xN930 AT Command Reference Guide

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Making machines talk.

APPLICABILITY TABLE

PRODUCT
LN930
LN930-AP
HN930

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Contents

1 Introduction

The scope of this document is to specify the AT commands supported by C-AT in XMMTM7160. It also specifies the parameters and possible responses of each of these commands in detail.

2 Network Service Commands

2.1 Network Registration +CREG

This command controls the presentation of an unsolicited result code +CREG and provides the information of network registration status.

- Set command is used to control the unsolicited result code +CREG. The syntax of unsolicited result +CREG as mentioned below: 1) +CREG :<stat> when <n>=1 and there is a change in the ME network registration status code. 2) +CREG: <stat> [, <lac>,<ci>[,<AcT>]] when <n>=2 and there is a change of the network cell.
- 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 <lac>, <ci> and <AcT>are returned only when <n>=2 and MT is registered in the network.
- Test command returns the range of supported modes (i.e. <n>s).

2.1.1 Syntax of the Command

Command syntax: AT+CREG=[<n>]

Command	Possible Response(s)
AT+CREG=[<n>]	OK or CME ERROR: <error>
AT+CREG?	+CREG: <n>,<stat>[,<lac>,<ci>[,<AcT>]] OK
AT+CREG=?	+CREG : (0-2) Note: i.e. list of supported <n>s OK

2.1.2 Defined values

Possible values of <n> can be

0 Disables network registration information (default)

1 Enable network registration information +CREG:<stat>

2 Enable network registration and location information +CREG:<stat>[,<lac>,<ci>]

Possible values of <stat> can be

0 Not registered, ME is not currently searching a new operator to register to (default)

1 Registered, home network

2 Not registered, but ME is currently searching a new operator to register

3 Registration denied

4 Unknown

5 Registered, in roaming

Possible values of <lac> can be

string type; two byte location area code or tracking area code in hexadecimal format
(e.g. "00C3" equals 195 in decimal)

Possible values of <ci> can be

string type; string type; four byte GERAN/UTRAN/E-UTRAN cell ID in hexadecimal format.

Possible values of <AcT> can be

0 GSM

2 UTRAN

3 GSM w/EGPRS

4 UTRAN w/HSDPA

5 UTRAN w/HSUPA

6 UTRAN w/HSDPA and HSUPA

7 E-UTRAN

2.2 Operator Selection +COPS

This command forces an attempt to select and register the GSM/UMTS network.

- Set command sets automatic network selection or selects network and a certain access technology AcT.
- Read command returns current network.
- Test command returns available networks and lists of supported <mode>s and <format>s. This command is abortable. The port shall be freed for issuing another command. No network abort shall be triggered.

2.2.1 Syntax of the Command

Command syntax: AT+COPS= [<mode> [, <format> [, <oper>> [, <AcT>]]]]

Command	Possible Response(s)
AT+COPS=[<mode>[,<format> [,<oper>[,< AcT>]]]]	OK or +CME ERROR: <err>
AT+COPS?	+COPS: <mode>[,<format>,<oper>[,< AcT>]] OK Or +CME ERROR: <err>
AT+COPS=?	+COPS: [list of supported (<stat>,long alphanumeric <oper> ,short alphanumeric <oper>,numeric <oper>[,< AcT>,<plmn_list>)s] [,,(list of supported <mode>s),(list of supported <format>s)] OK or +CME ERROR: <err>

2.2.2 Defined values

<mode>

is used to select, whether the selection is done automatically by the ME or is forced by this command to operator <oper> given in the format <format>. The values of <mode> can be:

0 Automatic, in this case other fields are ignored and registration is done automatically by ME

1 Manual. Other parameters like format and operator need to be passed

2 Deregister from network (default)

3 It sets <format> value. In this case <format> becomes a mandatory input

4 Manual / Automatic. In this case if manual selection fails then automatic mode is entered

Possible values of <format>

describes the format in which operator name is to be displayed. Different values of <format> can be:

0 <oper> format presentations are set to long alphanumeric. If Network name not available it displays combination of Mcc and MNC in string format.

1 <oper> format presentation is set to short alphanumeric.

2 <oper> format presentations set to numeric.

Possible values of <oper>

string type given in format <format>; this field may be up to 16 character long for long alphanumeric format, up to 8 characters for short alphanumeric format and 5 Characters long for numeric format (MCC/MNC codes)

Possible values of <stat>

describes the status of the network. It is one of the response parameter for test command.

0 Unknown Networks

1 Network Available

2 Current

3 Forbidden Network

Possible values of <AcT>

Indicates the radio access technology and values can be:

0 GSM

2 UMTS

7 LTE

<plmn_list>

Indicates whether the PLMN is present on the EHPLMN list, the User Controlled PLMN List or the Operator Controlled PLMN List.

0 PLMN is present on the EHPLMN list

1 PLMN is present on the User Controlled PLMN List

2 PLMN is present on the Operator Controlled PLMN List

<plmn_list>

Is supporting only from R7 Protocol Stack onwards. Note: The oprator name (short name and long name) and MNC/MCC mapping is maintained in a static table in C-AT (in msw_cat_src/cat/src/command_handlers/uta_cat_netcmds.c). However as the operator names keeps changing and may not be updated in this table. Hence it is customer responsibility to update this table.

2.3 Selection of Preferred PLMN List +CPLS

This command is used to select one PLMN selector with Access Technology list in the SIM
card or active application in the UICC (GSM or USIM), that is used by +CPOL command.

- Set command selects a list in the SIM/USIM.
- Read command returns the selected PLMN selector list from the SIM/USIM.
- Test command returns the whole index range supported lists by the SIM./USIM.

2.3.1 Syntax of the Command

Command syntax: AT+CPLS= [<cpls_list>]

Command	Possible Response(s)
AT+CPLS= [<cpls_list>]	OK or CME ERROR: <error>
AT+CPLS?	+CPLS: <cpls_list> OK
AT+CPLS=?	+CPLS: (0-2) OK

2.3.2 Defined values

<cpls_list>

0 User controlled PLMN selector with Access Technology EFPLMNwAcT, if not found in the

SIM/UICC) (default)

then PLMN preferred list EFPLMNsel (this file is only available in SIM card or GSM

application selected in UICC)

1 Operator controlled PLMN selector with Access Technology EFOPLMNwAcT

2 HPLMN selector with Access Technology EFHPLMNwAcT

2.4 Preferred PLMN List +CPOL

This command is used to edit the PLMN selector with Access Technology lists in the SIM card or active application in the UICC(GSM or USIM).

- Set command writes an entry in the SIM/USIM list of preferred PLMNs, previously selected by the command +CPLS. If no list has been previously selected, the User controlled PLMN selector with Access Technology, EFPLMNwAcT, is the one accessed by default. If <index> is given but <oper> is left out, entry is deleted. If <oper> is given but <index> is left out, <oper> is put in the next free location. If only <format> is given, the format of the <oper> in the read command is changed. The Access Technology selection parameters, <GSM_AcT>, <GSM_Compact_AcT>, <UTRA N_AcT>, <EUTRAN_AcT> are required when writing User controlled PLMN selector with Access Technology, EF EFPLMNwAcT, Operator controlled PLMN selector with Access Technology EFOPLMNwAcT and HPLMN selector with Access Technology EFHPLMNwAcT. Refer Appendix A for <err> values. Note:

  1. MT may also update the User controlled PLMN selector with Access Technology, EFPLMNwAcT, automatically when new networks are selected.
  2. The Operator controlled PLMN selector with Access Technology EFOPLMNwAcT, can only be written if the write access condition in the SIM/USIM has been previously verified.

- Read command returns all used entries from the SIM/USIM list of preferred PLMNs, previously selected by the command +CPLS, with the Access Technologies for each PLMN in the list.
- Test command returns the whole index range supported by the SIM and the list of supported formats.

2.4.1 Syntax of the Command

Command syntax:
AT+CPOL=<index>][,<format>[,<oper>[,<GSM_AcT>,<GSM_Compact_AcT>,<UTRAN_AcT>,<EUTRAN_AcT>]]]

Command	Possible Response(s)

AT+CPOL= [<index>][,<format>[,<oper>[,<GSM_AcT>,<GSM_Compact_AcT>,<UTRAN_AcT>, <EUTRAN_AcT>]]]	OK or CME ERROR: <error>

Command	Possible Response(s)
AT+CPOL?	+CPOL: <index1>,<format>,<oper1> [,<GSM_AcT1>,<GSM_Compact_AcT1>,<UTRAN_AcT1>] [<CR><LF>+CPOL: <index2>,<format>,<oper2> [,<GSM_AcT2>,<GSM_Compact_AcT2>,<UTRAN_AcT2>] [...]] OK or +CME ERROR: <err>
AT+CPOL=?	+CPOL: (list of supported <index>s),(list of supported <format>s) OK or +CME ERROR: <err>

2.4.2 Defined values

<index> integer type

the order number of operator in the SIM/USIM preferred operator list

<format>

indicates if the format is alphanumeric or numeric (see +COPS)

0 long format alphanumeric <oper> (default)

1 short format alphanumeric <oper>

2 numeric <oper>

<oper>

string type

<GSM_AcT>:

GSM access technology

0 access technology not selected

1 access technology selected

<GSM_Compact_AcT>:

GSM compact access technology

0 access technology not selected

1 access technology selected

<UTRAN_AcT>:

UTRAN access technology

0 access technology not selected

1 access technology selected

<EUTRAN_AcT>:

EUTRAN access technology

0 access technology not selected

1 access technology selected

Note: Read can have 'n' rat values.

Note: If matching PLMN name is not found then numeric PLMN id (MCCMNC) will be displayed.

2.5 Select RAT and BAND +XACT

This command allows to switch between all the allowed RATs and BANDs for air interface access.

- Set command is used to set up RAT and BAND
- Read command returns the present RAT and BAND used.
- Test command fgreturns list of supported RAT and BAND used.

2.5.1 Syntax of the Command

Command syntax: AT+XACT=[<rat>[,[<PreferredAct1>],[<PreferredAct2>][,<band_
1>[,<band_2>[,.....[,<band_n>]]]]]

Command	Possible response(s)
AT+XACT=[<rat>[,[<PreferredAct1>],[<Preferred Act2>] [,<band_1>[,<band_2>[,.....[,<band_n>]]]]]	OK or CME ERROR: <error>
AT+XACT?	+XACT : =[<rat>[,[<PreferredAct1>],[<Preferred Act2>] [,<band_1>[,<band_2>[,.....[,<band_n>]]]]]	
AT+XACT=?	+ XACT: list of supported <Rat>s, list of supported <gsm_band>s, list of supported <umts_band>s, list of supported <lte_band>s OK

2.5.2 Defined values

<Rat>

0: GSM (default)

1: UMTS

2: LTE

3: (GSM ,UMTS) (DUAL),GSM and UMTS are supported and preference is given to
PreferredAct1

4: (UMTS, LTE) (DUAL),UMTS and LTE are supported and preference is given to

PreferredAct1

5: (LTE , GSM) (DUAL),LTE and GSM are supported and preference is given to Preferred
Act1

6 (GSM,UMTS,LTE) (TRIPLE),GSM , UMTS and LTE will be selected and first preference and second preference is given to PreferredAct1 and PreferredAct2 respectively

< PreferredAct1 >,< PreferredAct2>
Only valid for DUAL or TRIPLE Mode

0: GSM

1: UMTS

2: LTE

<Band_1>,<Band_2>....<Band_n>

<gsm_band>:

900: selection of 900 MHz band

1800: selection of 1800 MHz band

1900: selection of 1900 MHz band

850: selection of 850 MHz band

450: selection of 450 MHz band

480: selection of 480 MHz band

750: selection of 750 MHz band

380: selection of 380 MHz band

410: selection of 410 MHz band

710: selection of 710 MHz band

810: selection of 810 MHz band

<umts_band>:

1: BAND_UMTS_I

2: BAND_UMTS_II

3: BAND_UMTS_III

4: BAND_UMTS_IV

5: BAND_UMTS_V

6: BAND_UMTS_VI

7: BAND_UMTS_VII

8: BAND_UMTS_VIII

9: BAND_UMTS_IX

10: BAND_UMTS_X

11: BAND_UMTS_XI

12: BAND_UMTS_XII

13: BAND_UMTS_XIII

14: BAND_UMTS_XIV

15: BAND_UMTS_XV

16: BAND_UMTS_XVI

17: BAND_UMTS_XVII

18: BAND_UMTS_XVIII

19: BAND_UMTS_XIX

20: BAND_UMTS_XX

21: BAND_UMTS_XXI

22: BAND_UMTS_XXII

<lte_band>:

101: BAND_LTE_1

102: BAND_LTE_2

103: BAND_LTE_3

104: BAND_LTE_4

105: BAND_LTE_5

106: BAND_LTE_6

107: BAND_LTE_7

108: BAND_LTE_8

109: BAND_LTE_9

110: BAND_LTE_10

111: BAND_LTE_11

112: BAND_LTE_12

113: BAND_LTE_13

114: BAND_LTE_14

115: BAND_LTE_15

116: BAND_LTE_16

117: BAND_LTE_17

118: BAND_LTE_18

119: BAND_LTE_19

120: BAND_LTE_20

121: BAND_LTE_21

122: BAND_LTE_22

123: BAND_LTE_23

124: BAND_LTE_24

125: BAND_LTE_25

126: BAND_LTE_26

127: BAND_LTE_27

128: BAND_LTE_28

129: BAND_LTE_29

130: BAND_LTE_30

131: BAND_LTE_31

132: BAND_LTE_32

133: BAND_LTE_33

134: BAND_LTE_34

135: BAND_LTE_35

136: BAND_LTE_36

137: BAND_LTE_37

138: BAND_LTE_38

139: BAND_LTE_39

140: BAND_LTE_40

141: BAND_LTE_41

142: BAND_LTE_42

143: BAND_LTE_43

144: BAND_LTE_44

145: BAND_LTE_45

146: BAND_LTE_46

147: BAND_LTE_47

148: BAND_LTE_48

149: BAND_LTE_49

150: BAND_LTE_50

151: BAND_LTE_51

152: BAND_LTE_52

153: BAND_LTE_53

154: BAND_LTE_54

155: BAND_LTE_55

156: BAND_LTE_56

157: BAND_LTE_57

158: BAND_LTE_58

159: BAND_LTE_59

160: BAND_LTE_60

161: BAND_LTE_61

162: BAND_LTE_62

163: BAND_LTE_63

164: BAND_LTE_64

Note 1: This command gives a flexibility to configure Either RAT/Preferred RAT/BAND. So user can configure only RAT or Band also.

Note 2: If only Band has to be configured then first 3 parameter has to be blank. So the command looks like:

AT+XACT=,,,160, 155 (ex: to configure LTE band 60 and LTE band 55).

Note 3: If the RAT information is not provided then the second and third parameter will be ignored as it belongs to Preferred RAT. In case of Dual mode only one parameter (2nd param) is valid and third parameter will be ignored.

Ex: AT+XACT= 3, 0, 1 => here 1 will be ignored.

Note 4: For triple mode preferred act1 and preferred act2 will be taken as mentioned in the table below. All other combinations except these will be rejected.

Note 5: LTE parameters should be used only for the LTE platforms. In other cases the behavior is not defined.
Note 6: Band changes for one particular RAT will not affect the other RAT configuration. Ex: Setting LTE bands will not change anything on GSM/UMTS bands.

