

# **AT Commands Manual Cat-1 Module**

CL12DAH31  
CL32DAH31

**TAIYO YUDEN**

## Table of Contents

<b>1. AT commands list</b> .....	- 3 -
1.1. Important notice .....	- 3 -
1.2. 3GPP supported AT commands list.....	- 3 -
<b>2. 3GPP supported AT commands description</b> .....	- 5 -
2.1. Request manufacturer identification +GMI .....	- 5 -
2.2. Request manufacturer identification +GMI .....	- 6 -
2.3. Request manufacturer identification +GMI .....	- 7 -
2.4. Request model identification +GMM .....	- 8 -
2.5. Request revision identification +GMR .....	- 9 -
2.6. Request product serial number identification +CGSN.....	- 10 -
2.7. Select TE character set +CSCS.....	- 12 -
2.8. Reset to default configuration Z .....	- 13 -
2.9. Request identification information I .....	- 14 -
2.10. Subscriber number +CNUM .....	- 15 -
2.11. Set phone functionality +CFUN .....	- 16 -
2.12. Signal quality +CSQ.....	- 17 -
2.13. Report mobile termination error +CMEE .....	- 18 -
2.14. PS attach or detach +CGATT.....	- 19 -
2.15. Show PDP address(es) +CGPADDR .....	- 20 -
2.16. EPS network registration status +CEREG .....	- 21 -
2.17. Preferred message format +CMGF .....	- 24 -
2.18. List message +CMGL .....	- 25 -
2.19. Read message +CMGR.....	- 27 -
2.20. Write message to memory +CMGW .....	- 29 -
2.21. Delete message +CMGD .....	- 30 -
2.22. Send message +CMGS .....	- 31 -
2.23. Clock +CCLK .....	- 33 -
2.24. Extended signal quality +CESQ.....	- 34 -
2.25. Fixed DTE rate +IPR.....	- 36 -
2.26. Flow Control &K .....	- 36 -
2.27. Command echo E .....	- 37 -
2.28. Dial DT .....	- 37 -
2.29. Controls the setting of eDRX parameters +CEDRXS.....	- 38 -
2.30. Retrieves eDRX parameters +CEDRXRDP .....	- 40 -

## 1. AT commands list

### 1.1. Important notice

- Please refer to "3GPP TS 27.007" for the 3GPP AT Commands.

### 1.2. 3GPP supported AT commands list

Command Name	Description	Notes/Limitations	3GPP Rev
+GMI	Request TA manufacturer identification (equals to +CGMI)	-	ITU-T V.250
+GMM	Request TA model identification (equals to +CGMM)	-	ITU-T V.250
+GMR	Request TA revision identification (equals to +CGMR)	-	ITU-T V.250
+CGSN	Request revision identification	Doesn't support additional capabilities of Rev12	Rev11
+CSCS	Select TE (Terminal) character set	Affects only SMS AT commands. Support only: · "UCS2" · "8859-1" (Latin) · "IRA" · "PCCP437"	Rev12
Z	TA sets all parameters to their defaults as specified by a user memory profile or by the manufacturer, and resets TA	Reset device but doesn't return values to factory default	ITU-T V.250
I	Request manufacturer specific information about the TA.	-	ITU-T V.250
+CNUM	Subscriber number	-	Rev12
+CFUN	Set phone functionality	Mode 2 not supported. Only mode 4 (flight mode) is stored in NV memory. <fun> doesn't support 128 and 129	Rev11
+CSQ	Signal quality	instead of RSSI the modem returns RSRP	Rev12
+CMEE	Report mobile termination error	-	Rev12
+CGATT	PS attach or detach	-	Rev12
+CGPADDR	Show PDP address +CGPADDR	-	Rev12
+CEREG	EPS network registration status	-	Rev12
+CMGF	Message Format	Support only Text mode	Rev12
+CMGL	List Messages	Support only text mode	Rev12
+CMGR	Read Messages	Support only text mode	Rev12
+CMGW	Write Message to Memory	Support only text mode	Rev12
+CMGD	Delete Messages	-	Rev12
+CMGS	Send Message from host	Support Text/PDU mode.	Rev12
+CCLK	Set the Real Time clock	-	Rev12
+CESQ	Extended Signal Quality	-	Rev12

Command Name	Description	Notes/Limitations	3GPP Rev
+IPR	Fixed DTE Interface Rate	FAST UART only. Automatic detection not supported Default rate is 115200	ITU-T V.250
&K	Flow Control	FAST UART only. Support only &K0 and &K3	Rockwell Rev4
DT	Modem dial	FAST UART only. ATDT<number> launch PPP daemon and switch to binary mode. The <number> parameter is ignored.	Rockwell Rev4
E	Command Echo	Always Returns OK. Does not do anything	ITU-T V.250
+CEDRXS	Controls the setting of eDRX parameters	-	Rev13
+CEDRXRDP	Retrieves eDRX parameters	-	Rev13

## 2. 3GPP supported AT commands description

### 2.1. Request manufacturer identification +GMI

#### Syntax

Command	Possible Responses(s)
+GMI	<manufacturer> +CME ERROR: <err>

#### Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the DCE to identify the manufacturer.

Typically, the text will consist of a single line containing the name of the manufacturer, but manufacturers may choose to provide more information if desired (e.g., address, telephone number for customer service, etc.).

The total number of characters, including line terminators, in the information text returned in response to this command shall not exceed 2048 characters. Note that the information text shall not contain the sequence "0 <CR>" (3/0, 0/13) or "OK<CR>" (4/15, 4/11, 0/13), so that DTE can avoid false detection of the end of this information text.

#### Defined values

Parameter	Type	Description
<manufacturer>	characters	including line terminators, in the information text shall not exceed 2048 characters. Text shall not contain the sequence 0<CR> or OK<CR>

## 2.2. Request manufacturer identification +GMI

### Syntax

Command	Possible Responses(s)
+GMI	<manufacturer> +CME ERROR: <err>

### Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the DCE to identify the manufacturer.

Typically, the text will consist of a single line containing the name of the manufacturer, but manufacturers may choose to provide more information if desired (e.g., address, telephone number for customer service, etc.).

The total number of characters, including line terminators, in the information text returned in response to this command shall not exceed 2048 characters. Note that the information text shall not contain the sequence "0 <CR>" (3/0, 0/13) or "OK<CR>" (4/15, 4/11, 0/13), so that DTE can avoid false detection of the end of this information text.

### Defined values

Parameter	Type	Description
<manufacturer>	characters	including line terminators, in the information text shall not exceed 2048 characters. Text shall not contain the sequence 0<CR> or OK<CR>

### 2.3. Request manufacturer identification +GMI

#### Syntax

Command	Possible Responses(s)
+GMI	<manufacturer> +CME ERROR: <err>

#### Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the DCE to identify the manufacturer.

Typically, the text will consist of a single line containing the name of the manufacturer, but manufacturers may choose to provide more information if desired (e.g., address, telephone number for customer service, etc.).

The total number of characters, including line terminators, in the information text returned in response to this command shall not exceed 2048 characters. Note that the information text shall not contain the sequence "0 <CR>" (3/0, 0/13) or "OK<CR>" (4/15, 4/11, 0/13), so that DTE can avoid false detection of the end of this information text.

#### Defined values

Parameter	Type	Description
<manufacturer>	characters	including line terminators, in the information text shall not exceed 2048 characters. Text shall not contain the sequence 0<CR> or OK<CR>

## 2.4. Request model identification +GMM

### Syntax

Command	Possible Responses(s)
+GMM	<model> +CME ERROR: <err>

### Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the DCE to identify the specific model of device. Typically, the text will consist of a single line containing the name of the product, but manufacturers may choose to provide any information desired.

The total number of characters, including line terminators, in the information text returned in response to this command shall not exceed 2048 characters. Note that the information text shall not contain the sequence "0 <CR>" (3/0, 0/13) or "OK<CR>" (4/15, 4/11, 0/13), so that DTE can avoid false detection of the end of this information text.

