AT+FTH=3
OK
```

Test command: **+FTH=?** Always returns **(3)**.

Example:
```
AT+FTH=?
(3)
OK
```

+FRH Receive HDLC

Description: HDLC receive speed.

Set command: **+FRH=**<speed>

Options: <speed> **3** V.21 Ch2 300 bps.

Example:
```
AT+FRH=3
CONNECT
```

Test command: **+FRH=?** Always returns **3**.

Example:
```
AT+FRH=?
(3)
OK
```

+FMI Request manufacturer's identification

Description: Request manufacturer identification.

Read command: **+FMI?**

Example:
```
AT+FMI?
Ericsson
OK
```

+FMM Request product identification

Description: Request model identification.

Read command: **+FMM?**

Example:
```
AT+FMM?
Ericsson SH 888 Infrared Modem
OK
```

+FMR Request version

Description: Request model revision.

Read command: **+FMR?**

Example:
```
AT+FMR?
9712080907
OK
```

6.3 Fax Service Class 2 commands

+FAA ***Fax auto answer setting***

Description: Used to determine if the fax setting is selected by auto answer or by the setting in +FCLASS.

Set command: **+FAA=**<setting>

Options: <setting> **0** Answer according to settings in FCLASS only.

Example:
```
AT+FAA=0
OK
```

Read command: **+FAA?** Returns the current setting.

Example:
```
AT+FAA?
0
OK
```

Test command: **+FAA=?** Always returns **(0)**.

Example:
```
AT+FAA=?
(0)
OK
```

+FAXERR Request hang-up cause code

Description: Returns the code of the error which caused the last hang-up.

Read command: **+FAXERR?**

Example:
```
AT+FAXERR?
0
OK
```

Test command: **+FAXERR=?** Always returns **(0-255)**.

Example:
```
AT+FAXERR=?
(0-255)
OK
```

+FBADLIN Number of consecutive bad lines to accept

Description: Sets the maximum acceptable number of consecutive bad lines.

Set command: **+FBADLIN=**<number>

Options: <number> **0**

Example:
```
AT+FBADLIN=0
OK
```

Read command: **+FBADLIN?** Returns the current setting.

Example:
```
AT+FBADLIN?
0
OK
```

Test command: **+FBADLIN=?** Always returns **(0)**.

Example:
```
AT+FBADLIN=?
(0)
OK
```

+FBADMUL Bad line multiplier parameter

Description: Sets the maximum acceptable percentage of bad lines per page multiplication value.

Set command: **+FBADMUL=**<number>

Options: <number> **0**

Example:
```
AT+FBADMUL=0
OK
```

Read command: **+FBADMUL?** Returns the current setting.

Example:
```
AT+FBADMUL?
0
OK
```

Test command: **+FBADMUL=?** Always returns **(0)**.

Example:
```
AT+FBADMUL=?
(0)
OK
```

+FBOR Facsimile page transfer bit order parameter

Description: Set the bit order for negotiation (<bit n>) and facsimile page transfer (<bit f>).

Set command: **+FBOR=**<bit order>

<bit order> is the sum of <bit f> and <bit n> where:

<bit f> 0 = same bit order
1 = reverse bit order

<bit n> 0 = same bit order
2 = reverse bit order.

Options: <bit order>

0	bit f + bit n = 0
1	bit f + bit n = 1
2	bit f + bit n = 2
3	bit f + bit n = 3

Default = **0**.

Example: If bit f = 1 and bit n=2:

```
AT+FBOR=3
OK
```

Read command: **+FBOR?** Returns the current setting.

Example:

```
AT+FBOR?
3
OK
```

Test command: **+FBOR=?** Always returns **(0-3)**.

Example:

```
AT+FBOR=?
(0-3)
OK
```

+FBUF Buffer size report

Description: Request buffering parameters

Read command: **+FBUF?**

Returns: <bs>,<xoft>,<xont>,<bt>

Options:

<bs> = buffer size
<xoft> = XOFF threshold
<xont> = XON threshold
<bt> = current number of characters in buffer.

Example:

```
AT+FBUF?
256,0,0,0
OK
```

+FCQ Copy quality checking

Description: Copy quality checking.

Set command: **+FCQ=**<value>

Options:

<value>	**0**	Do not perform quality checking.

Example:

```
AT+FCQ=0
OK
```

Read command: **+FCQ?** Returns the current setting.

Example:

```
AT+FCQ?
0
OK
```

Test command: **+FCQ=?** Always returns **(0)**.

Example:

```
AT+FCQ=?
(0)
OK
```

+FCR Capability to receive parameter

Description: Capability to receive.

Set command: **+FCR=**<setting>

Options: <setting> **0** Can not receive fax but can be polled.
1 Can receive fax.
Default = **1**.

Example:
```
AT+FCR=1
OK
```

Read command: **+FCR?** Returns the current setting.

Example:
```
AT+FCR?
1
OK
```

Test command: **+FCR=?** Always returns **(0,1)**.

Example:
```
AT+FCR=?
(0,1)
OK
```

+FCIG Local polling ID parameter

Description: Local polling ID.

Set command: **+FCIG**=“<string>”

Options: “<string>” String of 0 to 20 characters length.

Example:
```
AT+FCIG=“Ericsson Fax”
OK
```

Read command: **+FCIG?** Returns the current polling string.

Example:
```
AT+FCIG?
Ericsson Fax
OK
```

Test command: **+FCIG=?** Always returns **(20)(32-127)**.

Example:
```
AT+FCIG?
(20)(32-127)
OK
```

+FCTCRTY Continue to correct count during ECM

Description: Continue to correct count during ECM

Set command: **+FCTCRTY=**<value>

Options: <value> **0-255** <value> is in units of 4 retries.
Default = **0**.

Example:
```
AT+FCTCRTY=0
OK
```

Read command: **+FCTCRTY?** Returns the current setting.

Example:
```
AT+FCTCRTY?
0
OK
```

Test command: **+FCTCRTY=?** Always returns **(0-255)**.

Example:
```
AT+FCTCRTY=?
(0-255)
OK
```

+FDFFC Data format failure check

Description: Data format failure check.

Set command: **+FDFFC=**<value>

Options: <value> **0** Disable mismatch checking.

Example:
```
AT+FDFFC=0
OK
```

Read command: **+FDFFC?** Returns the current setting.

Example:
```
AT+FDFFC?
0
OK
```

Test command: **+FDFFC=?** Always returns **(0)**.

Example:
```
AT+FDFFC=?
(0)
OK
```

+FDCS Session results

Description: Current session results.

Read command: **+FDCS?**

Returns: <vr>,
,<wd>,<ln>,<df>,<ec>,<bf>,<st>

Options:

<vr> = vertical resolution

 = bit rate
<wd> = page width
<ln> = page length.
<df> = data compression format
<ec> =error correction
<bf> = binary file transfer
<st> = scan time per line.

Please refer to the +FDCC command for further information on these parameters.

Example:

```
AT+FDCS?
0,0,0,0,0,0,0,0
OK
```

Test command: **+FDCS=?** Always returns **(0-1),(0-3),(0-4),(0-2),(0-3),(0),(0),(0-7)**.

Example:

```
AT+FDCS=?
(0-1),(0-3),(0-4),(0-2),(0-3),(0),(0),(0-7)
OK
```

+FDIS Current session parameters

Description: Current session parameters.

Set command: **+FDIS=**<vr>,
,<wd>,<ln>,<df>,<ec>,<bf>,<st>

Options:

<vr>
- **0** Normal, 98 dpi
- **1** Fine, 196 dpi

Default = **1**.

- **0** 2400 bps
- **1** 4800 bps
- **2** 7200 bps
- **3** 9600 bps

Default = **3**.

<wd> Page width
- **0** 1728 pixels in 215 mm
- **1** 2048 pixels in 255 mm
- **2** 2432 pixels in 303 mm
- **3** 1216 pixels in 151 mm
- **4** 364 pixels in 107 mm

Default = **0**.

<ln> Page length
- **0** A4, 297 mm
- **1** B4, 364 mm
- **2** unlimited

Default = **2**.

<df> Data compression format
- **0** 1-D modified huffman
- **1** 2-D modified read
- **2** 2-D uncompressed mode
- **3** 2-D modified modified read

Default = **0**.

<ec> Error correction
- **0** disable ECM

<bf>		Binary file transfer
	0	disable BFT
<st>		Scan time per line
	0-7	0-40 ms depending on <vr> setting Default = **0**.

Example:
```
AT+FDIS=1,3
OK
```

Read command: **+FDIS?** Returns the current settings.

Example:
```
AT+FDIS?
1,3,0,2,0,0,0,0
OK
```

Test command: **+FDIS=?** Always returns **(0-1),(0-3),(0-4),(0-2),(0-3),(0),(0),(0-7)**.

Example:
```
AT+FDIS=?
(0-1),(0-3),(0-4),(0-2),(0-3),(0),(0),(0-7)
OK
```

+FECM Error correction mode

Description: Defines error correction mode.

Set command: **+FECM=0** Disable error correction mode

Example:
```
AT+FECM=0
OK
```

Read command: **+FECM?** Always returns **0**.

Example:
```
AT+FECM?
0
OK
```

Test command: **+FECM=?** Always returns **(0)**.

Example:
```
AT+FECM=?
(0)
OK
```

+FK Orderly fax abort

Description: Aborts fax transmission.

Execute command: **+FK**

Example:
```
AT+FK
OK
```

+FLID Local polling ID parameter

Description: Allows you to define the local ID string.

Set command: **+FLID=**“<string>”

Options: “<string>” String of 0 to 20 characters length.

Example:
```
AT+FLID="Ericsson Fax"
OK
```

Read command: **+FLID?** Returns the current polling string.

Example:
```
AT+FLID?
"Ericsson Fax"
OK
```

Test command: **+FLID=?** Always returns **(20)(32-127)**.

Example:
```
AT+FLID?
(20)(32-127)
OK
```

+FLNFC Page length format conversion parameter

Description: Defines page length format conversion.

Set command: **+FLNFC=**<value>

Options: <value> **0** Disable mismatch checking.

Example:
```
AT+FLNFC=0
OK
```

Read command: **+FLNFC?** Returns current settings.

Example:
```
AT+FLNFC?
0
OK
```

Test command: **+FLNFC=?** Always returns **(0)**.

Example:
```
AT+FLNFC=?
(0)
OK
```

+FLPL Document for polling parameter

Description: Used by the DTE to indicate to the DCE facsimile machine that it has a document ready for polling. This information is forwarded to the remote FAX.

Set command: **+FLPL=**<setting>

Options: <setting> **0** No document to poll.
1 Document available for polling.
Default = **0**.

Example:
```
AT+FLPL=1
OK
```

Read command: **+FLPL?** Returns the current setting.

Example:
```
AT+FLPL?
1
OK
```

Test command: **+FLPL=?** Always returns **(0,1)**.

Example:
```
AT+FLPL=?
(0,1)
OK
```

+FMDL Request product identification

Description: Returns the product identification of a Class 2 fax machine.

Read command: **+FMDL?**

Example:
```
AT+FMDL?
Ericsson SH 888 Infrared Modem
OK
```

+FMFR Request manufacturer's identification

Description: Returns the manufacturer identification for a Class 2 fax machine.

Read command: **+FMFR?**

Example:
```
AT+FMFR?
Ericsson
OK
```

+FMINSP Minimum facsimile page transfer speed parameter

Description: Set the minimum negotiable speed parameter.

Set command: **+FMINSP=**

Options:

 	0	2400 bps
	1	4800 bps
	2	7200 bps
	3	9600 bps
		Default = **0**.

Example:
```
AT+FMINSP=0
OK
```

Read command: **+FMINSP?** Returns the current setting.

Example:
```
AT+FMINSP?
0
OK
```

Test command: **+FMINSP=?** Always returns **(0,3)**.

Example:
```
AT+FMINSP=?
(0,3)
OK
```

+FPHCTO Facsimile page transfer timeout parameter

Description: Sets the period the Infrared Modem waits for another page from the PC before it assumes there are no more pages and aborts.

Set command: **+FPHCTO=**<time>

Options:

<time>	**0 - 255**	The timeout period in units of 100ms. Default = **100**.

Example:

```
AT+FPHCTO=60
OK
```

Read command: **+FPHCTO?** Returns the current setting.

Example:

```
AT+FPHCTO?
60
OK
```

Test command: **+FPHCTO=?** Always returns **(0-255)**.

Example:

```
AT+FPHCTO=?
(0-255)
OK
```

+FPTS Page transfer status parameter

Description: Set post page transfer response.

Set command: **+FPTS=**<ppr>

Options:

<ppr>	
	Post page message
1	partial page errors
2	page good
3	page bad; retrain requested.

Example:
```
AT+FPTS=1
OK
```

Read command: **+FPTS?** Returns current settings.

Example:
```
AT+FPTS?
1
OK
```

Test command: **+FPTS=?** Always returns **(1-3)**.

Example:
```
AT+FPTS=?
(1-3)
OK
```

+FREV Request DCE revision

Description: Returns the version, revision level or other information related to a Class 2 device.

Read command: **+FREV?**

Example:
```
AT+FREV?
9712080907
OK
```

+FRBC Receive data block size

Description: Receive data block size.

Set command: **+FRBC=**<n>

Options: <n> **0** Block can only be set to a size of 0 bytes.

Example:
```
AT+FRBC=0
OK
```

Read command: **+FRBC?** Returns the current setting.

Example:
```
AT+FRBC?
0
OK
```

Test command: **+FRBC=?** Always returns **(0)**.

Example:
```
AT+FRBC=?
(0)
OK
```

+FREL Facsimile page transfer EOL alignment parameter

Description: Received EOL alignment

Set command: **+FREL=**<n>

Options:

<n>	**0**	EOL patterns are bit aligned as received.

Example:

```
AT+FREL=0
OK
```

Read command: **+FREL?** Returns the current setting.

Example:

```
AT+FREL?
0
OK
```

Test command: **+FREL=?** Always returns **(0)**.

Example:

```
AT+FREL=?
(0)
OK
```

+FSPL Enable polling parameter

Description: Used to indicate if the PC wishes or is able to poll a document.

Set command: **+FSPL=**<setting>

Options: <setting> **0** Do not want to poll.
1 Can receive a polled document.
Default = **0**.

Example:
```
AT+FSPL=1
OK
```

Read command: **+FSPL?** Returns the current setting.

Example:
```
AT+FSPL?
1
OK
```

Test command: **+FSPL=?** Always returns **(0,1)**.

Example:
```
AT+FSPL=?
(0,1)
OK
```

+FTBC Fax page transfer data transmit byte count parameter

Description: Sets the size of the transmit data block

Set command: **+FTBC=**<n>

Options: <n> **0** Block can only be set to a size of 0 bytes.

Example:
```
AT+FTBC=0
OK
```

Read command: **+FTBC?** Returns the current setting.

Example:
```
AT+FTBC?
0
OK
```

Test command: **+FTBC=?** Always returns **(0)**.

Example:
```
AT+FTBC=?
(0)
OK
```

+FVRFC Vertical resolution conversion parameter

Description: Disables mismatch checking.

Set command: **+FVRFC=**<n>

Options:

<n>	**0**	Disable mismatch checking.

Example:

```
AT+FVRFC=0
OK
```

Read command: **+FVRFC?** Returns the current setting.

Example:

```
AT+FVRFC?
0
OK
```

Test command: **+FVRFC=?** Always returns **(0)**.

Example:

```
AT+FVRFC=?
(0)
OK
```

+FWDFC Page width conversion parameter

Description: Width format conversion checking.

Set command: **+FWDFC=**<n>

Options:

<n>	**0**	Disable mismatch checking.

Example:

```
AT+FWDFC=0
OK
```

Read command: **+FWDFC?** Returns the current setting.

Example:

```
AT+FWDFC?
0
OK
```

Test command: **+FWDFC=?** Always returns **(0)**.

Example:

```
AT+FWDFC=?
(0)
OK
```

Glossary

Analog

An analog signal can have any value between two limits. Traditional telephone lines, for example, transfer the human voice, itself an analogue signal, by means of a continuously varying electrical voltage. This voltage is an electrical representation of the pressure produced by the sound on the telephone microphone.

ASCII

Acronym for American Standard Code for Information Interchange. A standard code used for transferring data between computers and associated equipment.

Asynchronous communication

Data communication in which data elements are NOT separated according to time. Instead, a special code such as a start bit and a stop bit is used. By using a code, in lieu of time, asynchronous communication is more tolerant of time variations. Complex timing circuits are not needed. The serial port and the COM port of a computer are associated with asynchronous communication, as is the RS-232-C interface. Also some end to end modem protocols are asynchronous.

AT

The characters AT stand for Attention and tells the Infrared Modem that a command follows. AT must be used at the beginning of a command line or dial string.

AT command set

The commands used to control the Infrared Modem.

Auto-answer mode

The state in which the Infrared Modem automatically answers the telephone when it rings.

Bps

Acronym for bits per second (bits/s). A measure of speed at which bits are transmitted over the telephone lines.

Carrier

The frequency used by two connecting modems to transmit and receive data.

CCITT

Consultative Committee for International Telephony and Telegraphy. A European based advisory committee established by the United Nations to recommend international communication protocol standards.

CD

Carrier Detect. An EIA232 signal sent from the Infrared Modem to your computer, usually indicating that your Infrared Modem has detected a carrier signal over the communications line.

Command line

A line of alphanumeric characters sent to the Infrared Modem to instruct the Infrared Modem to perform the commands specified in the line of characters.

Off-line command mode

The operational state in which the Infrared Modem can accept typed commands.

COM (communications) port

The name allocated to the serial port through which digital signals are exchanged between the computer and a serial peripheral. For example COM1 and COM2.

CTS

Clear To Send. An EIA232 signal sent from a modem to the computer, usually indicating that the modem is ready to receive data.

On-line data mode

The state the Infrared Modem is in when transmitting or receiving data over the telephone line.

DCD

Data Carrier Connect. See the &C command.

DCE

Data Communications Equipment. This term applies to modems and to other equipment that provide communication between data terminal equipment and the telephone line.

Default setting

A setting that the Infrared Modem will always use unless specified otherwise.

Digital transmission

A digital signal can have only two values. These can be, for example, ON and OFF, HIGH and LOW or 1 and 2. A digital signal is usually transferred by means of a voltage which is either HIGH or LOW. Conventional modems communicate by means of audio tones which can use the analog telephone network. (See analog) The Infrared Modem links through your mobile telephone to a digital network and therefore has no need to use audio encoding. However, when you use your mobile telephone for a voice call, the analog signal from the microphone must be converted into a digital signal. This is done by a converter which samples the signal voltage several thousand times per second. Each sample is converted into a binary number which represents the voltage at that instant, eg 10011010, and the binary numbers are sent as a serial stream down the digital network.

DSR

Data Set Ready. An EIA232 signal sent from the Infrared Modem to the computer, usually indicating that the Infrared Modem is ready to establish a connection.

DTE

Data Terminal Equipment. The equipment that provides data, such as a computer or terminal.

DTR

Data Terminal Ready. An EIA232 signal sent from the computer to the Infrared Modem, usually indicating that the computer is ready to begin communication.

EIA

Electronics Industries Association. A U.S. based group that forms technical standards and coordinates ITU-TCCITT activities in the United States.

Escape code

A series of three consecutive characters (default is + + +) sent to the Infrared Modem, causing it to exit on-line data mode and enter on-line command mode.

Factory default settings

The profile configuration that is in effect when the Infrared Modem is shipped from the factory.

Final result code

A message sent from the Infrared Modem to inform the PC that execution of an entered AT command has been completed. Examples are 0K and ERR0R.

Flow control

The use of characters or EIA232 signals to start and stop the flow of data to avoid data loss during buffering.

Full duplex

Communication involving data transmitted in two directions simultaneously.

Half duplex

Communication involving data transmitted in two directions, but not at the same time.

Intermediate result code

Information sent from the Infrared Modem to the PC as a response to an executed AT command. Intermediate result codes are always followed by a final result code. For example `+CBC: 0,100`.

ISDN

The term used to refer to the digital public switched telephone network

ITU-T

The ITU Telecommunication Standardization Sector (ITU-T), is a permanent organ of the International Telecommunication Union. The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunication on a world wide basis

As a consequence of a reform process within the International Telecommunication Union (ITU), the CCITT ceased to exist as of 28 February 1993. In its place the ITU Telecommunication Standardization Sector (ITU-T) was created as of 1 March 1993.

Modem

Modulator-Demodulator. A device that converts digital signals to analog for transmission over telephone lines, then converts them back to digital at the other end of the line.

Off hook

The Infrared Modem state similar to picking up a telephone receiver. The Infrared Modem goes off hook to dial or answer, and remains off hook while connected.

On hook

The Infrared Modem state similar to hanging up a telephone receiver.

PIN

Personal identification number.

Protocols

The rules or procedures all modems must follow to communicate.

Result code

A message the Infrared Modem sends to the computer containing information about the state of the Infrared Modem.

RLP

Radio Link Protocol, an error correction protocol used during radio link connections.

RLSD

Received Line Signal Detect. See AT command &C.

RTS

Request To Send. An EIA232 signal sent from the computer to the Infrared Modem, usually indicating that the computer is ready to send data to the Infrared Modem.

RS-232-C interface

A communication standard established by the Electronics Industry Association (Recommended Standard number 232, revision C). Originally established to standardize communication between computer and modem. It was later adapted to become a popular standard for communication between computer and any other peripheral equipment, including other computers.

Serial port

The port through which digital signals are exchanged between the Infrared Modem and the computer.

Short message service (SMS)

A text messaging service permitting the transmission of up to 160 characters to a facsimile, X400, telex and voice services or mobile phone.

Synchronous Communication

V.22bis

ITU-T standard for 2400 bps.

V.27ter

ITU-T standard for 4800 bps full-duplex modems connected to switched telephone networks.

V.29

ITU-T standard for 9600 bps half-duplex modems included in FAX machines.

V.42bis

ITU-T standard for the compression of asynchronous data. V.42bis is based on a dictionary that looks up common strings and replaces the strings with code words. This reduces the amount of characters actually transmitted. V.42bis has been found to be most effective for file transfers that contain long strings of repetitive information and least effective for short strings of unique data. Require LAPM or MNP2, MNP3 or MNP4 as error correcting.

Unsolicited result code

A message sent from the Infrared Modem to the PC that is not a response to an executed AT command. For example `RING`.

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