RAT Combination Table For Triple Mode:

Preferred Act1	Preferred Act2	RAT Combination List		
Not stated	Not stated	RAT_LTE	RAT_UMTS	RAT_GSM
0	Not stated	RAT_GSM	RAT_LTE	RAT_UMTS
1	Not stated	RAT_UMTS	RAT_LTE	RAT_GSM
2	Not stated	RAT_LTE	RAT_UMTS	RAT_GSM
0	1	RAT_GSM	RAT_UMTS	RAT_LTE
0	2	RAT_GSM	RAT_LTE	RAT_UMTS
1	0	RAT_UMTS	RAT_GSM	RAT_LTE
1	2	RAT_UMTS	RAT_LTE	RAT_GSM
2	0	RAT_LTE	RAT_GSM	RAT_UMTS
2	1	RAT_LTE	RAT_UMTS	RAT_GSM

2.6 Select Band +XBANDSEL

This command allows to switch from automatic band selection to selection of one or more (up to four) GSM bands.

- Set command is used to set up to four bands for further used to register network.
- Read command returns the previously set of <band> values. If the xbandsel is not set, read command will not display any value.
- Test command returns the range of supported <band> values.

2.6.1 Syntax of the Command

Command syntax:
AT+XBANDSEL=[<band_1>[,<band_2>[,<band_3>[,<band_4>]]]]

Command	Possible Response(s)
AT+XBANDSEL=[<band_1>[,<band_2>[,<band_3>[,<band_4>]]]]	OK or CME ERROR: <error>
AT+XBANDSEL?	+XBANDSEL :[<band_1>[,<band_2>[,<band_3>[,<band_4>]]]] OK
AT+XBANDSEL=?	+XBANDSEL: list of supported <band>s OK

2.6.2 Defined values

<band_1> or <band_2> or <band_3> or <band_4> may be:

0: automatic band selection (entering every time possible, display improbable), If 0 is given at any place, other bands will be neglected. (default)

1800: selection of 1800 MHz band

1900: selection of 1900 MHz band

850: selection of 850 MHz band

450: selection of 450 MHz band

480: selection of 480 MHz band

750: selection of 750 MHz band

380: selection of 380 MHz band

410: selection of 410 MHz band

2.7 Facility Lock +CLCK

This command is used to lock, unlock or interrogate a MT or a network facility <fac>. Password is normally needed to do such actions.

When querying the status of a network service (<mode>=2) the response line for 'not active' case (<status>=0) should be returned only if service is not active for any <class>.

- Set command is used to lock, unlock or interrogate a MT or a network facility <fac>.
- Test command returns the facility values supported as a compound value.

2.7.1 Syntax of the Command

Command syntax: AT+CLCK = <fac>, <mode> [, <passwd> [, <class>]]

Command	Possible Response(s)
AT+CLCK=<fac>,<mode>[,<passwd>[,<class>]]	when <mode>=2 and command successful: OK +CLCK: <status>[,<class1> [<CR><LF> +CLCK: <status>,<class2> [...]] Or +CME ERROR: <err>
AT+CLCK=?	+CLCK: (list of supported <fac>s) OK +CME ERROR: <err>

2.7.2 Defined values

<fac>

values reserved by the present document:

"PS" PH SIM (lock PHone to SIM/UICC card) (MT asks password when other than current
SIM/UICC card inserted;

MT may remember certain amount of previously used cards thus not requiring password when they are inserted)

"SC" SIM (lock SIM/UICC card) (SIM/UICC asks password in MT power up and when this lock command issued)

"AO" BAOC (Barr All Outgoing Calls) (refer 3GPP TS 22.088 [6] clause 1)

"OI" BOIC (Barr Outgoing International Calls) (refer 3GPP TS 22.088 [6] clause 1)

"OX" BOIC exHC (Barr Outgoing International Calls except to Home Country) (refer 3GPP TS 22.088 [6] clause 1)

"AI" BAIC (Barr All Incoming Calls) (refer 3GPP TS 22.088 [6] clause 2)

"IR" BIC Roam (Barr Incoming Calls when Roaming outside the home country) (refer
3GPP TS 22.088 [6] clause 2)
"AB" All Barring services (refer 3GPP TS 22.030 [19]) (applicable only for <mode>=0) "AG" All outGoing barring services (refer 3GPP TS 22.030 [19]) (applicable only for
<mode>=0)

"AC" All inComing barring services (refer 3GPP TS 22.030 [19]) (applicable only for
<mode>=0)

"FD" SIM card or active application in the UICC (GSM or USIM) fixed dialling memory feature (if PIN2 authentication has not been done during the current session, PIN2 is required as <passwd>)

"PN" Network Personalization (refer 3GPP TS 22.022 [33])

"PU" network subset Personalization (refer 3GPP TS 22.022 [33]) "PP" service Provider Personalization (refer 3GPP TS 22.022 [33]) "PC" Corporate Personalization (refer 3GPP TS 22.022 [33])

<mode>

0 unlock

1 lock

2 query status

<status>

0 not active

1 active

<passwd>

string type; shall be the same as password specified for the facility from the MT user interface or with command Change Password +CPWD

<classx>

is a sum of integers each representing a class of information (default 7):
1 voice
(telephony)

2 data (refers to all bearer services; with <mode>=2 this may refer only to some bearer service if TA does not support values 16, 32, 64 and 128)

4 fax (facsimile services)

8 short message service

16 data circuit sync

32 data circuit async

64 dedicated packet access

128 dedicated PAD access

2.8 Disable Circuit Switching Paging +XCSPAGING

This command allows enable/disable the circuit switching paging. The command has an effect only when used before +COPS or +CGATT.

- Set command is used for enabling the circuit switching paging.
- Test command returns the supported values of <mode>.

2.8.1 Syntax of the Command

Command syntax: AT+XCSPAGING=<mode>

Command	Possible Response(s)
AT+XCSPAGING=<mode>	OK or CME ERROR: <error>
AT+XCSPAGING=?	+XCSPAGING: (0-1) OK

2.8.2 Defined values

<mode>

type of preferred mode may be

0 circuit switched paging disabled(packet switched preferred)

1 circuit switched paging enabled.

2.9 Signal Quality +CSQ

This execution command returns signal strength indication <rssi> and channel bit error.

- Test command returns values supported as compound values.

2.9.1 Syntax of the Command

Command syntax : AT+CSQ

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

2.9.2 Defined values

0 -113 dBm or less

1 -111 dBm

2...30 -109...-53 dBm

31 -51 dBm or greater

99 not known or not detectable (default)

<ber> (in percent)

0...7 as RXQUAL values the table in TS 45.008 [20] subclause 8.2.4

99 not known or not

detectable (default) Note:

For UMTS radio signal quality CPICH EC/NO range 49 to 0 is scaled to 0 to 7 as <ber> to maintain compatibility.

2.10 Radio Signal Strength and Quality with URC support +XCSQ

This command is used to enable +XCSQ URC and also to read the Radio signal strength and Quality.

- Set command is used to enable/disable the signal strength and Quality status unsolicited result code
- Read command returns the current setting of the XCSQ command, the current signal strength and signal Quality values.
- Test command returns list of supported values for XCSQ setting.

The URC will be

+XCSQ: <rssi>,<ber>

2.10.1 Syntax of the Command

Command syntax: AT+XCSQ=<n>

Command	Possible response(s)
AT+ XCSQ =<n>	OK or CME ERROR: <error>
AT+ XCSQ?	+ XCSQ: <n>,<rssi>,<ber> OK
AT+ XCSQ =?	+ XCSQ: (list of supported <n>s) OK

2.10.2 Defined values

<n>

0: disable Radio signal strength and Quality indication unsolicited result code (default)

1: enable Radio signal strength and Quality indication unsolicited result code

<rssi>

0 -113 dBm

1 -112 dBm

1 -111 dBm

2 -110 dBm

2 -109 dBm

3 -108 dBm

3 -107 dBm

....

29 -56 dBm 29 -55 dBm 30 -54 dBm 30 -53 dBm 31 -52 dBm 99 not known or not detectable

<ber>

received

signal

quality :

If RAT is

GSM

radio signal strength is the average of the received signal level measurement samples in dBm taken on a channel within the reporting period of length one SACCH multi frame

0....7 as RXQUAL values in the table as in 3GPP 45.008 section 8.2.4

If RAT is UMTS

The current radio signal strength CPICH RSCP in levels

0....49 According to specification 3GPP 25.133 section 9.1.2.3

99 not known or not detectable

If RAT is LTE

The current radio signal quality RSRQ in levels

0....34 According to specification 3GPP 36.133 section 9.1.7

2.11 Subscriber Number +CNUM

This action command returns the MSISDNs related to this subscriber. If the subscriber has different MSISDN for different services, each MSISDN is returned in a separate line.

2.11.1 Syntax of the Command

Command syntax : AT+CNUM

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

2.11.2 Defined values

<alphax>

optional alphanumeric string associated with <numberx>; used character set should be the one selected with command Select TE Character Set +CSCS

<numberx>

string type phone number of format specified by <typex>

<typex>

type of address octet in integer format

<speed>

as defined in subclause 6.7 , corresponding to setting +CBST

<service>

service related to the phone number as follows

0 asynchronous modem

1 synchronous modem

2 PAD Access (asynchronous)

3 Packet Access (synchronous)

4 voice police

5 fax

<itc>

information transferin capability as follows

0 3.1 kHz

1 UDI

2.12 Read Operator Names +COPN

This Execution command returns the list of operator names from the ME.Each operator code <numeric_n> that has an alphanumeric equivalent <alpha_n> in the ME memory shall be returned.

2.12.1 Syntax of the Command

Command syntax :AT+COPN

Command	Possible Response(s)
AT+COPN	+COPN: <numeric 1>,<alpha1> [<CR><LF> +COPN: <numeric2>,<alpha2>[...]] OK or CME ERROR: <error>
AT+COPN=?	OK

2.12.2 Defined values

<numeric n>

string type;

operator in numeric format (see +COPS)

<alpha n>

string type;

operator in long alphanumeric format (see +COPS)

Note : If matching PLMN name is not found then numeric PLMN id (MCCMNC) will be displayed

2.13 Extended Error Report for Location Update Reject During CS Registration +NEER

Execution command causes the TA to return one or more lines of information text
<report>, determined by the MT manufacturer, which should offer the user of the TA an extended Network error cause report of the reason for the failure in the last unsuccessful CS Registration be returned.

2.13.1 Syntax of the Command

Command syntax : AT+NEER

Command	Possible Response(s)
AT+NEER	+NEER: <report>
AT+NEER=?	OK

2.13.2 Defined values

<report>

extended Network error cause report of the reason for the failure in the last unsuccessful CS Registration be returned.

2.14 Display EONS Names +XEONS

This command displays the list of available networks with details like long operator name, short operator name, MCC/MNC, Long EONS name, Short EONS name for each PLMN.

This command is an extension to at+cops=? Command interworking to provide addition- ally EONS names for the found PLMN's.

2.14.1 Syntax of the Command

Command syntax : AT+XEONS: +XEONS: [list of supported (<stat>,long_alphanumeric <oper>,short_alphanumeric <oper>,numeric <oper>, [<AcT>],[<EONS long_operator_ name>],[<EONS short_operator_name>])s]

Command	Possible Response(s)

AT+XEONS	+XEONS: (2,"T-Mobile D","T-Mobile D","26201",2,"hello","hello world"),(3,"Vodafone.de","Vodafone.de","26202", 0,"test network EONS","test EONS"),(3,"E-Plus","E-Plus","26203", 0,"","",),(3,"o2 - de","o2 - de","26207", 0,"","") OK or CME ERROR: <error>
AT+XEONS=?	OK

2.14.2 Defined values

Please refer to +COPS and +XCOPS

Note : If matching PLMN name is not found then numeric PLMN id (MCCMNC) will be displayed

2.15 Display Most Adapted Network Name +XCOPS

This command allows display of the most adapted name of the network.The command parameter <type> allows requesting the name type which shall be displayed. Depending on whether this type is currently available or not the command will return the requested one or the next possible.

- Set command allows display of the most adapted name of the network.
- Test command returns list of supported <type>s

2.15.1 Syntax of the Command

Command syntax: AT+XCOPS=<type> Response syntax: +XCOPS: <type>[,<name>[,<display_condition>]]

Command	Possible Response(s)
AT+XCOPS=<Type>	+XCOPS: <type>[,<name>[,<display_condition>]] OK

AT+XCOPS=?	+XCOPS: (list of supported <type>s) OK

2.15.2 Defined values

<type> may be

0 numeric format of network MCC/MNC (three BCD digit country code and two/three BCD digit network code)

1 Short Name in ROM (NV-RAM)

2 Long Name in ROM (NV-RAM)

3 Short Network Operator Name (CPHS)

4 Long Network Operator Name (CPHS)

5 Short NITZ Name

6 Full NITZ Name

7 Service Provider Name

8 EONS short operator name from EF-PNN

9 EONS long operator name from EF-PNN

11 Short PLMN name (When PS or CS is registered)

12 Long PLMN name (When PS or CS is registered)

13 numeric format of network MCC/MNC even in limited service

Note: EONS means enhanced operator name from SIM-files EF-OPL and EF-PNN.

Note: (8 and 9)If the EF OPL is not present, then the first record in the EF PNN is used for the default network name when registered in the HPLMN (if the EHPLMN list is not present or is empty) or an EHPLMN (if the EHPLMN list is present).

<name> may be

"network name", "additional Unicode network name" for <type> = 1 or 2 "network name" for <type> = 3, 4, 5 or 6
"service provider name" followed by <display_condition> for <type> 7 "MCCMNC" for <type> = 0
The coding of <name> is according to the +CSCS setting.

<display_condition>

display condition as stored on SIM for the service provider name in respect to the registered PLMN (see GSM11.11 cp.10.3.11 for more details) Priority of network name types

If the requested network name <type> is not available the next possible type is returned. The following priority has been defined:

Requested <type> = 6: returned <type> = 6 or 4 or 2 or 0 (descending priority)
Requested <type> = 5: returned <type> = 5 or 3 or 1 or 0 (descending priority)
Requested <type> = 7: returned <type> = 7 (no fallback)
Requested <type> = 8: returned <type> = 8 or 5 or 3 or 1 or 0 (descending priority) Requested <type> = 9: returned <type> = 9 or 6 or 4 or 2 or 0 (descending priority)
Note : If matching PLMN name is not found then numeric PLMN id (MCCMNC) will be displayed

2.16 Home Zone Reporting +XHOMEZR

This Set command enables and disables the home zone change event reporting. If the reporting is enabled; the MT returns the unsolicited result code +XHOMEZR: <label> whenever the home zone is changed.

- Set command enables and disables the home zone change event reporting.
- Read command gives the status of event reporting
- Test command returns list of supported <ON/OFF>s

2.16.1 Syntax of the Command

Command syntax: AT+XHOMEZR=<ONOFF>

Command	Possible Response(s)
AT+XHOMEZR=1	OK or CME ERROR: <error>
AT+XHOMEZR?	+XHOMEZR: <onoff> OK
AT+XHOMEZR=?	+XHOMEZR: (0-1) i.e. list of supported <onoff>s OK

2.16.2 Defined values

<onoff>

integer type value indicating 0 disable home zone change event reporting (default)

1 enable home zone change event reporting

<label>

string type which indicates the zone label

for eg: "HOME" (also possible as "home", dependent from network indication)
"CITY"

2.17 Mobile Station Event Reporting for Battery and Sig- nal Strength +XMER

This command enables or disables sending of unsolicited result codes from the MS to the DTE when the battery charge level or the radio signal level crosses a defined threshold.