### Defined values

Parameter	Type	Description
<model>	characters	including line terminators, in the information text shall not exceed 2048 characters. Text shall not contain the sequence 0<CR> or OK<CR>



## 2.5. Request revision identification +GMR

### Syntax

Command	Possible Responses(s)
+GMR	<revision> +CME ERROR: <err>

### Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, which is intended to permit the user of the DCE to identify the version, revision level or date, or other pertinent information of the device. Typically, the text will consist of a single line containing the version of the product, but manufacturers may choose to provide any information desired.

The total number of characters, including line terminators, in the information text returned in response to this command shall not exceed 2048 characters. Note that the information text shall not contain the sequence "0 <CR>" (3/0, 0/13) or "OK<CR>" (4/15, 4/11, 0/13), so that DTE can avoid false detection of the end of this information text.

### Defined values

Parameter	Type	Description
<revision>	characters	including line terminators, in the information text shall not exceed 2048 characters. Text shall not contain the sequence 0<CR> or OK<CR>

## 2.6. Request product serial number identification +CGSN

### Syntax

Command	Possible Responses(s)
+CGSN[=<snt>]	<b>when &lt;snt&gt;=0 (or omitted) and command successful:</b> <sn> <b>when &lt;snt&gt;=1 and command successful:</b> +CGSN: <imei> <b>when &lt;snt&gt;=2 and command successful:</b> +CGSN: <imeisv> <b>when &lt;snt&gt;=3 and command successful:</b> +CGSN: <svn> +CME ERROR: <err>
+CGSN=?	<b>when TE supports &lt;snt&gt; and command successful:</b> +CGSN: (list of supported <snt>s)

### Description

Execution command causes the TA to return IMEI (International Mobile station Equipment Identity number) and related information to identify the MT that the TE is connected to.

Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

Test command returns values supported as a compound value. For a TA which does not support <snt>, only OK is returned.

### Defined values

Parameter	Type	Description
<snt>	integer	0: returns <sn> 1: returns the IMEI (International Mobile station Equipment Identity) 2: returns the IMEISV (International Mobile station Equipment Identity and Software Version number) 3: returns the SVN (Software Version Number)
<sn>	characters	one or more lines of information text determined by the MT manufacturer. Typically, the text will consist of a single line containing the IMEI number of the MT, but manufacturers may choose to provide more information if desired. The total number of characters, including line terminators, in the information text shall not exceed 2048 characters. Text shall not contain the sequence 0<CR> or OK<CR>
<imei>	string	refer 3GPP TS 23.003 [7], subclause 6.2.1. IMEI is composed of Type Allocation Code (TAC) (8 digits), Serial Number (SNR) (6 digits) and the Check Digit (CD) (1 digit). Character set used in <imei> is as specified by command Select TE Character Set +CSCS.
<imeisv>	string	refer 3GPP TS 23.003 [7], subclause 6.2.2. The 16 digits of IMEISV are composed of Type Allocation Code (TAC) (8 digits), Serial Number (SNR) (6 digits) and the software version (SVN) (2 digits). Character set used in <imeisv> is as specified by command Select TE Character Set +CSCS.

Parameter	Type	Description
<svn>	string	refer 3GPP TS 23.003 [7], subclause 6.2.2. This allows identifying different software versions of a given mobile. Character set used in <svn> is as specified by command Select TE Character Set +CSCS. <b>NOTE:</b> The default value <snt>=0 returns the information text <sn> with no command name prefixed. This has been done to retain backward compatibility. All other values of <snt> return the information text including command name prefix.

### Informative examples

To get <sn> which returns IMEI of the MT

AT+CGSN

490154203237518

OK

To get <imei> which returns IMEI of the MT

AT+CGSN=1

+CGSN: "490154203237518"

OK

## 2.7. Select TE character set +CSCS

### Syntax

Command	Possible Responses(s)
+CSCS=[<chset>]	
+CSCS?	+CSCS: <chset>
+CSCS=?	+CSCS: (list of supported <chset>s)

### Description

Set command informs TA which character set <chset> is used by the TE. TA is then able to convert character strings correctly between TE and MT character sets.

When TA-TE interface is set to 8-bit operation and used TE alphabet is 7-bit, the highest bit shall be set to zero.

### NOTE:

It is manufacturer specific how the internal alphabet of MT is converted to/from the TE alphabet.

Read command shows current setting and test command displays conversion schemes implemented in the TA.

Test command returns values supported as a compound value.

### Defined values

Parameter	Type	Description
<chset>	string	<p>"GSM": GSM 7 bit default alphabet (3GPP TS 23.038 [25]); this setting causes easily software flow control (XON/XOFF) problems.</p> <p>"HEX": Character strings consist only of hexadecimal numbers from 00 to FF; e.g. "032FE6" equals three 8-bit characters with decimal values 3, 47 and 230; no conversions to the original MT character set shall be done. If MT is using GSM 7 bit default alphabet, its characters shall be padded with 8th bit (zero) before converting them to hexadecimal numbers (i.e. no SMS style packing of 7-bit alphabet).</p> <p>"IRA": International reference alphabet (see ITU-T Recommendation T.50 [13]).</p> <p>"PCCPxxx": PC character set Code Page xxx</p> <p>"PCDN": PC Danish/Norwegian character set</p> <p>"UCS2": 16-bit universal multiple-octet coded character set (see ISO/IEC10646 [32]); UCS2 character strings are converted to hexadecimal numbers from 0000 to FFFF; e.g. "004100620063" equals three 16-bit characters with decimal values 65, 98 and 99.</p> <p>"UTF-8": Octet (8-bit) lossless encoding of UCS characters (see RFC 3629 [69]); UTF-8 encodes each UCS character as a variable number of octets, where the number of octets depends on the integer value assigned to the UCS character. The input format shall be a stream of octets. It shall not be converted to hexadecimal numbers as in "HEX" or "UCS2". This character set requires an 8 bit TA – TE interface.</p> <p>"8859-n": ISO 8859 Latin n (1-6) character set</p> <p>"8859-C": ISO 8859 Latin/Cyrillic character set</p> <p>"8859-A": ISO 8859 Latin/Arabic character set</p> <p>"8859-G": ISO 8859 Latin/Greek character set</p> <p>"8859-H": ISO 8859 Latin/Hebrew character set</p>

## 2.8. Reset to default configuration Z

### Syntax

Command	Possible Responses(s)
Z[<value>]	OK

### Description

This command instructs the DCE to set all parameters to their factory defaults as specified by the manufacturer. This may include taking into consideration the settings of hardware configuration switches or non-volatile parameter storage (if implemented). If the DCE is connected to the line, it is disconnected from the line, terminating any call in progress.

All of the functions of the command shall be completed before the DCE issues the result code. The DTE should not include additional commands on the same command line after the Z command because such commands may be ignored.

### NOTE:

Because this command may take into consideration the settings of switches and non-volatile parameter storage, it does not necessarily return the DCE to a "known state". In particular, the DCE may, as a result of execution of this command, be placed in a state in which it appears to not respond to DTE commands, or respond in a completely different format than was being used prior to execution of the command.

### Defined values

Parameter	Type	Description
<value>	number	Profile index, possible values 0-1; optional parameter, the default value is 0

## 2.9. Request identification information I

### Syntax

Command	Possible Responses(s)
I[<value>]	<ordering_code> OK

### Description

This command causes the DCE to transmit one or more lines of information text, determined by the manufacturer, followed by a final result code. <value> may optionally be used to select from among multiple types of identifying information, specified by the manufacturer.

### NOTE:

The responses to this command may not be reliably used to determine the DCE manufacturer, revision level, feature set, or other information, and should not be relied upon for software operation. In particular, expecting a specific numeric response to an I0 command to indicate which other features and commands are implemented in a DCE dooms software to certain failure, since there are widespread differences in manufacturer implementation among devices that may, coincidentally, respond with identical values to this command. Software implementors should use I commands with extreme caution, since the amount of data returned by particular implementations may vary widely from a few bytes to several thousand bytes or more, and should be prepared to encounter ERROR responses if the value is not recognized.

### Defined values

Parameter	Type	Description
<ordering_code>	string	Product ordering code

## 2.10. Subscriber number +CNUM

### Syntax

Command	Possible Responses(s)
+CNUM	+CNUM: [<alpha1>,<number1>,<type1>[,<speed>,<service>[,<itc>]] [<CR><LF>+CNUM: [<alpha2>,<number2>,<type2>[,<speed>,<service>[,<itc>]] [...]] +CME ERROR: <err>
+CNUM=?	

### Description

Action command returns the MSISDNs related to the subscriber (this information can be stored in the SIM/UICC or in the MT). When storing information in the SIM/UICC, if the currently selected card slot contains a SIM card or a UICC with an active GSM application, the information is stored in the EFMSISDN under DFTelecom. If the currently selected card slot contains a UICC with an active USIM application, the information is stored in the EFMSISDN under ADFUSIM). If subscriber has different MSISDN for different services, each MSISDN is returned on a separate line. Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

### Defined values

Parameter	Type	Description
<alphax>	string	used character set should be the one selected with command Select TE Character Set +CSCS
<numberx>	string	string type phone number of format specified by <typex>
<typex>	integer	type of address octet in integer format (refer 3GPP TS 24.008 [8] subclause 10.5.4.7)
<speed>	integer	integer type as defined in subclause 6.7
<service>	integer	0: asynchronous modem 1: synchronous modem 2: PAD Access (asynchronous) 3: Packet Access (synchronous) 4: voice 5: fax all other values below 128 are reserved by the present document
<itc>	integer	0: 3,1 kHz 1: UDI

## 2.11. Set phone functionality +CFUN

### Syntax

Command	Possible Responses(s)
+CFUN=[<fun>[,<rst>]]	+CME ERROR: <err>
+CFUN?	+CFUN: <fun> +CME ERROR: <err>
+CFUN=?	+CFUN: (list of supported <fun>s),(list of supported <rst>s) +CME ERROR: <err>

### Description

Set command selects the level of functionality <fun> in the MT. Level "full functionality" is where the highest level of power is drawn. "Minimum functionality" is where minimum power is drawn. Level of functionality between these may also be specified by manufacturers. When supported by manufacturers, MT resetting with <rst> parameter may be utilized. Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

### NOTE1:

It is manufacturer specific if this command affects network registration. Command Operator Selection +COPS is used to force registration/deregistration.

Read command returns the current setting of <fun>.

Test command returns values supported by the MT as compound values.

### Defined values

Parameter	Type	Description
<fun>	integer	<p>0: minimum functionality</p> <p>1: full functionality. Enable (turn on) the transmit and receive RF circuits for all supported radio access technologies. For MTs supporting +CSRA, this equals the RATs indicated by the response of +CSRA=?.</p> <p>Current +CSRA setting is ignored. It is not required that the MT transmit and receive RF circuits are in a disabled state for this setting to have effect.</p> <p>2: disable (turn off) MT transmit RF circuits only</p> <p>3: disable (turn off) MT receive RF circuits only</p> <p>4: disable (turn off) both MT transmit and receive RF circuits</p> <p>5...127: reserved for manufacturers as intermediate states between full and minimum functionality</p> <p>128: Full functionality with radio access support according to the setting of +CSRA</p> <p>Enables (turns on) the transmit and receive RF circuits if not already enabled. This &lt;fun&gt; setting is applicable for MTs supporting +CSRA.</p> <p>129: Prepare for shutdown. This setting has its prime use when some of the MT's resources (e.g. file system) are located on a tightly integrated TE (host). The MT will execute pending actions resulting in "permanent" changes, e.g. execute pending file system operations.</p> <p>The MT will also make an orderly network detach. After this action and +CFUN has returned OK, the MT can be shut down with &lt;fun&gt;=0, or by other means. After setting &lt;fun&gt;=129, only &lt;fun&gt;=0 is valid. All other values will make +CFUN return ERROR.</p>



Parameter	Type	Description
<rst>	integer	0: do not reset the MT before setting it to <fun> power level <b>NOTE2:</b> This shall be always default when <rst> is not given. 1: reset the MT before setting it to <fun> power level

## 2.12. Signal quality +CSQ

### Syntax

Command	Possible Responses(s)
+CSQ	+CSQ: <rssi>,<ber> +CME ERROR: <err>
+CSQ=?	+CSQ: (list of supported <rssi>s),(list of supported <ber>s)

### Description

Execution command returns received signal strength indication <rssi> and channel bit error rate <ber> from the MT.

Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

Test command returns values supported as compound values.

### Defined values

Parameter	Type	Description
<rssi>	integer	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>	integer	channel bit error rate (in percent) 0...7: as RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4 99: not known or not detectable

## 2.13. Report mobile termination error +CMEE

### Syntax

Command	Possible Responses(s)
+CMEE=[<n>]	
+CMEE?	+CMEE: <n>
+CMEE=?	+CMEE: (list of supported <n>s)

### Description

Set command disables or enables the use of final result code +CME ERROR: <err> as an indication of an error relating to the functionality of the MT. When enabled, MT related errors cause +CME ERROR: <err> final result code instead of the regular ERROR final result code. ERROR is returned normally when error is related to syntax, invalid parameters, or TA functionality.

Read command returns the current setting of <n>.

Test command returns values supported as a compound value.

### Defined values

Parameter	Type	Description
<n>	integer	0: disable +CME ERROR: <err> result code and use ERROR instead 1: enable +CME ERROR: <err> result code and use numeric <err> values (refer subclause 9.2) 2: enable +CME ERROR: <err> result code and use verbose <err> values (refer subclause 9.2)

## 2.14. PS attach or detach +CGATT

### Syntax

Command	Possible Responses(s)
+CGATT=<state>	+CME ERROR: <err>
+CGATT?	+CGATT: <state>
+CGATT=?	+CGATT: (list of supported <state>s)

### Description

The execution command is used to attach the MT to, or detach the MT from, the Packet Domain service. After the command has completed, the MT remains in V.250 command state. If the MT is already in the requested state, the command is ignored and the OK response is returned. If the requested state cannot be achieved, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command. Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

#### NOTE1:

If the initial PDP context is supported, the context with <cid>=0 is automatically defined at startup, see subclause 10.1.0.

Any active PDP contexts will be automatically deactivated when the attachment state changes to detached.

The read command returns the current Packet Domain service state.

The test command is used for requesting information on the supported Packet Domain service states.

#### NOTE2:

This command has the characteristics of both the V.250 action and parameter commands. Hence it has the read form in addition to the execution/set and test forms.

### Defined values

Parameter	Type	Description
<state>	integer	indicates the state of PS attachment 0: detached 1: attached

## 2.15. Show PDP address(es) +CGPADDR

### Syntax

Command	Possible Responses(s)
+CGPADDR[=<cid> >[,<cid>[,...]]]	[+CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]]] [<CR><LF>+CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]] [...]]
+CGPADDR=?	+CGPADDR: (list of defined <cid>s)
<b>NOTE:</b> The syntax of the AT Set Command is corrected to be according to ITU-T Recommendation V.250 [14]. Older versions of the specification specify incorrect syntax +CGPADDR=[,<cid>[,<cid>[,...]]].	

### Description

The execution 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.

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

### Defined values

Parameter	Type	Description
<cid>	integer	specifies a particular PDP context definition (see the +CGDCONT and +CGDSCONT commands)
<PDP_addr_1>, <PDP_addr_2>	string	each is a string type that identifies the MT in the address space applicable to the PDP. The address may be static or dynamic. For a static address, it will be the one set by the +CGDCONT and +CGDSCONT commands when the context was defined. For a dynamic address it will be the one assigned during the last PDP context activation that used the context definition referred to by <cid>. Both <PDP_addr_1> and <PDP_addr_2> are omitted if none is available. Both <PDP_addr_1> and <PDP_addr_2> are included when both IPv4 and IPv6 addresses are assigned, with <PDP_addr_1> containing the IPv4 address and <PDP_addr_2> containing the IPv6 address. The string is given as dot-separated numeric (0-255) parameter of the form: a1.a2.a3.a4 for IPv4 and a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16 for IPv6. When +CGPIAF is supported, its settings can influence the format of the IPv6 address in parameter <PDP_addr_1> or <PDP_addr_2> returned with the execute form of +CGPADDR. <b>NOTE:</b> In dual-stack terminals (<PDP_type> IPV4V6), the IPv6 address will be provided in <PDP_addr_2>. For terminals with a single IPv6 stack (<PDP_type> IPV6) or due to backwards compatibility, the IPv6 address can be provided in parameter <PDP_addr_1>.