- Set command enables and disables sending of unsolicited result code:XCIEV from the MS to the DTE when the battery charge level or the radio signal level crosses a defined threshold.
- Read command gives the status of urc enabled or disabled.
- Test command returns list of supported <enables>.

2.17.1 Syntax of the Command

Command syntax: AT+XMER=<enable>
Response: +XCIEV: <rssi>,
or
+XCIEV:,<battery_level> in dependency on which threshold has crossed.

Command	Possible Response(s)
AT+XMER=1	OK or ERROR: <error>
AT+XMER?	+XMER: <enable> OK

AT+XMER=?	+XMER: list of supported <enables>s OK

2.17.2 Defined values

<enable> may be

0 disable the event report of the parameters (default) 1 enable the event report of the parameters

<rssi>

radio signal strength can have the values

0 -107 dBm or less or unknown 1 -99 dBm or less

2 -91 dBm or less

3 -83 dBm or less

4 -75 dBm or less

5 -67 dBm or less

6 -59 dBm or less

7 -51 dBm or less

<battery_level>

can have the values

0 0 / <= level < 5 /

1 5 / <= level < 15 /

2 15 / <= level < 25 /

3 25 / <= level < 40 /

4 40 / <= level < 55 /

5 55 / <= level < 70 /

6 70 / <= level < 85 /

7 85 / <= level <= 100 /

2.18 Current Network Registration Status +XREG

This command reports where the device is attached to.

- Set command enables/disables network registration status unsolicited result code +XR EG. URC XREG is same as read syntax.
- Read command gives the status of registration.
- Test command returns list of supported <n>.

URC syntax +XREG:
<State/act>,<Band>[,<HSPA+type>]

2.18.1 Syntax of the Command

Command syntax: AT+XREG=<n>

Command	Possible response(s)
AT+XREG=<n>	OK or CME ERROR: <error>
AT+XREG?	+XREG: <n>, <State/act>,<Band>[,<HSPA+type>] OK
AT+XREG=?	+XREG: (list of supported <n>s) OK

2.18.2 Defined values

<n>

0 disable network registration attach status unsolicited result code (default)

1 enable network registration attach status unsolicited result code +XREG

<State1act>

0 not registered

1 registered, GPRS attached

2 registered, EDGE attached

3 registered, WCDMA attached

4 registered, HSDPA attached // with DFS22.21.00, DFSD23.09.01

5 registered, HSUPA attached // with DFS22.21.00, DFSD23.09.01

6 registered, HSUPA and HSDPA attached

7 registered, GSM

20 "FAST" OOS indication for STACK whose sim_id will be based on terminal.

21 For STACK back to In service. sim_id will be based on terminal.

- Note:

  1. <state> 20, 21 is available only in DSDS configuration. <state> 20 followed with
     <state> 0, then <state> 0 refer to "SLOW" OOS.
  2. <State> 20, 21 will be reported for both CS and PS registered network.
  3. Both <state> 20 and 21 will never be returned on response to XREG?.
  4. When in <state> 20. XCOPS returns network names as before.
  5. Any change in <State/act>/<Band> will be reported when stack is back to In_ Service.

<Band>

900 MHz band

1800 MHz band

1900 MHz band

850 MHz band

450 MHz band

480 MHz band

750 MHz band

380 MHz band

410 MHz band

710 MHz band

810 MHz band

BAND_UMTS_I

BAND_UMTS_II

BAND_UMTS_III

BAND_UMTS_IV

BAND_UMTS_V

BAND_UMTS_VI

BAND_UMTS_VII

BAND_UMTS_VIII

BAND_UMTS_IX

BAND_UMTS_X

BAND_UMTS_XI

BAND_UMTS_XII

BAND_UMTS_XIII

BAND_UMTS_XIV

BAND_UMTS_XV

BAND_UMTS_XVI

BAND_UMTS_XVII

BAND_UMTS_XVIII

BAND_UMTS_XIX

BAND_UMTS_XX

BAND_UMTS_XXI

BAND_UMTS_XXII

BAND_LTE_1

BAND_LTE_2

BAND_LTE_3

BAND_LTE_4

BAND_LTE_5

BAND_LTE_6

BAND_LTE_7

BAND_LTE_8

BAND_LTE_9

BAND_LTE_10

BAND_LTE_11

BAND_LTE_12

BAND_LTE_13

BAND_LTE_14

BAND_LTE_15

BAND_LTE_16

BAND_LTE_17

BAND_LTE_18

BAND_LTE_19

BAND_LTE_20

BAND_LTE_21

BAND_LTE_22

BAND_LTE_23

BAND_LTE_24

BAND_LTE_25

BAND_LTE_33

BAND_LTE_34

BAND_LTE_35

BAND_LTE_36

BAND_LTE_37

BAND_LTE_38

BAND_LTE_39

BAND_LTE_40

BAND_LTE_41

BAND_LTE_42

BAND_LTE_43

Note : If band information is not available, then BAND_INVALID will be displayed. BAND_INVALID means the band is not known or the band is invalid.

Note : The gap between LTE bands 25 and 33 is intentional, as the bands from 26-32 do not exist yet.

Note : LTE is supported only in R8.

<HSPA+ type>

Is a numeric and optional parameter providing the HSPA+ connection type. This will be a bitmap with the below mentioned mapping for the

various HSPA+ connection possibilities. Also this can be a single bit (or) a combination of bits.

Bit 0 Indicates High Speed Packet Access Plus Connection type is 64Quadrature amplitude modulation in Down Link

Bit 1 Indicates High Speed Packet Access Plus Connection type is 16Quadrature amplitude modulation in Up Link

Bit 2 Indicates High Speed Packet Access Plus Connection type is Continuous Packet Connectivity for Uplink Discontinuous Transmission and Downlink Discontinuous Recep- tion

Bit 3 Indicates High Speed Packet Access Plus Connection type is DC HSDPA

2.19 PLMN Search and Cell Selection Improvements +X AACOPS

This command is added with the PLMN Search and Cell Selection (PSSI) improvements, as part of the AP Assisted Cell Search (APACS) feature. It is used to create a table of cells and frequencies for faster connectivity. The search list will have a maximum of 12 entries.

The frequencies associated with each PLMN are limited to:

- 6 UARFCN (3G) per cell
- 32 ARFCN (2G) per cell
- 6 EARFCN (4G) per cell

Each entry in the list will contain the following cell information:

- PLMN, specified by:

  mcc (Mobile Country Code), 1 word
  mnc (Mobile Network Code), 1 word

- 1-6 3G frequencies, specificed by UARFCN, 1 word each
- 2G frequency type (GSM 1800, GSM 1900), 1 byte

- 1-32 2G frequencies, specified by ARFCN, 1 word each

- 1-6 4G frequencies, specificed by EARFCN, 1 word each

  The maximum length of the search list will then be: 12 cells * (1 PLMN + 6 UARFCN + 1 ftype + 32 ARFCN + 6 EARFCN) = 1116 bytes

  The command will be multi-part, that is, the group of cells and supported frequencies for the search list will be sent in a packet of commands. The entire packet must be received (as given by a <total> number of commands) before it will be used. Each entry in the table will require 1-2 commands in the packet, depending on the number of frequencies required.

  Each command will contain the following cell information:

- PLMN, specified by:

  mcc (Mobile Country Code)
  mnc (Mobile Network Code)

- 1-3 3G frequencies (UARFCN)

- the 2G frequency type (see <ftype> below)

- 1-16 2G frequencies (ARFCN), all of ftype given

- 1-3 4G frequencies (EARFCN)

- Two commands will be needed if the entry has greater than three 3G frequencies, or greater than sixteen 2G frequencies. In this case, the PLMN must be the same for both commands, and if used, the <ftype> must match also. When the second command is received with the same PLMN, the additional frequencies will be appended to the matching PLMN entry. Thus, a maximum of 24 commands may be required to transfer the entire search list, if all entries are specified, and two commands are needed to complete each entry. In this case, <total> will be 24. If another packet of cells and frequencies is sent to form a new search list, this new list will completely overwrite the previous one.

- Set command creates a table of cells and frequencies for PLMN Search and Cell Selection Improvements.
- Test command returns list of supported <cmds>,<plms>,[<3G frequencies> <2G ftype> <2G frequencies> <4G frequencies>].

2.19.1 Syntax of the Command

Command syntax: AT+XAACOPS=<cmd_no>,<total>,<mcc>,<mnc>[,<fr3G 1>[,<fr3 G 2>[,<fr3G 3>]]][,<ftype>,<fr2G 1>[,<fr2G 2> ... [,<fr2G 16>]][,<fr4G 1>[,<fr4G 2>[,<fr4G 3>]]]]

Command	Possible response(s)
AT+XAACOPS=<cmd_no>,<total>,<mcc>,<mnc>[,<fr3G 1>[,<fr3G 2>[,<fr3G 3>]]][,<ftype>,<fr2G 1>[,<fr2G 2> ... [,<fr2G 16>]][,<fr4G 1>[,<fr4G 2>[,<fr4G 3>]]]] at least 1 frequency of either type must be specified in a command1-3 3G frequencies may be specified 1-16 2G frequencies may be specified,of the same <ftype> If any 2G frequencies are specified the comma separators for unused 3G frequencies must be included	OK or CME ERROR: <error>
AT+XAACOPS=?	+XAACOPS: (1-24),(1-24),(0-999),(0-999)[,(0-65535)[,(0-65535)[,(0-65535)]]][,(1-3),(0-65535)...[,(0-65535)]][,(0-65535)[,(0-65535)[,(0-65535)]]] OK

2.19.2 Defined values

<cmd_no>:

The index of this command within the packet

1-24 the <cmd_no> must be less than or equal to the <total>

<total>:

The total number of commands that will be sent in this packet 1-24

<mcc>:

Mobile Country Code

0-999, decimal

<mnc>:

Mobile Network Code

0-999, decimal

<fr3G m>:

3G Frequency m, m=1-3

0-65535: UARFCN

The 3G frequency is always specificed by UARFCN (UTRA Absolute Radio Frequency
Channel Number)

<ftype>:

Enumeration for the type of 2G frequencies in the entry (command)

1: GSM1800, all <fr2G n> are ARFCN

2: GSM1900, all <fr2G n> are ARFCN

<fr2G n>:

2G Frequency n, n=1-16

0-65535: ARFCN The 2G frequency is always specificed by ARFCN (Absolute Radio
Frequency Channel Number)

All 2G frequencies in the command must be of the same <ftype>

Note: If any 2G frequencies are specified in a command, and there are unused 3G
frequencies, the comma separated

<fr4G m>:

4G Frequency x, x=1-3

0-65535: EARFCN

The 4G frequency is always specificed by EARFCN (E-UTRA Absolute Radio Frequency Channel Number)

2.20 Select 3G Band +XUBANDSEL

This command allows switching from automatic band selection to selection of one or more UMTS bands

It is project configuration dependent which UMTS bands are indeed supported in a certain configuration.

- Set command enables allows switching from automatic band selection to selection of one or more (up to 21) UMTS bands.
- Read command display the selected bands.
- Test command returns list of supported <bands>.

2.20.1 Syntax of the Command

Command syntax: AT+XUBANDSEL=
[<band_1>[,<band_2>[,<band_3>[,<band_4>[,<band_5>[,<band_6>[,<band_7>[,<band_8>[,<band_9>[,<band_10>[,<band_11>[,<band_12>[,<band_13>[,<band_14>[,<band_15>[,<band_16>[,<band_17>[,<band_18>[,<band_19>[,<band_20>[,<band_21>]]]]]]]]]]]]]]]]]]]]]]]]]

Command	Possible response(s)
AT+XUBANDSEL=[<band_1>[,<band_2>[,<band_3>[,<band_4>[,<band_5>[,<band_6>[,<band_7>[,<band_8>[,<band_9>[,<band_10>[,<band_11>[,<band_12>[,<band_13>[,<band_14>[,<band_15>[,<band_16>[,<band_17>[,<band_18>[,<band_19>[,<band_20>[,<band_21>]]]]]]]]]]]]]]]]]]]]]]	OK or CME ERROR: <error>
AT+XUBANDSEL?	+XUBANDSEL: <band_1>[,<band_2>[,<band_3>[,<band_4>[,<band_5>[,<band_6>[,<band_7>[,<band_8>[,<band_9>[,<band_10>[,<band_11>[,<band_12>[,<band_13>[,<band_14>[,<band_15>[,<band_16>[,<band_17>[,<band_18>[,<band_19>[,<band_20>[,<band_21>]]]]]]]]]]]]]]]]]]]]]] OK

AT+XUBANDSEL=?	+XUBANDSEL: (0,"UMTS_BAND_I","UMTS_BAND_II","UMTS_BAND_III","UMTS_BAND_IV","UMTS_BAND_VI","UMTS_BAND_VII","UMTS_BAND_VIII","UMTS_BAND_IX", "UMTS_BAND_X", "UMTS_BAND_XI", "UMTS_BAND_XII", "UMTS_BAND_XIII", "UMTS_BAND_XIV", "UMTS_BAND_XV", "UMTS_BAND_XVI", "UMTS_BAND_XVII", "UMTS_BAND_XVIII", "UMTS_BAND_XIX", "UMTS_BAND_XX", "UMTS_BAND_XXI", "UMTS_BAND_XXII")i.e. (list of supported bands) OK

2.20.2 Defined values

<band_n> where n = 1 to 21, may be

0: automatic band selection (entering every time possible, display improbable), If 0 is given at any place, other bands will be neglected. (default)

UMTS_BAND_I
UMTS_BAND_II
UMTS_BAND_III
UMTS_BAND_IV
UMTS_BAND_V
UMTS_BAND_VI
UMTS_BAND_VII
UMTS_BAND_VIII
UMTS_BAND_IX
UMTS_BAND_X
UMTS_BAND_XI
UMTS_BAND_XII
UMTS_BAND_XIII
UMTS_BAND_XIV
UMTS_BAND_XV
UMTS_BAND_XVI
UMTS_BAND_XVII
UMTS_BAND_XVIII
UMTS_BAND_XIX
UMTS_BAND_XX
UMTS_BAND_XXI
UMTS_BAND_XXII

2.21 Request for Timing Advance +XLRTA

This command used to send a request for timing advance and cell measurements.

- Set command return the measurement result and timing advance.

+XLRTA:<measure_result>,<timing advance>

2.21.1 Syntax of the Command

Command syntax : AT+XLRTA

Command	Possible Response(s)
AT+XLRTA	+XLRTA: <measure_result>,<timing advance> OK or CME ERROR: <error>
AT+XLRTA=?	OK

2.21.2 Defined values

<measure_result>:

Displayed in hexadecimal format; Neighboring cell Measurement results.As per GSM 04.08 10.5.2.20. Invalid when all FFs.

<timing_advance>:

Displayed in range of 0...63, 0xFF invalid, see GSM 05.10, 5.8

2.22 System Error Reporting +XSYSERR

This command is used to enable/disable the display of +XSYSERR unsolicited response.