## 2.16. EPS network registration status +CEREG

### Syntax

Command	Possible Responses(s)
+CEREG=<n>	+CME ERROR: <err>
+CEREG?	<b>when &lt;n&gt;=0, 1, 2 or 3 and command successful:</b> +CEREG: <n>,<stat>[,<tac>],[<ci>],[<AcT>],[<cause_type>,<reject_cause>]]] <b>when &lt;n&gt;=4 or 5 and command successful:</b> +CEREG: <n>,<stat>[,<lac>],[<ci>],[<AcT>],[<rac>],[<cause_type>],[<reject_cause>],[<Active-Time>],[<Periodic-TAU>]]]]
+CEREG=?	+CEREG: (list of supported <n>s)

### Description

The set command controls the presentation of an unsolicited result code +CEREG: <stat> when <n>=1 and there is a change in the MT's EPS network registration status in E-UTRAN, or unsolicited result code +CEREG: <stat>[,<tac>],[<ci>],[<AcT>]] when <n>=2 and there is a change of the network cell in EUTRAN.

The parameters <AcT>, <tac> and <ci> are provided only if available. The value <n>=3 further extends the unsolicited result code with [,<cause\_type>,<reject\_cause>], when available, when the value of <stat> changes.

If the UE wants to apply PSM for reducing its power consumption, see +CPSMS command and 3GPP TS 23.682 [149], the set command controls the presentation of an unsolicited result code +CEREG: <stat>[,<tac>],[<ci>],[<AcT>],[<cause\_type>],[<reject\_cause>],[<Active-Time>],[<Periodic-TAU>]]]]. When <n>=4 the unsolicited result code will provide the UE with additional information for the Active Time value and the extended periodic TAU value if there is a change of the network cell in E-UTRAN. The value <n>=5 further enhances the unsolicited result code with <cause\_type> and <reject\_cause> when the value of <stat> changes. The parameters <AcT>, <tac>, <ci>, <cause\_type>, <reject\_cause>, <Active-Time> and <Periodic-TAU> are provided only if available.

Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

### NOTE1:

If the EPS MT in GERAN/UTRAN/E-UTRAN also supports circuit mode services and/or GPRS services, the +CREG command and +CREG: result codes and/or the +CGREG command and +CGREG: result codes apply to the registration status and location information for those services. The read command returns the status of result code presentation and an integer <stat> which shows whether the network has currently indicated the registration of the MT. Location information elements <tac>, <ci> and <AcT>, if available, are returned only when <n>=2 and MT is registered in the network. The parameters [,<cause\_type>,<reject\_cause>], if available, are returned when <n>=3. Test command returns values supported as a compound value.

**Defined values**

Parameter	Type	Description
<n>	integer	0: disable network registration unsolicited result code 1: enable network registration unsolicited result code +CEREG: <stat> 2: enable network registration and location information unsolicited result code+CEREG: <stat>[,<tac>],[<ci>],[<AcT>] 3: enable network registration, location information and EMM cause value information unsolicited result code +CEREG: <stat>[,<tac>],[<ci>],[<AcT>],[<cause_type>,<reject_cause>] 4: For a UE that wants to apply PSM, enable network registration and location information unsolicited result code +CEREG: <stat>[,<tac>],[<ci>],[<AcT>][,.[<Active-Time>],[<Periodic-TAU>]] 5: For a UE that wants to apply PSM, enable network registration, location information and EMM cause value information unsolicited result code +CEREG: <stat>[,<tac>],[<ci>],[<AcT>][,.[<cause_type>],[<reject_cause>][,.[<Active-Time>],[<Periodic-TAU>]]
<stat>	integer	indicates the EPS registration status 0: not registered, MT is not currently searching an operator to register to 1: registered, home network 2: not registered, but MT is currently trying to attach or searching an operator to register to 3: registration denied 4: unknown (e.g. out of E-UTRAN coverage) 5: registered, roaming 6: registered for "SMS only", home network (not applicable) 7: registered for "SMS only", roaming (not applicable) 8: attached for emergency bearer services only (See NOTE 2) 9: registered for "CSFB not preferred", home network (not applicable) 10: registered for "CSFB not preferred", roaming (not applicable) <b>NOTE2:</b> 3GPP TS 24.008 [8] and 3GPP TS 24.301 [83] specify the condition when the MS is considered as attached for emergency bearer services.
<tac>	string	two byte tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)
<ci>	string	four byte E-UTRAN cell ID in hexadecimal format
<AcT>	integer	indicates the access technology of the serving cell 0: GSM (not applicable) 1: GSM Compact (not applicable) 2: UTRAN (not applicable) 3: GSM w/EGPRS (see NOTE 3) (not applicable) 4: UTRAN w/HSDPA (see NOTE 4) (not applicable) 5: UTRAN w/HSUPA (see NOTE 4) (not applicable) 6: UTRAN w/HSDPA and HSUPA (see NOTE 4) (not applicable) 7: E-UTRAN <b>NOTE3:</b> 3GPP TS 44.060 [71] specifies the System Information messages which give the information about whether the serving cell supports EGPRS. <b>NOTE4:</b> 3GPP TS 25.331 [74] specifies the System Information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.
<cause_type>	integer	indicates the type of <reject_cause>. 0: Indicates that <reject_cause> contains an EMM cause value, see 3GPP TS 24.301 [83] Annex A. 1: Indicates that <reject_cause> contains a manufacturer-specific cause.

Parameter	Type	Description
<reject_cause>	integer	contains the cause of the failed registration. The value is of type as defined by <cause_type>.
<reject_cause>	integer	<Active-Time>: string type; one byte in an 8 bit format. Indicates the Active Time value (T3324) allocated to the UE in E-UTRAN. The Active Time value is coded as one byte (octet 3) of the GPRS Timer 2 information element coded as bit format (e.g. "00100100" equals 4 minutes). For the coding and the value range, see the GPRS Timer 2 IE in 3GPP TS 24.008 [8] Table 10.5.163/3GPP TS 24.008. See also 3GPP TS 23.682 [149] and 3GPP TS 23.401 [82].
<Periodic-TAU>	string	one byte in an 8 bit format. Indicates the extended periodic TAU value (T3412) allocated to the UE in E-UTRAN. The extended periodic TAU value is coded as one byte (octet 3) of the GPRS Timer 3 information element coded as bit format (e.g. "01000111" equals 70 hours). For the coding and the value range, see the GPRS Timer 3 IE in 3GPP TS 24.008 [8] Table 10.5.163a/3GPP TS 24.008. See also 3GPP TS 23.682 [149] and 3GPP TS 23.401 [82].

## 2.17. Preferred message format +CMGF

### Syntax

Command	Possible Responses
+CMGF=[<mode>]	
+CMGF?	+CMGF: <mode>
+CMGF=?	+CMGF: (list of supported <mode>s)

### Description

Set command tells the TA, which input and output format of messages to use. <mode> indicates the format of messages used with send, list, read and write commands and unsolicited result codes resulting from received messages. Mode can be either PDU mode (entire TP data units used) or text mode (headers and body of the messages given as separate parameters). Text mode uses the value of parameter <chset> specified by command Select TE Character Set +CSCS to inform the character set to be used in the message body in the TA-TE interface.

Test command returns supported modes as a compound value.