- Set command enable or disable the display of +XSYSERR unsolicited response
- Read command reads the value of the XSYSERR setting (enabled or disabled)
- Test command returns the list of supported <n> values.

2.22.1 Command syntax:

AT+XSYSERR=<n>
unsolicited response synatx:
+XSYSERR: <err_type>

Command	Possible Response(s)
AT+XSYSERR=<n>	OK or CME ERROR: <error>
AT+XSYSERR?	+XSYSERR: <n> OK
AT+XSYSERR=?	+XSYSERR: (0,1) OK

2.22.2 Defined values

<n>

0 disable the display of +XSYSERR unsolicited response. (default)

1 enable the display of +XSYSERR unsolicited response.

<err_type>

0 URRCM_RESEL

1 SEARCH_CNF

2 NO_OOS_DETECTED

3 URRCDC_RESEL

4 URRCDC_OOS

5 URRCDC_CONFIG

6 BCCH_READING

7 CPHY_FW_ERROR

8 CPHY_FW_CORE_DUMP_START

255 NO_ERROR (This is to indicate that the modem has recovered from error or modem is working fine).

2.23 Manual CSG selection +XCSG

This command is used to perform manual selection of a CSG cell and also to query for the currently selected CSG cell information.

- Set command registers to the specific CSG
- Read command returns current selected CSG network

- Test command returns available CSG networks. This command is abortable.

2.23.1 Syntax of the Command

Command syntax: AT+XCSG= <csg_id>, <oper>

URC syntax +XCSG: <csg_sel_cause>[,<csg_id>, <csg_type_record_no>, <hnb_record_no>, <hnb_name>, <oper>,<AcT>,<csg_id_list_type>]

Command	Possible Response(s)
AT+XCSG=<csg_id>, <oper>	OK or +CME ERROR: <err>
AT+XCSG?	+XCSG: <csg_sel_cause>[, <csg_id>, <csg_type_record_no>, <hnb_record_no>, <hnb_name>, <oper>,<AcT>,<csg_id_list_type>] OK Or +CME ERROR: <err>
AT+XCSG=?	+XCSG: [list of supported (<csg_id>, <csg_type_record_no>, <hnb_record_no>, <hnb_name>, numeric <oper>,<AcT>, <csg_id_list_type>)s] OK or +CME ERROR: <err>

2.23.2 Defined values

<csg_id>

is the CSG identifier of the cell.

<csg_type_record_no>

is the record number in decimal based on EF-CGST (3GPP TS 31.102 4.4.6.3) where CSG type is stored.

Different values of <csg_type_record_no> can be:

0 if CSG type information is not available.

>0 if CSG type information is available at this record number in EF-CGST.

<hnb_record_no>

is the hnb record number at location EF-HNBN (3GPP TS

31.102 4.4.6.4). Different values of <hnb_record_no> can

be:

0 means the parameter <hnb_name> given is valid.

>0 means the parameter <hnb_name> given is not valid and valid <hnb_name> is present at this record number in EF-HNBN.

<hnb_name>

is the name of home Node B. This parameter is of string type.

<csg_id_ list_type>

is the type of list of <csg_id>. Refer to 3GPP 25.367.

0 <csg_id> is not in white list

1 <csg_id> is in the Operator list

2 <csg_id> is in the allowed list

<oper>

is the 5 character long numeric format (MCC/MNC codes) of the operator. This parameter is of string type.

<AcT>

Indicates the radio access technology

0 GSM

2 UMTS

7 LTE

<csg_sel_cause>

Specifies the cause of CSG selection.

0 No selection cause, moved out of all CSG Cell and CSG info should be ignored.

1 Selected by manual selection process

2 Selected by automatic selection process

Note: This command is supported only from release 8 and is available only when feature

FEAT_CSG_SUPPORT is enabled in the build config.

2.24 UE modes of operation for EPS +CEMODE

This command is used to to operate according to the specified mode of operation for
EPS.

- The set command is used to set the MT to operate according to the specified mode of operation for EPS, see 3GPP TS 24.301 [83].
- The read command returns the mode of operation set by the TE.
- The test command is used for requesting information on the supported MT mode of operation.

2.24.1 Syntax of the Command

Command syntax: AT+CEMODE=[<mode>]

Command	Possible response(s)
AT+CEMODE=[<mode>]	OK or CME ERROR: <error>
AT+CEMODE?	+CEMODE : <mode> OK
AT+CEMODE =?	+CEMODE: (list of supported <mode>s) OK

2.24.2 Defined values

<mode>:

a numeric parameter which indicates the mode of operation

0 PS mode 2 of operation (default)

1 CS/PS mode 1 of operation

2 CS/PS mode 2 of operation

3 PS mode 1 of operation

Note: This command is available only on LTE platform.

2.25 Circuit Switched FallBack +XCSFB

This command is used to enable/disable the CSFB URC indication and also to accept/reject the offering of the circuit switched call in E-UTRAN network

2.25.1 Syntax of the Command

Command syntax: AT+XCSFB=<n>

Command	Possible Response(s)
AT+XCSFB=<n>	OK or CME ERROR: <error>
AT+XCSFB?	+XCSFB: <n> OK
AT+XCSFB=?	+XCSFB : (0-5) Note: i.e. list of supported <n>s OK

2.25.2 Defined values

Possible values of <n> can be

0 Disable CSFB indication to AP/User.(default). In this case CSFB indication is not reported to AP. Hence no response is sent to PS. PS should handle the timeout scenario.

1 Enable CSFB indication to AP/User.

2 Send auto accept response to CSFB notification.

3 Send auto reject response to CSFB notification.

4 Send accept response to CSFB notification.

5 Send Reject response to CSFB notification.

Note 1: options 4 and 5 has to be sent only when the CSFB indication(URC) is sent to the AP/User with <m> = 1.

Note 2: options 4 and 5 will not be reported in AT+XCSFB? command.

Note 3: In case CSFB indication is reported to AP, and AP does not respond before the timer expires, PS should handle the timeout scenario.

Note 4: This command is availabe only

on LTE platform. Format of the URC

when enabled:

+XCSFBI: <m>,<ph_no>,<ss_code>,<lcs_indicator>,<lcs_client_identity>

<m>: Notification parameter

0 No user response required. This could be because of last user settings AT+CSFB=2 or
3.

1 User response required. User should respond with AT+CSFB=4 or 5.

2 CSFB operation failed due to some error.

<ph_no>

string type; contains the identification of the calling line for the mobile terminating call in the CS domain, which triggered the paging via SGs.

<ss_code>

contains information on the supplementary service transaction in the CS domain, which triggered the paging via SGs.

<lcs_indicator>

indicates that the paging was triggered by a terminating LCS request in the CS domain.

<lcs_client_identity>

string type; contains information related to the requestor of the terminating LCS request in the CS domain.

3 Call Control Commands

3.1 Select Type of Address +CSTA

This set command selects the type of number for further dialing commands (D) according to GSM specifications.

- Set command sets type of number for further dialing.
- Read command returns type of address.
- Test command returns the range of supported type of addresses

3.1.1 Syntax of the Command

Command Syntax: AT+CSTA= [<type>]

Command	Possible Responses
AT+CSTA=<type>	OK or +CME ERROR : <error>
AT+CSTA?	+CSTA: <type> OK
AT+CSTA=?	+CSTA: (128-255) OK

3.1.2 Defined Values

Possible values of <type> of dialing string, its values can be

145 Dialing string shall include international access code character "+"

129 Dial string begins with a digit or it is a local number (default)

3.2 Call Answer A

This command instructs the DCE to immediately connect to line and start

the answer sequence as specified for the underlying DCE. Any additional command that appears after A on the same command line is ignored. The user is informed that an incoming call is waiting, by the information result code RING or +CRING displayed on TE.

3.2.1 Syntax

Syntax of the command:
ATA Command | Possible Responses
---------|---------- -- | ATA | OK

or

+CME ERROR: <err>

3.3 Dial Command D

The V.24ter dial command D lists characters that may be used in a dialing string for making a call or controlling supplementary services in accordance with GSM02.30 and initiates the indicated kind of call. No further commands may follow in the command line.

3.3.1 V.25ter Dialing Digits

1 2 3 4 5 6 7 8 9 0 * # + A B C (implementation of these characters is mandatory for GSM/ UMTS). D (implementation of this character is optional for GSM/UMTS, and it is ignored)

3.3.2 V.25ter or GSM Modifier Characters

- ",", "T", ",", "W" or "@" are ignored
- ";" forces a voice call originated to the given address
- ">" allows direct dialing from phonebook

- "I" invocation restrict CLI presentation
- "i" suppression i.e. allows CLI presentation
- "G" or "g" control the CUG supplementary service information for this call (s.+CCUG)
- "+" in the beginning of the number would be considered as type of number (i.e. type of address octet in integer format (refer TS 24.008 [8] subclause 10.5.4.7); default 145 when dialing string includes international access code character "+", otherwise 129). "+" in the middle of the number will be considered as <subaddress> with format being ATD<number>[+<subaddress>];

3.3.3 Dialing with Called Party Sub Address

Dial with sub address is optional and only applicable to voice calls. The defined value for

<subaddress>

3.3.4 <subaddress>

String type. The length can be maximum 22 as defined in 3GPP TS 24.008 10.5.4.8 (except the first octet i.e. "Called party Subaddress IEI", rest all). The value will be considered as hexadecimal strings, first octet being the length

"+" in the beginning of the number would be considered as type of number (i.e. type of address octet in integer format (refer TS 24.008 [8] subclause 10.5.4.7); default 145 when dialing string includes international access code character "+", otherwise 129).

4/30/2012"+" in the middle of the number will be considered as <subaddress> with format being ATD<number>[+<subaddress>];

Following is an example: ATD123456+08A012345678910ABC; First bye '08' gives the length of the subaddress which can be maximum 21. Rest as defined in 3GPP TS 24.008

10.5.4.8.

3.3.5 Direct Dialing from Phonebooks with Syntax

- ATD><str> [I] [G] [;] originate a call to phone number which corresponding alphanumeric field in the default phonebook is <str>.

- ATD>mem<n> [I] [G] [;] originate a call to phone number in memory (one of the phonebooks) "mem" entry location <n>. "mem" may be for example "SM", "FD" or "LD".

- ATD><n> [I] [G] [;] originate a call to phone number in entry location <n> of the default phonebook. The semicolon character shall be added when a voice call is originated. CLIR and CUG per call modifiers can also be present.

3.3.6 Responses

VERBOSE	NUMERIC	DESCRIPTION
OK	0	Acknowledges successful execution of command.
CONNECT	1	A connection has been established
RING	2	The DCE has detected an incoming call signal from the network
NO CARRIER	3	The connection has been terminated or the attempt to establish a connection failed
BUSY	7	Engaged (busy) signal detected
NO ANSWER	8	If no hang up is detected after a fixed network timeout
CONNECT <data rate>	9	Same as CONNECT but includes the data rate
RING CTM	18	The MS has detected an incoming CTM call signal from the network; this code is proprietary
CONNECT FAX	11	Same as CONNECT but includes the indication related to FAX call
CTM CALL	19	The DTE user is informed that a TTY/CTM MI call will be established; proprietary code
NO CTM CALL	20	No TTY/CTM MO call can be established; proprietary code
WAITING CALL CTM	21	TTY/CTM call waiting; proprietary code

3.4 Resume Data Call Session : O

This command is used resume a circuit-switched data transfer session.

3.4.1 Syntax of the Command

Command syntax: ATO

Command	Possible responses
ATO	OK or ERROR

3.5 Hook Control H

This command is used to disconnect the remote user.

Note: all active calls and held calls will be released but not waiting calls

3.5.1 Syntax

Command Syntax: ATH or ATH0

Command	Possible Responses
ATH	OK or ERROR

3.6 Call Mode +CMOD

This command selects the call mode of further dialing commands (D) or for next answering command (A).

- Set command sets type of call mode for further dialing command (D) or next answering command (A).
- Read command returns information on the current call mode.
- Test command returns the range of supported call modes (i.e. <n>)

3.6.1 Syntax

Command Syntax: AT+CMOD= [<mode>]

Command	Possible Responses

AT+CMOD=0	OK OR CME ERROR : <error>
AT+CMOD?	+CMOD: <mode> OK
AT+CMOD=?	+CMOD: <list supported <mode>s> OK

3.6.2 Defined Values

<mode> Call mode. Values can be:

0 single mode (default)

1 alternating voice/fax

2 alternating voice/data

3 voice followed by data

4 data followed by voice(propriatory mode)

3.7 Select Bearer Service Type +CBST

This command is used to set bearer service type to establish data call.

- Set command selects the bearer service <name> with date rate <speed>, and connec- tion element <ce> to be used when data calls are originated
- Read command returns the current settings <name> <speed> and <ce>
- Test command returns values supported as a compound value

3.7.1 Syntax

Command syntax: AT+CBST= [<speed>[,<name>[,<ce>]]]

Command	Possible Responses
AT+CBST=[<speed>[,<name>[,<ce>]]]	OK OR CME ERROR : <error>

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

3.7.2 Defined Values

<speed>

0 autobauding (automatic selection of the speed; this setting is possible in case of 3.1 kHz modem and non-transparent service)

4 2400 bps (V.22bis)

5 2400 bps (V.26ter)

6 4800 bps (V.32)

7 9600 bps (V.32)

12 9600 bps (V.34)

14 14400 bps (V.34)

15 19200 bps (V.34)

16 28800 bps (V.34)

17 33600 bps (V.34)

39 9600 bps (V.120)

43 14400 bps (V.120)

47 19200 bps (V.120)

48 28800 bps (V.120)

49 38400 bps (V.120)

50 48000 bps (V.120)

51 56000 bps (V.120)

68 2400 bps (V.110 or X.31 flag stuffing)

70 4800 bps (V.110 or X.31 flag stuffing)

71 9600 bps (V.110 or X.31 flag stuffing)

75 14400 bps (V.110 or X.31 flag stuffing)

79 19200 bps (V.110 or X.31 flag stuffing)

80 28800 bps (V.110 or X.31 flag stuffing)

81 38400 bps (V.110 or X.31 flag stuffing)

82 48000 bps (V.110 or X.31 flag stuffing)

83 56000 bps (V.110 or X.31 flag stuffing; this setting can be used in conjunction with asynchronous non-transparent UDI or RDI service in order to get FTM)

84 64000 bps (X.31 flag stuffing; this setting can be used in conjunction with asyn- chronous non-transparent UDI service in order to get FTM)

115 56000 bps (bit transparent)

116 64000 bps (bit transparent)

120 32000 bps (PIAFS32k)

121 64000 bps (PIAFS64k)

130 28800 bps (multimedia)

131 32000 bps (multimedia)

132 33600 bps (multimedia)

133 56000 bps (multimedia)

134 64000 bps (multimedia)

<name>

0 data circuit asynchronous (UDI or 3.1 kHz modem) (default)

1 data circuit synchronous (UDI or 3.1 kHz modem)

4 data circuit asynchronous (RDI)

5 data circuit synchronous (RDI)

<ce>

0 transparent (default)

1 non-transparent

2 both, transparent preferred

3 both, non-transparent preferred

3.8 Service Class Selection and Identification +FCLASS

This command puts the MS into a particular mode of operation (data, fax, voice etc.). " Set command set the class type i.e. data or voice call " Read command returns the current setting <class> value " Test command returns values supported as a compound value

3.8.1 Syntax

Command syntax:
AT+FCLASS = [<class>]

Command	Possible Responses
AT+FCLASS=[<class>]	OK OR CME ERROR : <error>
AT+FCLASS?	<class> OK
AT+FCLASS=?	(list of supported <class>s) OK

3.8.2 Defined Values

<class>

0 data (default)

8 voice

NOTE:

Once all the calls are disconnected FCLASS value changes to data(0)

3.9 Mute Control +CMUT

This command is used to enable and disable the uplink voice muting during a voice call.

- Set command set the mute <n> value on/off for uplink voice

- Read command returns the current setting of mute <n> value
- Test command returns values supported as a compound value

3.9.1 Syntax

Command syntax: AT+CMUT = [n]

Command	Possible Responses
AT+CMUT = [n]	OK OR CME ERROR : <error>
AT+CMUT?	+CMUT : <n> OK
AT+CMUT=?	+CMUT: (list of supported <n>s) OK

3.9.2 Defined Values

<n> can be

0 mute off (default)

1 mute on

3.10 Hang Up Call +CHUP

This execution command causes TA to hang up the current GSM call of the ME. Note: all active call will be released but neither waiting or held calls.

3.10.1 Syntax

Command syntax: AT+CHUP

Command	Possible Response(s)

AT+CHUP	OK OR +CME ERROR: <error>
AT+CHUP=?	OK

3.11 Tone Duration +VTD

This command refers to an integer <n> that defines the length of tones emitted as a result of the +VTS command.

Note: In GSM/UMTS the value of tone duration is preset and cannot be altered.

- Set command sets duration value <n>.
- Read command returns current set value of duration <n>.
- Test command returns the list of supported duration values.

3.11.1 Syntax

Command Syntax: AT+VTD= [<n>]

Command	Possible Response(s)
AT+VTD=[n]	OK OR CME ERROR : <error>
AT+VTD?	+VTD: <n> OK
AT+VTD=?	+VTD: <list supported <n>s> OK

3.11.2 Defined Values

<n> is an integer in range of 0 to 255.

A value different than zero causes a tone of duration <n>/10 seconds.

The value 5 is default. If the value 0 is selected, the tone duration is set to 1/10 second.

3.12 DTMF and Tone Generation +VTS

This command allows the transmission of DTMF tones and arbitrary tones. These tones may be used e.g. when announcing the start of a recording period. In GSM this operates only in voice mode. If the optional parameter <duration> is left out, the tone duration is given by the setting +VTD (see +VTD description).

- Set command usage

The string parameter of the command consists of combinations of the following sepa- rated by commas

<DTMF>. A single ASCII character in the set 0-9, #,*,A-D. This is interpreted as a single ACSII character whose duration is set by the +VTD command.

{<DTMF>,<duration>}. This is interpreted as a DTMF tone of different duration from that mandated by the +VTD command.

NOTE : In GSM this operates only in voice mode.

- Test command returns the list of supported <DTMF> key (digit) values.

3.12.1 Syntax

Command Syntax:
AT+VTS=<DTMF>,{<DTMF>,<duration>}.

Command	Possible Response(s)
AT+VTS=<DTMF>,{<DTMF>,<duration>}	OK OR CME ERROR: <error>
AT+VTS=?	+VTS: (<list of <DTMF>s>),(),(list of supported <durations>s) OK

3.12.2 Defined Values

<DTMF>:

is a single ASCII character in the set 0-9, #, *, A-D.

<duration>:

integer in range 0-255, meaning 1/10(10 millisec) seconds multiples.
The string param- eter of the command consists of combinations of the following separated by commas:

NOTE : There is a limit of 50 dtmf tones can be requested through a single VTS command.

3.13 Voice Hangup Control +CVHU

This command controls the voice hangup.

- Set command selects whether ATH or "drop DTR" shall cause a voice connection to be disconnected or not.
- Read command returns current set value of <mode>.
- Test command returns the list of supported <mode> values.

3.13.1 Syntax

Command Syntax : AT+CVHU= [<mode>]

Command	Possible Response(s)
AT+CVHU=[mode]	OK OR CME ERROR : <error>
AT+CVHU?	+CVHU: <mode> OK
AT+CVHU=?	+CVHU: <list supported <mode>s> OK

3.13.2 Defined Values

<mode>

0 "Drop DTR" ignored but OK response given. ATH disconnects. (default)

1 "Drop DTR" and ATH ignored but OK response given.

2 "Drop DTR" behavior according to &D setting. ATH disconnects.

3.14 Call Deflection +CTFR

This refers to a service that causes an incoming alerting call to be forwarded to a specified number.

- Set command deflects an incoming call with specified number.

3.14.1 Syntax of the Command

Command Syntax: AT+CTFR= <number>[,<type>]

Command	Possible Response(s)
AT+CTFR=<number>[,<type>]	OK OR +CME ERROR : <error>
AT+CTFR=?	OK

3.14.2 Defined Values

<number>

string type phone number

<type>

type of address octet in integer format

3.15 Call Meter Maximum Event +CCWE

This command allows the sending of an unsolicited result code +CCWV to TE, when enabled. The warning is issued approximately when 30 seconds call time remains. It is also sent when starting a call if less than 30 s call time remains.

- Set command is used to enable or disable sending of an unsolicited result code +CCWV to TE.
- Read command returns the current setting.
- Test command returns supported settings.

3.15.1 Syntax of the Command

Command syntax :
AT+CCWE= <mode>

Command	Possible Response(s)
AT+CCWE=<mode>	OK or CME ERROR: <error>
AT+CCWE?	+CCWE : <mode> OK
AT+CCWE=?	+CCWE: (0-1) Note: i.e. list of supported <mode>s OK

3.15.2 Defined values

<mode>

0 Disable the call meter warning event (default)

1 Enable the call meter warning event

3.16 Service Reporting Control +CR

This command controls whether or not intermediate result code +CR: <serv> is returned from the TA to the TE.

- Set command controls whether or not intermediate result code +CR: <serv> is returned from the TA to the TE.
- Read command returns current mode of CR.
- Test command returns values supported as a compound value.

3.16.1 Syntax of the Command

Command syntax : AT+CR= <mode>

Command	Possible Response(s)
AT+CR=[<mode>]	OK Or CME ERROR: <error>
AT+CR?	+CR: <mode> OK
AT+CR=?	+CR: (list of supported <mode>s) OK

3.16.2 Defined values

<mode>

0 disables reporting (default)

1 enables reporting

<Serv>

ASYNC asynchronous transparent

SYNC synchronous transparent

REL ASYNC asynchronous

non transparent REL SYNC

synchronous non

transparent GPRS [<L2P>]

GPRS

The optional <L2P> proposes a layer 2 protocol to use between the MT and the TE. It is defined in the Enter GPRS Data Mode (+CGDATA) command.

3.17 Cellular Result Codes +CRC

This command enables a more detailed ring indication, in case of incoming call. Instead of RING a unsolicited result code +CRING: <type> is displayed on TE.

3.17.1 Syntax of the Command

Command syntax : AT+CRC= <mode>

Command	Possible Response(s)
AT+CRC=[<mode>]	OK Or CME ERROR: <error>
AT+CRC?	+CRC: <mode> OK
AT+CRC=?	+CRC: (list of supported <mode>s) OK

3.17.2 Defined values

<mode>

0 disables extended format (default)

1 enables extended format

<type>

ASYNC [,<priority>[,<subaddr>,<satype>]] asynchronous transparent

SYNC [,<priority>[,<subaddr>,<satype>]] synchronous transparent

REL ASYNC [,<priority>[,<subaddr>,<satype>]] asynchronous

non transparent REL SYNC [,<priority>[,<subaddr>,<satype>]]

synchronous non transparent VOICE

[,<priority>[,<subaddr>,<satype>]] normal voice (TS 11)

VOICE2 [,<priority>[,<subaddr>,<satype>]] normal voice

at line 2(TS 11) CTM [,<priority>[,<subaddr>,<satype>]]

Incoming CTM call

CTM2 [,<priority>[,<subaddr>,<satype>]] Incoming CTM call at line 2

VOICE/XXX [,<priority>[,<subaddr>,<satype>]] voice followed by data (BS 81) (XXX is
ASYNC, SYNC, REL ASYNC or REL SYNC)

ALT VOICE/XXX [,<priority>[,<subaddr>,<satype>]] alternating voice/data, voice first
(BS 61)

ALT XXX/VOICE [,<priority>[,<subaddr>,<satype>]] alternating voice/data, data

first
(BS 61)

GPRS <PDP_type>, <PDP_addr>[, [<L2P>][,<APN>]] GPRS network request for PDP
context activation

VGC <GCA>, <Gid>, <ackflag> [,<priority>] voice group call (TS 91)

VBC <GCA>, <Gid>, <ackflag> [,<priority>] voice broadcast call (TS 92)

<priority>

(optinal)indicates the EMLPP priority level of the incoming call by paging, notification or setup message.

<subaddr>:

string type subaddress of format specified by <satype>

<satype>:

type of subaddress octet in integer format

<PDP_type> ,<PDP_addr> and <APN>

are as defined in the Define PDP Context (+CGDCONT) command.

<L2P>

(optinal)proposes a layer 2 protocol to use between the MT and the TE. It is defined in the Enter GPRS Data Mode (+CGDATA) command. If the MT is unable to announce to the TE the network's request (for example it is in V.250 online data state) the MT shall reject the request. No corresponding unsolicited result code shall be issued when the MT returns to a command state.

<GCA>

is a part of the group call reference and indicates group call area.

<Gid> is a part of the group call reference and indicates group call identification.

<ackflag>

1 proposes that a predefined confirmation procedure is to be used after the call is ended.

0 no confirmation procedure is required

3.18 Accumulated Call Meter Maximum +CAMM

This command sets the Advise of Charge related accumulated call meter maximum value in the SIM file EF-ACMmax. ACMmax contains the maximum number of home units allowed to be consumed by the subscriber. When ACM reaches ACMmax, calls are prohibited. SIM PIN2 is required to set the value.

- Set command is used to set the ACMmax value.
- Read command returns the current ACMmax value in Hexadecimal format.
- Test command returns OK.

3.18.1 Syntax of the Command

Command syntax:
AT+CAMM=[<acmmax>[,<passwd>]]

Command	Possible Response(s)
AT+CAMM="00300","0933"	OK or CME ERROR: <error>
AT+CAMM?	+CAMM: <acmmax> OK
AT+CAMM=?	OK

3.18.2 Defiined values

<acmmax>

string type containing the accumulated call meter maximum value coded in hexadecimal format under, value zero disables ACMmax feature

<passwd>

SIM PIN2

3.19 Information to in-Band-Tones Availability +XPROG RESS

This command allows enabling / disabling the display of an unsolicited result code + XPROGRESS: <cin>, <status> on DTE while a call is in progress.

- Set command is used to set the XPROGRESS value.
- Read command returns the current XPROGRESS value.
- Test command returns supported values.

3.19.1 Syntax of the Command

Command syntax : AT+XPROGRESS=<mode>

Command	Possible Response(s)
AT+XPROGRESS=1	OK or CME ERROR: <error>
AT+XPROGRESS?	+XPROGRESS : <mode> OK
AT+XPROGRESS=?	+XPROGRESS: (0-1) OK Note: i.e. list of the supported <mode>s

3.19.2 Defiined values

<mode>

specifies whether the unsolicited result code +XPROGRESS: <cin>,<status> shall be displayed or not and may be

0 disable unsolicited result code +XPROGRESS (default)

1 enable unsolicited result code +XPROGRESS

<cin>

call number indication

<status>

indicates whether the in-band-tones are available from network and may be:

0 in-band-tones are not available or no information about that is present

1 alerting, in-band tones or TCH not yet available

2 mobile terminated call now accepted, TCH yet available

3 in-band tones available

4 in-band tones not available

5 TCH now available, mobile terminated call yet accepted

6 TCH now available, in-band tones yet indicated to be available

7 TCH now available, in-band tones yet indicated not to be available

8 channel mode changed to speech

9 channel mode changed to data

10 channel mode changed to vailable only/data/fax.

11 Last speech call has been ended and speech can be disabled

12 progress information Multimedia CAT (Customized Alert Tones) available in-band. This value is valid only if R8_SUPPORT flag is defined

3.20 Automatic Redialing +XREDIAL

The command allows enabling of automatic redialing if the called party was busy. For this purpose the command uses the <mode> parameter in order to enable or disable this function. If the function is enabled, the MS executes after the first unsuccessful attempt to establish a voice call link a lot of further attempts; the amount of failed repeat attempts is limited by the reason of failure. If the user is busy or the destination is temporary not obtainable, 10 repeat attempts are allowed; but there are also serious circumstances which make destination permanent unreachable as unknown or changed numbers - in this case only one repeat attempt is allowed (s. GSM02.07 annex A). If more then 8 failed call attempts exist, the corresponding phone number is stored

in the blacklist. This command allows the following handling Set syntax usage e.g. in order to enable/disable the function in the MS Display of unsolicited result code +XRE DIAL: <message> indicating the progress of the redialing procedure Stop the redialing procedure for the current redialing attempts

- Set command is used to enable/disable/terminate automatic redialing
- Read command returns the current automatic redialing mode.
- Test command returns OK.

3.20.1 Syntax

Command syntax :
AT+XREDIAL=<mode>

Command	Possible Response(s)
AT+XREDIAL=1	OK or CME ERROR: <error>
AT+XREDIAL?	+XREDIAL: <mode> OK
AT+ XREDIAL=?	+XREDIAL: (0-2) i.e. (list of supported <mode>'s) OK

3.20.2 Defined values

<mode>

select the working mode of the redialing function

0 disable automatic redialing, but SIMTK redialing possible (default)

1 enable automatic redialing (also SIMTK redialing)

2 terminate current redialing procedure; the function automatic redialing remains active;

<message>

parameter of the unsolicited result code +XREDIAL: <message> indicating the progress of the redialing procedure with following values:

<ds>

called party address (phone number); i.e. +XREDIAL: <ds>; OK: indicating the call establishment i.e. +XREDIAL: OK;
BUSY: indicating that the called party is not reachable; the corresponding phone number was registered in the blacklist; in this case the ATC displays the code +XREDIAL: NO CARRIER;
NO CARRIER: indicating that the current redialing attempts were terminated either on user command (AT+XREDIAL=2) or because of incoming call or because of a new mobile originated call; in this displays the code +XREDIAL: NO CARRIER.

3.21 Accumulated Call Meter +CACM

This command resets the Advice of charge related accumulated call meter value in SIM file EF-ACM. ACM contains the total number of home units for both the current and preceding calls. SIM PIN2 is required to reset the value.

- Set command is used to reset the ACM value.
- Read command returns the current ACM value in Hexadecimal format.
- Test command returns OK.