### Defined values

Parameter	Type	Description
<mode>	integer	0 PDU mode 1 text mode



## 2.18. List message +CMGL

### Syntax

Command	Possible Responses(s)
+CMGL[=<stat>]	<p><b>if text mode (+CMGF=1), command successful and SMS-SUBMITs and/or SMS-DELIVERs:</b>            +CMGL: &lt;index&gt;, &lt;stat&gt;, &lt;oa/da&gt;, [&lt;alpha&gt;], [&lt;scts&gt;], [<i>&lt;toa/toda&gt;</i>], &lt;length&gt;&lt;CR&gt;&lt;LF&gt;            &lt;data&gt;&lt;CR&gt;&lt;LF&gt;            +CMGL: &lt;index&gt;, &lt;stat&gt;, &lt;da/oa&gt;, [&lt;alpha&gt;], [&lt;scts&gt;], [<i>&lt;toa/toda&gt;</i>], &lt;length&gt;&lt;CR&gt;&lt;LF&gt;            &lt;data&gt;[...]</p> <p><b>if text mode (+CMGF=1), command successful and SMS-STATUS-REPORTs:</b>            +CMGL: &lt;index&gt;, &lt;stat&gt;, &lt;fo&gt;, &lt;mr&gt;, [&lt;ra&gt;], [&lt;tora&gt;], &lt;scts&gt;, &lt;dt&gt;, &lt;st&gt;&lt;CR&gt;&lt;LF&gt;            +CMGL: &lt;index&gt;, &lt;stat&gt;, &lt;fo&gt;, &lt;mr&gt;, [&lt;ra&gt;], [&lt;tora&gt;], &lt;scts&gt;, &lt;dt&gt;, &lt;st&gt;[...]</p> <p><b>if text mode (+CMGF=1), command successful and SMS-COMMANDs:</b>            +CMGL: &lt;index&gt;, &lt;stat&gt;, &lt;fo&gt;, &lt;ct&gt;&lt;CR&gt;&lt;LF&gt;            +CMGL: &lt;index&gt;, &lt;stat&gt;, &lt;fo&gt;, &lt;ct&gt;[...]</p> <p><b>if text mode (+CMGF=1), command successful and CBM storage:</b>            +CMGL: &lt;index&gt;, &lt;stat&gt;, &lt;sn&gt;, &lt;mid&gt;, &lt;page&gt;, &lt;pages&gt;&lt;CR&gt;&lt;LF&gt;&lt;data&gt;&lt;CR&gt;&lt;LF&gt;            +CMGL: &lt;index&gt;, &lt;stat&gt;, &lt;sn&gt;, &lt;mid&gt;, &lt;page&gt;, &lt;pages&gt;&lt;CR&gt;&lt;LF&gt;&lt;data&gt;[...]</p> <p><b>if PDU mode (+CMGF=0) and command successful:</b>            +CMGL: &lt;index&gt;, &lt;stat&gt;, [&lt;alpha&gt;], &lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;pdu&gt;&lt;CR&gt;&lt;LF&gt;            +CMGL: &lt;index&gt;, &lt;stat&gt;, [&lt;alpha&gt;], &lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;pdu&gt;[...]</p> <p><b>otherwise:</b>            +CMS ERROR: &lt;err&gt;</p>
+CMGL=?	+CMGL: (list of supported <stat>s)

### Description

Execution command returns messages with status value <stat> from message storage <mem1> to the TE. About text mode parameters in italics, refer command Show Text Mode Parameters +CSDH. If status of the message is 'received unread', status in the storage changes to 'received read'. If listing fails, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for <err> values.

### NOTE:

If 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.

Test command shall give a list of all status values supported by the TA.

### Defined values

Parameter	Type	Description
<stat>	integer	indicates the status of message in memory; defined values: 0: "REC UNREAD" received unread message (i.e. new message) 1: "REC READ" received read message 2: "STO UNSENT" stored unsent message (only applicable to SMs) 3: "STO SENT" stored sent message (only applicable to SMs) 4: "ALL" all messages (only applicable to +CMGL command)
<index>	integer	value in the range of location numbers supported by the associated memory

Parameter	Type	Description
<alpha>	string	implementation of this feature is manufacturer specific; used character set should be the one selected with command Select TE Character Set +CSCS (see definition of this command in 3GPP TS 27.007 [9])
<scts>	string	3GPP TS 23.040 [3] TP-Service-Centre-Time-Stamp in time-string format (refer <dt>)
<oa>	string	BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in TS 07.07); type of address given by <tooa>
<tora>	number	3GPP TS 24.011 [6] TP-Recipient-Address Type-of-Address octet in integer format (default refer <toda>)
<data>	string	In the case of SMS: 3GPP TS 23.040 [3] TP-User-Data in text mode responses; format: -if <dcs> indicates that 3GPP TS 23.038 [2] GSM 7 bit default alphabet is used and <fo> indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is not set: -if TE character set other than "HEX" (refer command Select TE Character Set +CSCS in 3GPP TS 27.007 [9]): ME/TA converts GSM alphabet into current TE character set according to rules of Annex A -if TE character set is "HEX": ME/TA converts each 7-bit character of GSM 7 bit default alphabet into two IRA character long hexadecimal number (e.g. character Ψ (GSM 7 bit default alphabet decimal 23) is presented as 17 (IRA 49 and 55)) -if <dcs> indicates that 8-bit or UCS2 data coding scheme is used, or <fo> indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is set: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)) In the case of CBS: 3GPP TS 23.041 [4] CBM Content of Message in text mode responses; format: -if <dcs> indicates that 3GPP TS 23.038 [2] GSM 7 bit default alphabet is used: -if TE character set other than "HEX" (refer command +CSCS in 3GPP TS 27.007 [9]): ME/TA converts GSM alphabet into current TE character set according to rules of Annex A -if TE character set is "HEX": ME/TA converts each 7-bit character of the GSM 7 bit default alphabet into two IRA character long hexadecimal number -if <dcs> indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number
<length>	integer	integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> > (or <cdata>) in characters; or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)
<dt>	string	"yy/MM/dd,hh:mm:ss□zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08"
<fo>	string	first octet of 3GPP TS 23.040 [3] SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format

## 2.19. Read message +CMGR

### Syntax

Command	Possible Responses(s)
+CMGR=<index>	<p><b>if text mode (+CMGF=1), command successful and SMS-DELIVER:</b>            +CMGR: &lt;stat&gt;, &lt;oa&gt;, [<i>&lt;alpha&gt;</i>], &lt;scts&gt;[, &lt;tooa&gt;, &lt;fo&gt;, &lt;pid&gt;, &lt;dcs&gt;, &lt;sca&gt;, &lt;tosca&gt;, &lt;length&gt;]&lt;CR&gt;&lt;LF&gt;&lt;data&gt;</p> <p><b>if text mode (+CMGF=1), command successful and SMS-SUBMIT:</b>            +CMGR: &lt;stat&gt;, &lt;da&gt;, [<i>&lt;alpha&gt;</i>], [<i>&lt;toda&gt;</i>], &lt;fo&gt;, &lt;pid&gt;, &lt;dcs&gt;, [<i>&lt;vp&gt;</i>], &lt;sca&gt;, &lt;tosca&gt;, &lt;length&gt;]&lt;CR&gt;&lt;LF&gt;&lt;data&gt;</p> <p><b>if text mode (+CMGF=1), command successful and SMS-STATUS-REPORT:</b>            +CMGR: &lt;stat&gt;, &lt;fo&gt;, &lt;mr&gt;, [<i>&lt;ra&gt;</i>], [<i>&lt;tora&gt;</i>], &lt;scts&gt;, &lt;dt&gt;, &lt;st&gt;</p> <p><b>if text mode (+CMGF=1), command successful and SMS-COMMAND:</b>            +CMGR: &lt;stat&gt;, &lt;fo&gt;, &lt;ct&gt;[, &lt;pid&gt;, [<i>&lt;mn&gt;</i>], [<i>&lt;da&gt;</i>], [<i>&lt;toda&gt;</i>], &lt;length&gt;]&lt;CR&gt;&lt;LF&gt;&lt;cdata&gt;]</p> <p><b>if text mode (+CMGF=1), command successful and CBM storage:</b>            +CMGR: &lt;stat&gt;, &lt;sn&gt;, &lt;mid&gt;, &lt;dcs&gt;, &lt;page&gt;, &lt;pages&gt;&lt;CR&gt;&lt;LF&gt;&lt;data&gt;</p> <p><b>if PDU mode (+CMGF=0) and command successful:</b>            +CMGR: &lt;stat&gt;, [<i>&lt;alpha&gt;</i>], &lt;length&gt;&lt;CR&gt;&lt;LF&gt;&lt;pdu&gt;</p> <p><b>otherwise:</b>            +CMS ERROR: &lt;err&gt;</p>
+CMGR=?	

### Description

Execution command returns message with location value <index> from message storage <mem1> to the TE. About text mode parameters in italics, refer command Show Text Mode Parameters +CSDH. If status of the message is 'received unread', status in the storage changes to 'received read'. If reading fails, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for <err> values.

### Defined values

Parameter	Type	Description
<stat>	integer	indicates the status of message in memory; defined values: 0: "REC UNREAD" received unread message (i.e. new message) 1: "REC READ" received read message 2: "STO UNSENT" stored unsent message (only applicable to SMSs) 3: "STO SENT" stored sent message (only applicable to SMSs) 4: "ALL" all messages (only applicable to +CMGL command)
<index>	integer	value in the range of location numbers supported by the associated memory
<alpha>	string	implementation of this feature is manufacturer specific; used character set should be the one selected with command Select TE Character Set +CSCS (see definition of this command in 3GPP TS 27.007 [9])
<scts>	string	3GPP TS 23.040 [3] TP-Service-Centre-Time-Stamp in time-string format (refer <dt>)
<oa>	string	BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in TS 07.07); type of address given by <tooa>
<tora>	number	3GPP TS 24.011 [6] TP-Recipient-Address Type-of-Address octet in integer format (default refer <toda>)

Parameter	Type	Description
<data>	string	<p>In the case of SMS: 3GPP TS 23.040 [3] TP-User-Data in text mode responses; format:</p> <ul style="list-style-type: none"> <li>-if &lt;dc&gt; indicates that 3GPP TS 23.038 [2] GSM 7 bit default alphabet is used and &lt;fo&gt; indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is not set:</li> <li>-if TE character set other than "HEX" (refer command Select TE Character Set +CSCS in 3GPP TS 27.007 [9]): ME/TA converts GSM alphabet into current TE character set according to rules of Annex A</li> <li>-if TE character set is "HEX": ME/TA converts each 7-bit character of GSM 7 bit default alphabet into two IRA character long hexadecimal number (e.g. character Ψ (GSM 7 bit default alphabet decimal 23) is presented as 17 (IRA 49 and 55))</li> <li>-if &lt;dc&gt; indicates that 8-bit or UCS2 data coding scheme is used, or &lt;fo&gt; indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is set: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65))</li> </ul> <p>In the case of CBS: 3GPP TS 23.041 [4] CBM Content of Message in text mode responses; format:</p> <ul style="list-style-type: none"> <li>-if &lt;dc&gt; indicates that 3GPP TS 23.038 [2] GSM 7 bit default alphabet is used:</li> <li>-if TE character set other than "HEX" (refer command +CSCS in 3GPP TS 27.007 [9]): ME/TA converts GSM alphabet into current TE character set according to rules of Annex A</li> <li>-if TE character set is "HEX": ME/TA converts each 7-bit character of the GSM 7 bit default alphabet into two IRA character long hexadecimal number</li> <li>-if &lt;dc&gt; indicates that 8-bit or UCS2 data coding scheme is used: ME/TA converts each 8-bit octet into two IRA character long hexadecimal number</li> </ul>
<length>	integer	integer type value indicating in the text mode (+CMGF=1) the length of the message body <data> > (or <cdata>) in characters; or in PDU mode (+CMGF=0), the length of the actual TP data unit in octets (i.e. the RP layer SMSC address octets are not counted in the length)
<dt>	string	"yy/MM/dd,hh:mm:ss□zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08"
<fo>	string	first octet of 3GPP TS 23.040 [3] SMS-DELIVER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND (default 2) in integer format
<tooa>	string	3GPP TS 24.011 [6] TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>)
<toda>	string	3GPP TS 24.011 [6] TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129)
<da>	string	3GPP TS 23.040 [3] TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in 3GPP TS 27.007 [9]); type of address given by <toda>

## 2.20. Write message to memory +CMGW

### Syntax

Command	Possible Responses(s)
<b>if text mode (+CMGF=1):</b> +CMGW[=<oa/da>[,<tooa/toda>[,<stat>]]]<CR> text is entered<ctrl-Z/ESC>	+CMGW: <index> +CMS ERROR: <err>
<b>if PDU mode (+CMGF=0):</b> +CMGW=<length>[,<stat>]<CR>PDU is given<ctrl-Z/ESC> +CMGW=?	+CMGW: <index> +CMS ERROR: <err>

### Description

Execution command stores message (either SMS-DELIVER or SMS-SUBMIT) to memory storage <mem2>. Memory location <index> of the stored message is returned. By default message status will be set to 'stored unsent', but parameter <stat> allows also other status values to be given. The entering of text is done similarly as specified in command Send Message +CMGS. If writing fails, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for <err> values.

### NOTE:

SMS-COMMANDs and SMS-STATUS-REPORTs can not be stored in text mode.

### Defined values

Parameter	Type	Description
<stat>	integer	indicates the status of message in memory; defined values: 0: "REC UNREAD": received unread message (i.e. new message) 1: "REC READ": received read message 2: "STO UNSENT": stored unsent message (only applicable to SMSs) 3: "STO SENT": stored sent message (only applicable to SMSs) 4: "ALL": all messages (only applicable to +CMGL command)
<index>	integer	value in the range of location numbers supported by the associated memory
<oa>	string	BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in TS 07.07); type of address given by <tooa>
<tooa>	string	3GPP TS 24.011 [6] TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>)
<toda>	string	3GPP TS 24.011 [6] TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129)
<da>	string	3GPP TS 23.040 [3] TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in 3GPP TS 27.007 [9]); type of address given by <toda>

## 2.21. Delete message +CMGD

### Syntax

Command	Possible Responses(s)
+CMGD=<index>[,<delflag>]	+CMS ERROR: <err>
+CMGD=?	+CMGD: (list of supported <index>s)[,(list of supported <delflag>s)]

### Description

Execution command deletes message from preferred message storage <mem1> location <index>. If <delflag> is present and not set to 0 then the ME shall ignore <index> and follow the rules for <delflag> shown below. If deleting fails, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for <err> values.

Test command shows the valid memory locations and optionally the supported values of <delflag>.

### Defined values

Parameter	Type	Description
<delflag>	integer	indicating multiple message deletion request as follows: 0: Delete the message specified in <index> 1: Delete all read messages from preferred message storage, leaving unread messages and stored mobile originated messages (whether sent or not) untouched 2: Delete all read messages from preferred message storage and sent mobile originated messages, leaving unread messages and unsent mobile originated messages untouched 3: Delete all read messages from preferred message storage, sent and unsent mobile originated messages leaving unread messages untouched. 4: Delete all messages from preferred message storage including unread messages.
<index>	integer	value in the range of location numbers supported by the associated memory

## 2.22. Send message +CMGS

### Syntax

Command	Possible Responses(s)
<b>if text mode (+CMGF=1):</b> +CMGS=<da>[,<toda>]<CR> <i>text is entered</i> <ctrl-Z/ESC>	<b>if text mode (+CMGF=1) and sending successful:</b> +CMGS: <mr>[,<scts>] <b>if sending fails:</b> +CMS ERROR: <err>
<b>f PDU mode (+CMGF=0):</b> +CMGS=<length><CR> PDU is given<ctrl-Z/ESC>	<b>if PDU mode (+CMGF=0) and sending successful:</b> +CMGS: <mr>[,<ackpdu>] <b>if sending fails:</b> +CMS ERROR: <err>
+CMGS=?	OK

### Description

Execution command sends message from a TE to the network (SMS-SUBMIT). Message reference value <mr> is returned to the TE on successful message delivery. Optionally (when +CSMS <service> value is 1 and network supports) <scts> is returned. Values can be used to identify message upon unsolicited delivery status report result code. If sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for a list of <err> values. This command should be abortable.