3.21.1 Syntax of the Command

Command syntax:
AT+CACM= [<passwd>]

Command	Possible Response(s)
AT+CACM=[<passwd>]	OK or CME ERROR: <error>

AT+CACM?	+CAMM: <acm> OK
AT+CACM=?	OK

3.21.2 Defined values

<passwd>

SIM PIN2 as string type

<acm>

accumulated call meter value similarly coded as <ccm> under +CAOC as string type

3.22 Advice of Charge +CAOC

This command allows the subscriber to get the information about the call costs in home units using the Advise of Charge supplementary service (3GPP TS 22.024 and 3GPP TS 22.086). If enabled the following unsolicited result code is sent to TE periodically:

+CCCM: <ccm>

Set command is used to set the mode.

Read command returns the current mode value.

Test command returns list of supported modes

3.22.1 Syntax of the Command

Command syntax :
AT+CAOC=[<mode>]

Command	Possible Response(s)
AT+CAOC=[<mode>]	+CAOC: <ccm> OK or CME ERROR: <error>
AT+CAOC?	+CAOC: <mode> OK
AT+CAOC=?	+CAOC: (0-2) i.e. (list of supported <modes>) OK

3.22.2 Defined values

<Mode>

may be 0 query the CCM value 1 deactivate the unsolicited reporting of CCM value
(default)

2 activate the unsolicited reporting of CCM value

<ccm>

current call meter may is indicated as a string in hexadecimal format

3.23 Set Reporting Call Status +XCALLSTAT

This command allows enabling / disabling the reporting voice call status on DTE using an unsolicited result code +XCALLSTAT: <call_id><stat>. This code may be repeated so that for each call one line is displayed on DTE (e.g. one call is active and one call is waiting, or up to 6 calls are active in a multiparty session). The unsolicited result code is sent not only for voice calls managed by the AT interface, but also for the voice calls established by another SW block e.g.MI.

- Set command is used to enable/disable the XCALLSTAT.
- Read command returns the current XCALLSTAT value.
- Test command returns supported values.

3.23.1 Syntax of the Command

Command syntax:
AT+XCALLSTAT=< enable>

Command	Possible Response(s)
Execute command AT+XCALLSTAT=<enable>	OK or CME ERROR: <error>
Read command AT+XCALLSTAT?	+XCALLSTAT: <enable> OK
Test command AT+XCALLSTAT=?	+XCALLSTAT: (list of supported <enable>'s) OK

3.23.2 Defiined values

<enable>

0 reporting disabled (default)

1 reporting enabled

<call_id>

indicates the call identification (GSM02.30 4.5.5.1)

<stat>

indicates the voice call status as follows

0 active

1 hold

2 dialling (MO call)

3 alerting (MO call; ringing for the remote party)

4 ringing (MT call)

5 waiting (MT call)

6 disconnected

7 connected (indicates the completion of a call setup first time for MT and MO calls - this is reported in addition to state active)

3.24 Automatic Answer-S0

This S-parameter command controls the automatic answering feature of the DCE. If set to 0, automatic answering is disabled, otherwise it cause the DCE to answer when the Incoming call indication (ring) has occurred; the number of times will be indicated by the value that is set.

- Set command is used to enable the automatic answering feature of the DCE.
- Read command returns the value that is currently set.

3.24.1 Syntax of the Command

Command syntax :
ATS0= <autoans>

Command	Possible Response(s)
ATS0= <autoans>	OK or CME ERROR: <error>
ATS0?	<autoans> OK

3.24.2 Defined values

<autoans>

is a integer in range 0-255.

Default setting: S0=0(default), meaning automatic answering is disabled.

3.25 SEND_DTMF User Setting +XDTMF

This command allows setting the value of SEND DTMF user setting that controls whether the DTMF tone generation on request from SIM-TK is allowed.

- Set command allows setting the value of SEND DTMF user setting.
- Read command allows reading the value of SEND DTMF user setting.
- Test command returns list of supported values for SEND DTMF user setting.

3.25.1 Syntax of the Command

AT+XDTMF=<mode>

+XDTMF action command syntax

Command	Possible Response(s)
AT+XDTMF=<mode>	OK or CME ERROR: <error>
AT+XDTMF?	+XDTMF: <mode> OK
AT+XDTMF=?	+XDTMF: (list of supported <mode>s) OK

3.25.2 Defined values

<mode>

indicates the working mode in relation to DTMF tone generation via SIM-TK and may be:

0 SEND_DTMF off (default)

1 SEND_DTMF on

3.26 Set Line +XLIN

This command sets the current line.

- Set command sets the current line.
- Read command reads the current line.
- Test command returns list of supported <line>s.

3.26.1 Syntax of the Command

AT+XLIN=[<line>]

Command	Possible Response(s)
AT+XLIN=[<line>]	OK or CME ERROR: <error>
AT+XLIN?	+XLIN: <line> OK
AT+XLIN=?	+XLIN: (1-2) OK

3.26.2 Defined values

<line>

line identifier may be:

1 indicates line 1 (default)

2 indicates line 2

3.27 Start and Stop Tone Generation +XVTS

This Set command allows to start and to stop DTMF tones. In GSM this operates only in voice mode.

- Set command allows to start and to stop DTMF tones.

3.27.1 Syntax of the Command

Start Command Syntax: AT+XVTS=<DTMF>

Stop Command Syntax: AT+XVTS=

Command	Possible responses
AT+XVTS=<DTMF> or AT+XVTS=	OK OR ERROR
AT+XVTS=?	OK

3.27.2 Defined values

<DTMF>

is a single ASCII character in the set 0-9, #, *, A-D

3.28 Enable Emergency Reporting +XEMC

This command enables the URC reporting to AP when an emergency call is Sent or received.

- Set command is used to enable/disable URC reporting to AP when an emergency call is received.
- Read command returns the current mode.
- Test command returns the list of supported <mode>s.

3.28.1 Syntax of the Command

Command syntax : AT+XEMC=<mode>

URC Syntax: +XEMC: <EmergencyCallState>

Command	Possible responses
AT+XEMC=1	OK or CME ERROR: <error>
AT+XEMC?	+XEMC: <mode> OK

AT+XEMC=?	+XEMC: (list of supported <modes>'s) OK

3.28.2 Defined values

<mode>

0- stop XEMC reporting (default)

1- start XEMC reporting

<Emergency Call State>

0: Emergency call is finished

1: Emergency call is entered

note: Be aware that, there are some case where mobile send as normal voice call but network will change to emergency which modem is not aware. In this case +XEMC won't be sent.

3.29 Emergency Number +XEMN

This command is used to check the number is an Emergency number (or) not.

3.29.1 Syntax of the Command

Command syntax: AT+XEMN=<number>

Command	Possible responses
AT+XEMN=<number>	+ XEMN: <number>,<state> OK or CME ERROR: <error>

3.29.2 Defined values

<number>

Emergency number string

<state>

If the number is emergency number then return TRUE, if not FALSE

Usage

AT+XEMN="911"

+XEMN:"911", 1

OK AT+XEMN="111"
+XEMN:"111", 0

OK

3.30 Deliver Diagnostic Information +XDIAG

This command is used to display the diagnostic codes for supplementary services.

- Execution command is used to display the diagnostic codes for Supplementary Services.

3.30.1 Syntax of the Command

Command syntax: AT+XDIAG

Command	Possible responses
AT+XDIAG	+XDIAG: <n> OK
AT+XDIAG=?	OK

3.30.2 Defined values

<n>

0: no information

1: outgoing calls barred within CUG

2: no CUG selected

3: unknown CUG index

4: CUG index incompatible with requested basic service

5: CUG call failure, unspecified

6: CLIR not subscribed

7: CCBS possible

8: CCBS not possible

NOTE: Please refer 24.008, sec: 10.5.4.11

3.31 Provide Speech Information +XSPEECHINFO

This command provides the speech codec related information.

- Set command enables the unsolicited response +XSPEECHINFO: <type>.
- Read Command reads the if the unsolicited response is enabled or not
- Test command returns list of all supported <mode>s i.e. 0,1

3.31.1 Syntax of the Command

AT+XSPEECHINFO=<mode>

Command	Possible responses
AT+XSPEECHINFO=<mode>	OK ERROR
AT+XSPEECHINFO?	+ XSPEECHINFO: <mode> OK
AT+ XSPEECHINFO=?	+ XSPEECHINFO:(0,1) OK

3.31.2 Defined values

<mode>

0 disable the reporting of speech codec when it changes (default)

1 enable the reporting of speech codec through unsolicited response +XSPEECHINFO:
<type>

<type>

0 - codec GSM Full Rate (13.0 kBit/s)

1 - codec GSM Half Rate (5.6 kBit/s)

2 - codec GSM Enhanced Full Rate (12.2 kBit/s)

3 - codec Full Rate Adaptive Multi-Rate

4 - codec Half Rate Adaptive Multi-Rate

5 - codec UMTS Adaptive Multi-Rate

6 - codec UMTS Adaptive Multi-Rate 2

7 - codec TDMA Enhanced Full Rate

8 - codec PDC Enhanced Full Rate

9 - codec Full Rate Adaptive Multi-Rate Wideband

10 - codec UMTS Adaptive Multi-Rate Wideband

11 - codec OHR Adaptive Multi-Rate

12 - codec OFR Adaptive Multi-Rate Wideband

13 - codec OHR Adaptive Multi-Rate Wideband

3.32 Mobile Termination event reporting +CMER

This Commands is used to enables or disables sending of unsolicited result codes in form of : +CIEV <ind>, <value>

- Set Command enables or disables sending of unsolicited result codes from TA to TE in the case of changes indicator state changes .
- Read command returns the default value for <mode>,<keyp>,<disp> <bufr> and the current value for <ind>.
- Test command returns the modes supported as compound values.

3.32.1 Syntax of the Command

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

Command	Possible responses
AT+CMER=[<mode>[,<keyp>[,<disp>[,<ind>[,<bfr>]]]]]	+CME ERROR: <err> OK
AT+CMER?	+ CMER: <mode>,<keyp>,<disp>,<ind>,<bufr> OK
AT+CMER=?	+ CMER:(1,0,0,(0-1),0) OK

3.32.2 Defined values

<mode>:

1 discard unsolicited result codes when TA TE link is reserved (e.g. in on line data mode);

otherwise forward them directly to the TE

<keyp>:

0 no keypad event reporting

<disp>:

0 no display event reporting

<ind>:

0 no indicator event reporting (default)

1 indicator event reporting using result code +CIEV: <ind>,<value>.

<ind> indicates the indicator order number (as specified for +CIND) and

<value> is the new value of indicator.

Only those indicator events, which are not caused by +CIND shall be indicated by the

TA to the TE

<bfr>:

0 TA buffer of unsolicited result codes defined within this command is cleared when

<mode> 1 is entered

3.33 Indicator control +CIND

This Command is used to set MT indicators:

- Set command is used to set the values of MT indicators. <ind> value can be set as ON
  or OFF
- Read command returns the status of MT indicators
- Test command returns the modes supported as compound values.

3.33.1 Syntax of the Command

Command syntax AT+CIND=[<ind>[,<ind>[,...]]]

Command	Possible responses
AT+CIND=[<ind>[,<ind>[,...]]]	OK +CME ERROR: <err>
AT+ CIND?	+ CIND: [<ind>[,<ind>[,...]]] OK
AT+ CIND =?	+CIND : ("call",(0,1)), ("roam",(0,1)) OK

3.33.2 Defined values

<Ind>:

integer type value, which shall be in range of corresponding <descr>

<descr>:

values reserved by the present document and their <ind> ranges: "call" call in progress
(0 1) "roam" roaming indicator (0 1)

3.34 User Controlled Ciphering Indicator +XUCCI

This command enables/Disables the Report of User Controlled Ciphering indicator only when the bit in EF-AD is set to ON in the SIM/USIM. The indication is sent during the CS or PS call.

- Set command enables or disables the URC.
- Read command gives the current URC status.
- Test command returns list of supported <mode> values

3.34.1 Syntax of the Command

Command Syntax:
AT+XUCCI=<mode>

URC Syntax: +XUCCI: <Ciphering_status>,<Domain>,< Key_status>, <Key_context>

Command	Possible responses
AT+XUCCI =<mode>	OK OR CME ERROR: <error>
AT+XUCCI?	+XUCCI: <mode> OK
AT+XUCCI=?	+XUCCI: (list of supported <mode>s) OK

3.34.2 Defined values

<mode>

0: Disable the URC indication (default)

1: Enable the URC indication, but the ciphering state unsolicited command is sent only when ciphering feature is enabled in EFad.

2: Enable the URC indication, and the ciphering state unsolicited command is sent for each connection (whatever EFad ciphering configuration)

<Ciphering_status>

Indicates whether connection is Enciphered or not. 0: Connection not ciphered 1: Connection is enciphered.

<Domain>

0: CS domain

1: PS Domain

2: Both CS and PS domain.

<Key status>:

0: The key status has no meaning

1: The ciphering key is derived from a different context. If GSM authentication is received on a UMTS network, the CK and IK are derived, since CKSN is active. If UMTS authentication is received on a GSM network, the Kc is derived, since KSI is active

4 Supplementary Services Commands

4.1 Calling Line Identification Restriction +CLIR

This command allows controlling the calling line identification restriction supplementary service (GSM02.81).

- Set command overrides the CLIR subscription (default is restricted or allowed) when temporary mode is provisioned as a default adjustment for all following outgoing calls. This adjustment can be revoked by using the opposite command. If this command is used by a subscriber without provision of CLIR in permanent mode the network will act according 3GPP TS 22.081 [3].
- Read command gives the default adjustment for all outgoing calls (given in <n>), and also triggers an interrogation of the provision status of the CLIR service (given in <m>).
- Test command returns values supported as a compound value.

4.1.1 Syntax of the command

AT+CLIR= [<n>]

Command	Possible Response(s)
AT+CLIR=[<n>]	OK or CME ERROR: <error>
AT+CLIR?	+CLIR: <n>,<m> OK
AT+CLIR=?	+CLIR: (0-2) OK

4.1.2 Defined Values

Possible values of <n>

parameter sets the "Call line identification" adjustment for outgoing calls:

0 presentation indicator is used according to the subscription of the CLIR service(default)

1 CLIR invocation

2 CLIR suppression

Possible values of <m>

parameter shows the subscriber CLIR service status in network. Values of <m> can be:

0 CLIR not provisioned

1 CLIR provisioned in permanent mode

2 Unknown (e.g. no network, etc.)

3 CLIR temporary mode presentation restricted

4 CLIR temporary mode presentation allowed

4.2 Calling Line Identification Presentation +CLIP

This command allows to control the calling line identification presentation supplementary service.

- Set command enables or disables the presentation of the CLI at the TE. It has no effect on the execution of the supplementary service CLIP in the network.
- Read command gives the status of <n>, and also triggers an interrogation of the provision status of the CLIP service according 3GPP TS 22.081 [3] (given in <m>).
- Test command returns values supported as a compound value. When CLI is enabled below mwntioned URC mentioned.

4.2.1 Syntax of the command

AT+CLIP= [<n>] URC Syntax:

+CLIP: <number>,<type>[,<subaddr>,<satype>[,[<alpha>][,[<Validity>]]]]

Command	Possible Response(s)
AT+CLIP=[<n>]	OK OR CME ERROR: <error>
AT+CLIP?	+CLIP: <n>,<m> OK
AT+CLIP=?	+CLIP: (0,1) OK

4.2.2 Defined Values

Possible values of <n>

Parameter enables/disables the result code presentation status to the TE:

0 disable(default)

1 enable

Possible values of <m>

Parameter shows the subscriber CLIP service status in the network:

0 CLIP not provisioned

1 CLIP provisioned

2 Unknown (e.g. no network, etc.)

<number>

string type phone number of format specified by <type>

<type>

type of address octet in integer format

<subaddr>

string type subaddress of format specified by <satype>

<satype>

type of subaddress octet in integer format

<alpha>

optional string type alphanumeric representation of <number> corresponding to the entry found in phonebook.

<**CLI validity**>

integer type

0 CLI valid

1 CLI has been withheld by the originator.

2 CLI is not available due to interworking problems or limitations of originating network.

3 CLI is not available due to calling party being of type payphone

4.3 Connected Line Identification Presentation +COLP

This command allows the control of the connected line identification presentation sup- plementary service, useful in case of call forwarding of the connected line.

- Set command is used to enable or disable the Connected line Identity of the called party. When enabled (and called subscriber allows), +COLP: <number>, <type> [, <subaddr>, <satype> [, <alpha>]] intermediate result code is returned from TA to TE.
- Read command gives the status of <n>, and also triggers an interrogation of the provision status of the COLP service (given in <m>).
- Test command returns <n> values supported as a compound value.

4.3.1 Syntax of the command

AT+COLP= [<n>]

Command	Possible Response(s)
AT+COLP=[<n>]	OK or CME ERROR: <error>
AT+COLP?	+COLP: <n>,<m> OK
AT+COLP=?	+COLP: (0,1) OK

4.3.2 Defined Values

Possible values of <n>

Parameter enables/disables the result code presentation status to the TE:

0 disable(default)

1 enable

Possible values of <m>

Parameter shows the subscriber COLP service status in the network:

0 COLP not provisioned

1 COLP provisioned

2 Unknown (e.g. no network, etc.)

4.4 Call Forwarding Number and Conditions +CCFC

This command allows the control of the call forwarding supplementary service according to GSM02.82. Registration, erasure, activation, deactivation and status query are supported.

- Set command supports registration, erasure, activation, deactivation, and status query for call forwarding. When querying the status of a network service (<mode>=2) the response line for "not active" case (<status>=0) should be returned only if service is not active for any <class>.
- Test command returns <reason> values supported as a compound value.

4.4.1 Syntax of the command

AT+CCFC=<reason>,<mode>[,<number>[,<type>[,<class>[,<subaddr>[,<satype>[,<time>]]]]]]

Command	Possible Response(s)

AT+CCFC=<reason>,<mode>[,<number>[,<type>[,<class>[,<subaddr>[,<satype>[,<time>]]]]]]	OK or +CME ERROR: <err> when <mode>=2 and command successful: +CCFC: <status>,<class1>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]][<CR><LF>+CCFC: <status>,<class2>[,<number>,<type> [,<subaddr>,<satype>[,<time>]]] [...]]
AT+CCFC=?	+CCFC: (list of supported <reason>s) OK

4.4.2 Defined Values

Possible values of <reason>

Parameter describes the call forwarding reasons. Its values can be:

0 unconditional

1 mobile busy

2 no reply

3 not reachable

4 all call forwarding (refer 3GPP TS 22.030)

5 all conditional call forwarding (refer 3GPP TS 22.030)

Possible values of <mode>

Parameter describes the mode in which call forwarding is executed. Its values can be:

0 disable

1 enable

2 query status

3 registration

4 erasure

Possible values of <number>

Parameter Phone number of forwarding address in string, in a format

specified by
<type>.

Possible values of <type>

Parameter type of address in integer format; default 145 when available string includes
"+", Otherwise 129

Possible values of <class>

Parameter is a sum of integers each representing a class of information (default 7)

1 voice(telephony)

2 data(refers to all bearer services; with <mode>=2 this may refer only
to some bearer service if TA does not support values 16, 32, 64 and 128)

4 fax (facsimile services)

8 short message service

16 data circuit sync

32 data circuit async

64 dedicated packet access

128 dedicated PAD access

Possible values of <subaddr>

Parameter String type subaddress of format specified by <satype>

Note: not supported and is only for future

Possible values of <satype>

Parameter type of subaddress octet in integer format default 128

Possible values of <time>

Parameter time in seconds to wait before call is forwarded (default 20), but only when
<reason>=2 (no reply) is enabled

Possible values of <status>

Parameter Indicates the call forwarding status returned after
executing the Set com- mand. Its values can be:

0 not active

1 active

4.5 Call Waiting +CCWA

This command allows control of the Call Waiting supplementary service according to
GSM02.83. Activation, deactivation and status query are supported.

- Set command allows activation and deactivation of Call Waiting and also support "status query" When querying the status of a network service (<mode>=2) the response line for "not active" case (<status>=0) should be returned only if service is not active for any <class>.
- Read command returns the result code presentation status to the TE.
- Test command returns values supported as a compound value. If enabled by <n> an unsolicited result code is presented on TE when a call is available URC will be displayed in following format: +CCWA: <number>,<type>,<classx>,,<CLI validity>="">.

4.5.1 Syntax of the command

AT+CCWA=[<n>[,<mode>[,<class>]]]

Command	Possible Response(s)
AT+CCWA=[<n>,[<mode>,[<class>]]]	when <mode>=2 and command successful: +CCWA: <status>,<class1> +CCWA: <status>,<class2> [...]] OK Or +CME ERROR: <err>
AT+CCWA?	+CCWA: <n> OK
AT+CCWA=?	+CCWA: (list of supported <fac>s) OK

4.5.2 Defined values

Possible values of <n>

Parameter Sets/shows the result code presentation status to the TE. Its values can be:

0 presentation status is disabled to TE(default)

1 presentation status is enabled to TE

Possible values of <mode>

Parameter When <mode> parameter is not given, network is not interrogated. Its values can be 0 Disable call waiting

1 Enable call waiting

2 Query status

Possible values of <classx>

Parameter is sum of integers each representing a class of information (default 1):

1 voice(telephony)

2 data(refers to all bearer services; with <mode>=2 this may refer only to some bearer service if TA does not support values 16, 32, 64 and 128)

4 fax (facsimile services)

8 short message service

16 data circuit sync

32 data circuit async

64 dedicated packet access

128 dedicated PAD access

Possible values of <status>

Parameter describes status of call waiting. Its values can be:

0 not active

1 active

<**number**>

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

<**type**>

Type of address octet in integer format.

<**CLI validity**>:

integer type

0 CLI valid

1 CLI has been withheld by the originator.

2 CLI is not available due to interworking problems or limitations of originating network.

4.6 Call Hold +CHLD

This command allows to managing call hold and multiparty conversation (conference call).Calls can be put on hold, recovered, released or added to conversation.

Note: Call Hold, Multi Party and Explicit Call Transfer are only applicable to tele service
11.

- Set command can be used to put calls on hold, recovered, released, added to conversation, and transferred. This is based on the GSM/UMTS supplementary ser- vices HOLD, MPTY (i.e Multi Party) and ECT (Explicit Call Transfer). The interaction of this command with other commands based on other GSM/UMTS supplementary services is described in the GSM/UMTS standards.
- Test command returns a list of operations which are supported. The call number required by some operations shall be denoted by "x" (e.g. +CHLD: (0, 1, 1x, 2, 2x, 3)).

4.6.1 syntax of the command

AT+CHLD = [<n>]

Command	Possible Response(s)
AT+CHLD=[<n>]	OK Or +CME ERROR: <error>
AT+CHLD=?	[+CHLD: (list of supported <n>s)] OK

4.6.2 Defined Values

Possible values of <n>

Parameter values can be:
0 (deafult)release all held calls or set User Determined User Busy for a waiting/incoming call; if both exists then only the waiting call will be rejected

1 release all active calls and accepts the other (held or waiting)

Note: In the scenario: An active call, a waiting call and held call, when the active call is terminated, we will make the Waiting call as active.

1x release a specific call (x specific call number as indicated by +CLCC)

2 place all active calls (if exist) on hold and accepts the other call (held or waiting/in- coming). If only one call exists which is active, place it on hold and if only held call exists make it active call

2x place all active calls on hold except call x with which communication is supported

3 adds a held call to the conversation

4 connects the two calls and disconnects the subscriber from both calls (Explicit Call
Transfer)

6 puts an active call on hold or an held call to active, while another call is waiting

7 disconnect users in multiparty without accepting incoming call

8 release all calls

4.7 Unstructured Supplementary Service Data +CUSD

This command allows control of the Unstructured Supplementary Service Data (USS D) according to 3GPP TS 22.090 [23].Both network and mobile initiated operations are supported. Parameter <n> (refer to defined values) is used to disable/enable the presentation of an

unsolicited result +CUSD: <m> [, <str>, <dcs>] to the TE. In addition, value <n>=2 is used to cancel an ongoing USSD session.

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

Note: In case of successful mobile initiated operation, TA implemented according to a version prior to 6 of this standard, waits the USSD response from the network and sends it to the TE before the final result code. This will block the AT command interface for the period of the operation. Such TA does not support <n> value 2.

- Read command gives the current status of the result code presentation to the TE (disable/enable)
- Test command returns values supported as a compound value

4.7.1 syntax of the command

AT+CUSD = [<n> [, <str> [, <dcs>]]]

Command	Possible Response(s)
AT+CUSD = [<n>[,<str>[,<dcs>]]]	OK Or +CME ERROR: <error>
AT+CUSD?	+CUSD: <n> OK
AT+CUSD=?	+CUSD:(list of supported <n>s) OK

4.7.2 Defined Values

Possible values of <n>

Parameter is used to disable/enable the presentation of an unsolicited result code:

0 Disable the result code presentation to the TE(default)

1 Enable the result code presentation to the TE

2 Cancel session (not applicable to read command response)

Possible values of <str>

string type USSD string (when <str> parameter is not given, network is not interrogated)

Possible values of <dcs>

indicates Cell Broadcast Data Coding Scheme. Its default value is 0.

Possible values of <m>

Parameter Values can be:

0 No further user action required (network initiated USSD-Notify or no further information needed after mobile initiated operation)

1 Further user action required (network initiated USSD request, or further information needed after mobile initiated operation)

2 USSD terminated by network

3 Other local client has responded

4 Operation not supported

5 Network time out

4.8 List Current Calls +CLCC

This action command returns list of current calls of ME. If command succeeds but no calls are available, no information response is sent to TE.

- Set command lists the current calls of ME. If command succeeds but no calls are available, no information response is sent to TE.
- Read command is N/A.
- Test command returns OK.

4.8.1 Syntax of the command

AT+CLCC

Command	Possible Response(s)
AT+CLCC	[+CLCC: <id1>,<dir>,<stat>,<mode>,<mpty> [,<number>,<type>[,<alpha>[,<priority>]]] [<CR><LF>+CLCC: <id2>,<dir>,<stat>,<mode>, <mpty>[,<number>,<type>[,<alpha>[, <priority>]]] […]]] OK Or +CME ERROR: <error>
AT+CLCC=?	OK

4.8.2 Defined Values

Possible values of <idx>

Parameter is an integer type, indicating the call identification number as described in
3GPP TS 22.030 [19] subclause 4.5.5.1;this number can be used in
+CHLD command operations.

Possible values of <dir>

Parameter values can be:

0 mobile originated (MO) call

1 mobile terminated (MT) call

Possible values of <stat>

Parameter values can be:

0 active

1 held

2 dialing (MO call)

3 alerting (MO call)

4 incoming (MT call)

5 waiting (MT call)

Possible values of <mode>

Parameter bearer/teleservice:

0 Voice

1 Data

3 Voice followed by data, voice mode

9 Unknown

Possible values of <mpty>

Parameter values can be:

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

1 call is one of multiparty (conference) call parties

8 Possible values of <number>

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

Possible values of <type>

Parameter type of address octet in integer format (refer TS 24.008 [8] subclause 10.5.
4.7)

Possible values of <alpha>

Parameter string type alpha-numeric representation of <number> corresponding to the entry found in phonebook; used character set should be the one selected with command Select TE Character Set +CSCS.

Possible values of <priority>

Parameter optional digit type parameter indicating the eMLPP priority level of the call, values specified in 3GPP TS 22.067 [54].

4.9 Closed User Group +CCUG

This command allows control of the Closed User Group supplementary service (refer
3GPP TS 22.085 [21]).

- Set command enables the served subscriber to select a CUG index, to suppress the
  Outgoing Access (OA), and to suppress the preferential CUG.

- Read command returns information on the current status of CUG enabled/disabled <n>, the CUG index <index> and its information <info>.
- Test command returns OK.

4.9.1 syntax of the command

AT+CCUG= [<n> [, <index> [, <info>]]]

Command	Possible Response(s)
AT+CCUG= [<n>[,<index>[,<info>]]]	OK Or CMEE ERROR: <error>
AT+CCUG?	+CCUG: <n>,<index>,<info> OK
AT+CCUG=?	OK

4.9.2 Defined Values

Possible values of <n>

Parameter values can be:

0 disable CUG temporary mode(default)

1 enable CUG temporary mode

Possible values of <index>

Parameter values can be:

0...9 CUG index (0 as default)

10 no index (preferred CUG taken from subscriber data)

Possible values of <info>

Parameter values can be:

0 no information(default)

1 suppress OA

2 suppress preferential CUG

3 suppress OA and preferential CUG

4.10 Supplementary Service Notifications +CSSN

This command refers to supplementary service related network initiated notifications. When <n>=1 and a supplementary service notification is received after a mobile orig- inated call setup, intermediate result code +CSSI: <code1> is sent before any other MO call setup result codes. When <m>=1 and a supplementary service notification are received during a call, unsolicited result code +CSSU: <code2> is sent.

- Set command enables/disables the presentation of notification result codes from TA to TE.
- Read command gives corresponding setting value of <n> and <m>.
- Test command returns values supported as a compound value.

4.10.1 syntax of the command

Command Syntax: AT+CSSN = [<n>[,<m>]] URC Response Syntax:

+CSSI : <code1>[,<index>]

+CSSU: <code2>[<index> [,<number>,<type>]]

Command	Possible Response(s)
AT+CSSN = [<n>[,<m>]]	OK Or CME ERROR: <error>
AT+CSSN?	+CSSN: <n>, <m> OK
AT+CSSN=?	+CSSN: (0-2) OK

4.10.2 Defined Values

Possible values of <n>

Parameter sets/shows the +CSSI result code presentation status to the TE:

0 disable(default)

1 enable

Possible values of <m>

Parameter sets/shows the +CSSU result code presentation status to the TE:

0 disable(default)

1 enable

Possible values of <code1>

Parameter it is manufacturer specific, which of these codes are supported:

0 unconditional call forwarding is active

1 some of the conditional call forwarding are active

2 call has been forwarded

3 call is waiting

4 this is a CUG call (also <index> present)

5 outgoing calls are barred

6 incoming calls are barred

7 CLIR suppression rejected

8 call has been deflected

Possible values of <index>

Parameter refer "Closed user group +CCUG"

Possible values of <code2>

Parameter it is manufacturer specific, which of these codes are supported:

0 this is a forwarded call (MT call setup)

1 this is a CUG call (<index> present) (MT call setup)

2 call has been put on hold (during a voice call)

3 call has been retrieved (during a voice call)

4 multiparty call entered (during a voice call)

5 call has been released - not a SS notification - (during a voice call)

6 forward check SS message received (can be received whenever)

7 call is being connected (alerting) with the remote party in alerting state in explicit call transfer operation (during a voice call)

8 call has been connected with the other remote party in explicit call transfer operation

(during a voice call or MT call setup)

9 this is a deflected call (MT call setup)

10 additional incoming call forwarded

Possible values of <number>

Parameter string type phone of format specified by <type>

Possible values of <index>

Parameter type of address octet in integer format

4.11 Calling Name Presentation +CNAP

This command allows controlling the name identification supplementary service. When the presentation of CNAP at the TE is enabled, the following unsolicited result code is displayed: +CNAP: <calling_name> [, <CNAP_validity>].