Execution command sends message from a TE to the network (SMS-SUBMIT). 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 sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for a list of <err> values. This command should be abortable.

- entered text (3GPP TS 23.040 [3] TP-Data-Unit) is sent to address <da> and all current settings (refer Set Text Mode Parameters +CSMP and Service Centre Address +CSCA) are used to construct the actual PDU in ME/TA.
- the TA shall send a four character sequence <CR><LF><greater\_than><space> (IRA 13, 10, 62, 32) after command line is terminated with <CR>; after that text can be entered from TE to ME/TA.
- the DCD signal shall be in ON state while text is entered.
- the echoing of entered characters back from the TA is controlled by V.25ter echo command E.
- the entered text should be formatted as follows:
  - if <dcs> (set with +CSMP) indicates that 3GPP TS 23.038 [2] GSM 7 bit default alphabet is used and <fo> indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is not set:
  - if TE character set other than "HEX" (refer command Select TE Character Set +CSCS in 3GPP TS 27.007 [9]): ME/TA converts the entered text into the GSM 7 bit default alphabet according to rules of Annex A; backspace can be used to delete last character and carriage returns can be used (previously mentioned four character sequence shall be sent to the TE after every carriage return entered by the user);
  - if TE character set is "HEX": the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into the GSM 7 bit default alphabet characters.

- (e.g. 17 (IRA 49 and 55) will be converted to character · (GSM 7 bit default alphabet 23)).
- if <dc> indicates that 8-bit or UCS2 data coding scheme is used or <fo> indicates that 3GPP TS 23.040 [3] TP-User-Data-Header-Indication is set: the entered text should consist of two IRA character long hexadecimal numbers which ME/TA converts into 8-bit octet (e.g. two characters 2A (IRA 50 and 65) will be converted to an octet with integer value 42).
- sending can be cancelled by giving <ESC> character (IRA 27).
- <ctrl-Z> (IRA 26) must be used to indicate the ending of the message body.

#### Defined values

Parameter	Type	Description
<scts>	string	3GPP TS 23.040 [3] TP-Service-Centre-Time-Stamp in time-string format (refer <dt>)
<mr>	number	3GPP TS 23.040 [3] TP-Message-Reference in integer format
<toda>	string	3GPP TS 24.011 [6] TP-Destination-Address Type-of-Address octet in integer format (when first character of <da> is + (IRA 43) default is 145, otherwise default is 129)
<da>	string	3GPP TS 23.040 [3] TP-Destination-Address Address-Value field in string format; BCD numbers (or GSM 7 bit default alphabet characters) are converted to characters of the currently selected TE character set (refer command +CSCS in 3GPP TS 27.007 [9]); type of address given by <toda>



## 2.23. Clock +CCLK

### Syntax

Command	Possible Responses(s)
+CCLK=<time>	+CME ERROR: <err>
+CCLK?	+CCLK: <time> +CME ERROR: <err>
+CCLK=?	

### Description

Set command sets the real-time clock of the MT. If setting fails in an MT error, +CME ERROR: <err> is returned.

Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

Read command returns the current setting of the clock.

### Defined values

Parameter	Type	Description
<time>	string	format is "yy/MM/dd,hh:mm:ss±zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone (indicates the difference, expressed in quarters of an hour, between the local time and GMT; range -96...+96). E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08"  <b>NOTE:</b> If MT does not support time zone information then the three last characters of <time> are not returned by +CCLK?. The format of <time> is specified by use of the +CSDF command.

## 2.24. Extended signal quality +CESQ

### Syntax

Command	Possible response(s)
+CESQ	+CESQ: <rxlev>,<ber>,<rscp>,<ecno>,<rsrq>,<rsrp> +CME ERROR: <err>
+CESQ=?	+CESQ: (list of supported <rxlev>s),(list of supported <ber>s),(list of supported <rscp>s),(list of supported <ecno>s),(list of supported <rsrq>s),(list of supported <rsrp>s)

### Description

Execution command returns received signal quality parameters. If the current serving cell is not a GERAN cell, <rxlev> and <ber> are set to value 99. If the current serving cell is not a UTRA FDD or UTRA TDD cell, <rscp> is set to 255. If the current serving cell is not a UTRA FDD cell, <ecno> is set to 255. If the current serving cell is not an E-UTRA cell, <rsrq> and <rsrp> are set to 255.

Refer 3GPP TS 27.007 subclause 9.2 for possible <err> values.

Test command returns values supported as compound values.

### Defined values

Parameter	Type	Description
<rxlev>	integer	received signal strength level (see 3GPP TS 45.008 [20] subclause 8.1.4). 0: rssi < -110 dBm 1: -110 dBm £ rssi < -109 dBm 2: -109 dBm £ rssi < -108 dBm : : : : 61: -50 dBm £ rssi < -49 dBm 62: -49 dBm £ rssi < -48 dBm 63: -48 dBm £ rssi 99: not known or not detectable
<ber>	integer	channel bit error rate (in percent) 0...7: as RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4 99: not known or not detectable
<rscp>	integer	received signal code power (see 3GPP TS 25.133 [95] subclause 9.1.1.3 and 3GPP TS 25.123 [96] subclause 9.1.1.1.3). 0: rscp < -120 dBm 1: -120 dBm £ rscp < -119 dBm 2: -119 dBm £ rscp < -118 dBm : : : : 94: -27 dBm £ rscp < -26 dBm 95: -26 dBm £ rscp < -25 dBm 96: -25 dBm £ rscp 255: not known or not detectable

Parameter	Type	Description
<ecno>	integer	ratio of the received energy per PN chip to the total received power spectral density (see 3GPP TS 25.133 [95] subclause). 0: $E_c/I_o < -24$ dB 1: $-24$ dB $\leq E_c/I_o < -23.5$ dB 2: $-23.5$ dB $\leq E_c/I_o < -23$ dB : : : : 47: $-1$ dB $\leq E_c/I_o < -0.5$ dB 48: $-0.5$ dB $\leq E_c/I_o < 0$ dB 49: 0 dB $\leq E_c/I_o$ 255: not known or not detectable
<ber>	integer	channel bit error rate (in percent) 0...7: as RXQUAL values in the table in 3GPP TS 45.008 [20] subclause 8.2.4 99: not known or not detectable
<rsrp>	integer	received signal code power (see 3GPP TS 25.133 [95] subclause 9.1.1.3 and 3GPP TS 25.123 [96] subclause 9.1.1.1.3). 0: $rsrp < -120$ dBm 1: $-120$ dBm $\leq rsrp < -119$ dBm 2: $-119$ dBm $\leq rsrp < -118$ dBm : : : : 94: $-27$ dBm $\leq rsrp < -26$ dBm 95: $-26$ dBm $\leq rsrp < -25$ dBm 96: $-25$ dBm $\leq rsrp$ 255: not known or not detectable
<ecno>	integer	ratio of the received energy per PN chip to the total received power spectral density (see 3GPP TS 25.133 [95] subclause). 0: $E_c/I_o < -24$ dB 1: $-24$ dB $\leq E_c/I_o < -23.5$ dB 2: $-23.5$ dB $\leq E_c/I_o < -23$ dB : : : : 47: $-1$ dB $\leq E_c/I_o < -0.5$ dB 48: $-0.5$ dB $\leq E_c/I_o < 0$ dB 49: 0 dB $\leq E_c/I_o$ 255: not known or not detectable
<rsrq>	integer	reference signal received quality (see 3GPP TS 36.133 [96] subclause 9.1.7). 0: $rsrq < -19.5$ dB 1: $-19.5$ dB $\leq rsrq < -19$ dB 2: $-19$ dB $\leq rsrq < -18.5$ dB : : : : 32: $-4$ dB $\leq rsrq < -3.5$ dB 33: $-3.5$ dB $\leq rsrq < -3$ dB 34: $-3$ dB $\leq rsrq$ 255: not known or not detectable
<rsrp>	integer	reference signal received power (see 3GPP TS 36.133 [96] subclause 9.1.4). 0: $rsrp < -140$ dBm 1: $-140$ dBm $\leq rsrp < -139$ dBm 2: $-139$ dBm $\leq rsrp < -138$ dBm : : : : 95: $-46$ dBm $\leq rsrp < -45$ dBm 96: $-45$ dBm $\leq rsrp < -44$ dBm 97: $-44$ dBm $\leq rsrp$ 255: not known or not detectable

## 2.25. Fixed DTE rate +IPR

### Syntax

Command	Possible response(s)
+IPR=<rate>	OK
+IPR?	+IPR: <rate>
+IPR=?	+IPR:(list of supported autodetectable <rate> values)[,(list of fixed-only <rate> values)]

### Description

This numeric extended-format parameter specifies the data rate at which the DCE will accept commands, in addition to 1200 bit/s or 9600 bit/s (as required in 4.3). It may be used to select operation at rates at which the DCE is not capable of automatically detecting the data rate being used by the DTE. Specifying a value of 0 disables the function and allows operation only at rates automatically detectable by the DCE. The specified rate takes effect following the issuance of any result code(s) associated with the current command line.

The <rate> specified does not apply in online data state if Direct mode of operation is selected.

### Defined values

Parameter	Type	Description
<rate>	integer	0 (factory-programmed value): autobauding 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 (default value), 230400, 460800, 921600, 3000000, 3250000, 6000000, 6500000

## 2.26. Flow Control &K

### Syntax

Command	Possible response(s)
&K[<value>]	OK

### Description

This command defines the DTE/DCE (terminal/modem) flow control mechanism. The parameter value, if valid, is written to S39 bits 0, 1, and 2.

### Defined values

Parameter	Type	Description
<value>	integer	0: Disables flow control. 3: Enables RTS/CTS flow control. (Default for data modem modes.) 4: Enables XON/XOFF flow control. 5: Enables transparent XON/XOFF flow control. 6: Enables both RTS/CTS and XON/XOFF flow control. (Default for fax modem and voice modes.)

## 2.27. Command echo E

### Syntax

Command	Possible Responses(s)
E[<value>]	OK

### Description

The setting of this parameter determines whether or not the DCE echoes characters received from the DTE during command state and online command state (see 5.2.3).

### Defined values

Parameter	Type	Description
<value>	integer	0: DCE does not echo characters during command state and online command state. 1: DCE echoes characters during command state and online command state.

## 2.28. Dial DT

### Syntax

Command	Possible Responses(s)
ATDT	OK

### Description

pulse dial the numbers that follow until a "T" is encountered. Affects current and subsequent dialing. Some countries prevent changing dialing modes after the first digit is dialed.

## 2.29. Controls the setting of eDRX parameters +CEDRXS

### Syntax

Command	Possible Responses(s)
+CEDRXS=[<mode>[,<AcT-type>[,<Requested_eDRX_value>]]]	+CME ERROR: <err>
+CEDRXS?	[+CEDRXS: <AcT-type>,<Requested_eDRX_value>[<CR><LF>+CEDRXS: <AcT-type>,<Requested_eDRX_value>[...]]]
+CEDRXS=?	+CEDRXS: (list of supported <mode>s),(list of supported <AcT-type>s),(list of supported <Requested_eDRX_value>s)

### Description

The set command controls the setting of the UEs eDRX parameters. The command controls whether the UE wants to apply eDRX or not, as well as the requested eDRX value for each specified type of access technology.

The set command also controls the presentation of an unsolicited result code +CEDRXP: <AcT-type>,<Requested\_eDRX\_value>[,<NW-provided\_eDRX\_value>[,<Paging\_time\_window>]] when <n>=2 and there is a change in the eDRX parameters provided by the network

### Editor's Note: It is FFS if the new access for 5G must be include in the text.

A special form of the command can be given as +CEDRXS=3. In this form, eDRX will be disabled and data for all parameters in the command +CEDRXS will be removed or, if available, set to the manufacturer specific default values.

Refer subclause 9.2 for possible <err> values.

The read command returns the current settings for each defined value of <AcT-type>.

### The test command returns the supported <mode>s and the value ranges for the access technology and the requested eDRX value as compound values

### Defined values

<mode>:

integer type, indicates to disable or enable the use of eDRX in the UE. This parameter is applicable to all specified types of access technology, i.e. the most recent setting of <mode> will take effect for all specified values of <AcT>.

0: Disable the use of eDRX

1: Enable the use of eDRX

2: Enable the use of eDRX and enable the unsolicited result code

+CEDRXP: <AcT-type>,<Requested\_eDRX\_value>[,<NW-provided\_eDRX\_value>[,<Paging\_time\_window>]]]

3: Disable the use of eDRX and discard all parameters for eDRX or, if available, reset to the manufacturer specific default values.

<AcT-type>:

integer type, indicates the type of access technology. This AT-command is used to specify the relationship between the type of access technology and the requested eDRX value.

0: Access technology is not using eDRX. This parameter value is only used in the unsolicited result code.

1: EC-GSM-IoT (A/Gb mode)

2: GSM (A/Gb mode)

3: UTRAN (Iu mode)

4: E-UTRAN (WB-S1 mode)

5: E-UTRAN (NB-S1 mode)

<Requested\_eDRX\_value>:

string type; half a byte in a 4 bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]).

For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008. The default value, if available, is manufacturer specific.

<NW-provided\_eDRX\_value>:

string type; half a byte in a 4 bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]).

For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008.

<Paging\_time\_window>:

string type; half a byte in a 4 bit format. The paging time window refers to bit 8 to 5 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]).

For the coding and the value range, see the Extended DRX parameters information element in 3GPP TS 24.008 [8] 10.5.5.32/3GPP TS 24.008.

## Implementation

Optional.

## 2.30. Retrieves eDRX parameters +CEDRXRDP

### Syntax

Command	Possible Responses(s)
+CEDRXRDP	+CEDRXRDP: <AcT-type>[,<Requested_eDRX_value>[,<NW-provided_eDRX_value>[,<Paging_time_window>]]]
+CEDRXRDP=?	

### Description

The execution command returns <AcT-type> and <Requested\_eDRX\_value>, <NW-provided\_eDRX\_value> and <Paging\_time\_window> if eDRX is used for the cell that the MS is currently registered to.

### Editor's Note: It is FFS if the new access for 5G must be include in the text.

If the cell that the MS is currently registered to is not using eDRX, AcT-type=0 is returned.

### Defined values

<AcT-type>:

integer type, indicates the type of access technology. This AT-command is used to specify the relationship between the type of access technology and the requested eDRX value.

0: Access technology is not using eDRX

1: EC-GSM-IoT (A/Gb mode)

2: GSM (A/Gb mode)

3: UTRAN (Iu mode)

4: E-UTRAN (WB-S1 mode)

5: E-UTRAN (NB-S1 mode)

<Requested\_eDRX\_value>:

string type; half a byte in a 4 bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]).

For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008.

<NW-provided\_eDRX\_value>:

string type; half a byte in a 4 bit format. The eDRX value refers to bit 4 to 1 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]).

For the coding and the value range, see Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008.

<Paging\_time\_window>:

string type; half a byte in a 4 bit format. The paging time window refers to bit 8 to 5 of octet 3 of the Extended DRX parameters information element (see subclause 10.5.5.32 of 3GPP TS 24.008 [8]).

For the coding and the value range, see the Extended DRX parameters information element in 3GPP TS 24.008 [8] Table 10.5.5.32/3GPP TS 24.008.



**Implementation**

Optional.