- Set command enables/disables the presentation of the calling name
- Read command gives corresponding setting value of <n> and <m>
- Test command returns values supported as a compound value.

4.11.1 syntax of the command

AT+CNAP= [<n>]

Command	Possible Response(s)
AT+CNAP=[<n>]	OK Or CME ERROR: <error>
AT+CNAP?	+CNAP: <n>, <m> OK
AT+CNAP=?	+CNAP: (0-1) OK

4.11.2 Defined Values

Possible values of <n>

Parameter sets the result code presentation in the TA:

0 disable(default)

1 enable

Possible values of <m>

Parameter shows the subscriber CNAP service status in the network and may be:

0 COLR not provisioned(default)

1 COLR provisioned

2 unknown

Possible values of <calling_name>

Parameter string type containing the calling party name

Possible values of <CNAP_validity>

Parameter may be:

0 name presentation allowed

1 presentation restricted

2 name unavailable

3 name presentation restricted

4.12 Connected Line Identification Restriction +COLR

This command supplementary service enables the connected party to prevent presenta- tion of its line identity to the calling party. The activation and deactivation of COLR is only a result of provision / withdrawal. The command +COLR allow only the interrogation of the current state of COLR service in the network.

- Set command gives the status of the COLR being provisioned or not
- Test command returns OK.

4.12.1 syntax of the command

AT+COLR

Command	Possible Response(s)
AT+COLR	+COLR: <status> OK
AT+COLR=?	OK

4.12.2 Defined Values

Possible values of <status>

Parameter shows the subscriber COLR service status in the network and may be:

0 COLR not provisioned

1 COLR provisioned

2 unknown

5 Commands Specific to MS's Supporting the Packet Domain

5.1 PDP Context Activate or Deactivate +CGACT

This execution command is used to activate or deactivate the specified PDP con- text(s).After this command the MT remains in the command state. If any context is already in the requested state, the state for the context remains unchanged. If the requested state can not be achieved, an ERROR is returned. If the MT is not GPRS attached when the activation form of the command is executed, the MT first performs a GPRS attach and them attempts to activate the specified contexts.

5.1.1 Syntax

Command syntax: AT+CGACT= [<state> [, <cid> [, <cid> [,...]]]]

Command	Possible Response(s)
AT+CGACT= [<state> [, <cid> [, <cid> [,...]]]]	OK Or ERROR
AT+CGACT?	+CGACT: <cid>, <state> OK
AT+CGACT=?	+CGACT: (list of supported <state>s) OK

5.1.2 Defined Values

<state>

(indicates the state of PDP context activation)

0 deactivated

1 activated

<cid>

It is a numeric parameter which specifies a particular PDP context definition

5.2 PS Attach or Detach +CGATT

This command is used to attach the MT to or detach the MT from the Packet Domain service.

- Set command is used to attach the MT to, or detach the MT from the Packet Domain service.
- Read command returns the current Packet Domain service state.
- Test command is used for requesting information on the supported Packet Domain service states.

5.2.1 Syntax

Command syntax: AT+CGATT = [<state>]

Command	Possible Response(s)
AT+CGATT= [<state>]	OK Or ERROR
AT+CGATT?	+CGATT: <state> OK
AT+CGATT=?	+CGATT: (list of supported <state>s) OK

5.2.2 Defined Values

<state> (indicates the state of PS attachment)

0 detached (default)

1 attached

Other values are reserved and will result in an ERROR response to the set command

5.3 GPRS Mobile Station Class +CGCLASS

This command allows to set the MT to operate according to the specified GPRS mobile class.

- Set command is used to set the MT to operate according the specified mode of operation.
- Read command returns the mode of operation set by the TE.
- Test command is used for requesting information on the supported MT mode of opera- tion.

5.3.1 Syntax

Command syntax: AT+CGCLASS = [<class>]

Command	Possible Response(s)
AT+CGCLASS=[<class>]	OK Or ERROR
AT+CGCLASS?	+CGCLASS: <class> OK
AT+CGCLASS=?	+CGCLASS: (list of supported <class>s) OK

5.3.2 Defined Values

<class>

a string parameter which indicates the

mode of operation "A" class A // only

supported if UMTS_SUPPORT is enabled "B"

class B (default)

"CG" class C in GPRS mode

"CC" class C in circuit switched mode.

5.4 Changing the Startup MS Class +XCGCLASS

This command allows setting the default value of the MS class which is used at startup

5.4.1 Syntax of the Command

AT+XCGCLASS=[<class>]

Command	Possible Response(s)
AT+XCGCLASS= [<class>]	OK or CME ERROR: <error>
AT+XCGCLASS?	+XCGCLASS: <class> OK
AT+XCGCLASS=?	+XCGCLASS: ("B","CC") i.e. (list of supported class values) OK

5.4.2 Defined values

<class> may be

"B" meaning mobile class B (default) "CC" meaning mobile class CC.

5.5 Quality of Service Profile (Requested) +CGQREQ

This command allows the TE to specify a Quality of Service Profile that is used when the
MT sends an Activate PDP context request message to the network.

- Set command specifies a profile for the context identified by the (local) context iden- tification parameter, <cid>. The syntax form used only with parameter <cid>, causes the requested profile for the indicated context number to become undefined.

- Read command returns the current settings for each defined context.
- Test command returns values supported as a compound value.

5.5.1 Syntax

Command syntax: AT+CGQREQ = [<cid> [,<precedence> [,<delay> [,<reliability.>[,<peak> [,<mean>]]]]]]

Command	Possible Response(s)
AT+CGQREQ=[<cid> [,<precedence> [,<delay> [,<reliability.> [,<peak> [,<mean>]]]]]]	OK or ERROR
AT+CGQREQ?	+CGQREQ: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean> OK
AT+CGQREQ=?	+CGQREQ: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s),(list of supported <peak>s), (list of supported <mean>s) OK

5.5.2 <cid>

<cid>

It is a numeric parameter which specifies a particular PDP context definition. For <cid> refer to defined values under +CGDCONT command.

<precedence>

a numeric parameter which specifies the precedence class

<delay>

a numeric parameter which specifies the delay class

<reliability>

a numeric parameter which specifies the reliability class

<peak>

a numeric parameter which specifies the peak throughput class

<mean>

a numeric parameter which specifies the mean throughput class If a value is omitted for a particular class then the value is considered to be unspecified.

5.6 Quality of Service Profile (Minimum Acceptable) + CGQMIN

This command allows the TE to specify a minimum acceptable profile which is checked by the MT against the negotiated profile returned in the Activate PDP Context Accept message.

- The set command specifies a profile for the context identified by the (local) context identification parameter, <cid>.
- The read command returns the current settings for each defined context.
- The test command returns values supported as a compound value.

5.6.1 Syntax

Command syntax: AT+CGQMIN = [<cid> [,<precedence> [,<delay> [,<reliability.>[,<peak> [,<mean>]]]]]]

Command	Possible Response(s)
+CGQMIN=[<cid> [,<precedence> [,<delay> [, <reliability.> [,<peak> [,<mean>]]]]]]	OK Or ERROR
+CGQMIN?	+CGQMIN: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean> OK
+CGQMIN=?	+CGQMIN: <PDP_type>, (list of supported <precedence>s), (list of supported <delay>s), (list of supported <reliability>s) , (list of supported <peak> s), (list of supported <mean>s) OK

5.6.2 Defined Values

<cid>

It is a numeric parameter which specifies a particular PDP context definition. For <cid>
refer to defined values under +CGDCONT command.

<precedence>

a numeric parameter which specifies the precedence class

<delay>

a numeric parameter which specifies the delay class

<reliability>

a numeric parameter which specifies the reliability class

<peak>

a numeric parameter which specifies the peak throughput class

<mean>

a numeric parameter which specifies the mean throughput class If a value is omitted for a particular class then the value is considered to be unspecified.

5.7 Enter Data State +CGDATA

This execution command causes the MT to perform whatever actions are necessary to establish communication between the TE and the network using one or more GPRS PDP types. This may include performing a GPRS attach and one or more PDP context activations. If the parameters are accepted, MT displays the intermediate result code CONNECT on TE and enters the online data state; thereafter data transfer may proceed. No other commands following +CGDATA in the command line will be processed. After data transfer is complete, the MT re-enters the command state and the final result code is displayed on TE. In error case the final result code NO CARRIER or CME ERROR :
<error> is displayed. PS attachment and PDP context activation

procedures may take place prior to or during the PDP startup if they have not already been performed using the +CGATT and +CGACT commands. If no <cid> is given or if there is no matching context definition, the MT shall attempt to activate the context with whatever information is available to the MT. The other context parameters shall be set to their default values. If the activation is successful, data transfer may proceed. After data transfer is complete, and the layer 2 protocol termination procedure has completed successfully, the V.250 command state is re-entered and the MT returns the final result code OK.

- Set command specifies the <L2P> and <cid> to establish data call (csd connection state)
- Test command returns values supported as a compound value.

5.7.1 Syntax

Command syntax: AT+CGDATA = [<L2P> [,<cid> [,<cid> [,...]]]]

Command	Possible Response(s)
+CGDATA = [<L2P> [,<cid> [,<cid> [,...]]]]	CONNECT It follows data transfer or CME ERROR: <error>
+CGDATA=?	+CGDATA: (list of supported <L2P>s) OK

5.7.2 Defined Values

<L2P>

a string parameter that indicates the layer 2 protocol to be used between the TE and MT NULL none, for PDP type OSP: IHOSS (Obsolete)

PPP Point-to-point protocol for a PDP such as IP

PAD character stream for X.25 character (triple X PAD) mode (Obsolete)

X25 X.25 L2 (LAPB) for X.25 packet mode (Obsolete).

M-OPT-PPP MS supports manufacturing specific protocol

M-HEX MS supports manufacturing specific protocol

M-RAW_IP MS supports manufacturing specific protocol.

<cid>

a numeric parameter which specifies a particular PDP context definition (see the +CGDC ONT and +CGDSCONT commands).

5.8 Extended Error Report +CEER

This execution command provides an extended report of 1 line about categorized error causes.

Examples: +CEER: "No report available" +CEER: "CC setup error",1,"Unassigned (unal- located) number" +CEER: "SM detach",0,"No cause information available"

- Execution command provides an extended report of 1 line about categorized error causes.
- Test command returns "OK" string.

5.8.1 Syntax

Command syntax:

AT+CEER

Response syntax:

- In case of CC and SM categories:
  +CEER: <category>[,<cause>,<descriptions>]
- In case of SS category network error cause and network GSM cause
- +CEER: <category>,<cause>
- In case of SS category network reject cause
- +CEER: <category>,<tag>,<cause>

Command	Possible Response(s)

AT+CEER	+CEER: <category>[,<cause>,<descriptions>] OK
AT+CEER=?	OK

5.8.2 Defined Values

<category> may be "No report available" "CC setup error"

"CC modification error" "CC release"

"SM attach error"

"SM detach"

"SM activation error" "SM deactivation"

"SS network error cause" "SS network reject cause" "SS network GSM cause"

<cause>

contains a digit representing the error cause sent by network or internally. For <cause> refer Annex C.

<descriptions>

is a verbose string containing the textual representation of the Cause A table of possible <causes> and <descriptions> for CC and SM categories is available in Annex Cand D for SS error codes in Annex E.

5.9 Automatic Response to a Network Request for PDP Context Activation +CGAUTO

The set command disables or enables an automatic positive or negative response (auto- answer) to the receipt of a Nwinitiated Request PDP Context Activation message from the network in UMTS/GPRS and a NW-initiated Request EPS Bearer Activation/ Modification Request messages in EPS. It also provides control over the use of the V.250 basic commands 'S0', 'A' and 'H' for handling network requests for PDP context activation.

The setting does not affect the issuing of the unsolicited result code RING or +CRING.

- The set command disables or enables an automatic positive or negative response (auto- answer) to the receipt of a NW initiated Request PDP Context Activation message from the network.
- The read command returns the current setting for the auto-answer whether it's enabled or disabled.
- The test command returns the values of <n> supported by MT as a compound value.

5.9.1 Syntax

Command syntax:
AT+CGAUTO = [<n>]

Command	Possible Response(s)
+CGAUTO= [<n>]	OK Or CME ERROR : <error>
+CGAUTO?	+CGAUTO: <n> OK
+CGAUTO =?	+CGAUTO: (list of supported <n>s) OK

5.9.2 Defined Values

<n>

Is a numeric parameter which indicates the setting for the auto-answer to be used

0 Turn off automatic response for Packet Domain only

1 Turn on automatic response for Packet Domain only

2 Modem compatibility mode, Packet Domain only

3 Modem compatibility mode, Packet Domain and circuit switched calls (default)

4 Turn on automatic negative response for Packet Domain only

For <n> = 0 Packet Domains network requests are manually accepted or rejected by the

+CGANS command.

For <n> = 1 Packet Domain network requests are automatically accepted according to the description above.

For <n> = 2, automatic acceptance of Packet Domain network requests is controlled by the 'S0' command. Manual control uses the 'A' and 'H' commands, respectively, to accept and reject Packet Domain requests. (+CGANS may also be used.) Incoming circuit switched calls can be neither manually nor automatically answered.

For <n> = 3, automatic acceptance of both Packet Domain network requests and incoming circuit switched calls is controlled by the 'S0' command. Manual control uses the 'A' and 'H' commands, respectively, to accept and reject Packet Domain requests. (+CGANS may also be used.) Circuit switched calls are handled as described elsewhere in this specification.

For <n> = 4, Packet Domain network requests are automatically rejected.

Note: When the +CGAUTO=1 command is received, the MT shall attempt to perform a
PS attach if it is not already attached.

Failure will result in ERROR or, if enabled, +CME ERROR being returned to the TE. Subsequently, when the MT announces a network request for PDP context activation by issuing the unsolicited result code RING or +CRING to the TE, this is followed by the intermediate result code CONNECT. The MT then enters V.250 online data state and follows the same procedure as it would after having received a +CGANS=1 with no <L2P> or <cid> values specified.

5.10 PDP Context Modify +CGCMOD

The execution command is used to modify the specified PDP context (s) with respect to
QOS profiles and TFTs.

- The set command is used to modify the specified PDP context (s) with respect to QoS
  profiles and TFTs.
- The test command returns a list of <cid>s associated with active contexts.

5.10.1 Syntax

Command syntax: AT+CGCMOD = [<cid>[,<cid>[,...]]]

Command	Possible Response(s)
+CGCMOD= [<cid>[,<cid>[,...]]]	OK Or CME ERROR : <error>
+CGCMOD=?	+CGCMOD: (list of <cid>s associated with active contexts) OK

5.10.2 Defined Values

<cid>

a numeric parameter which specifies a particular PDP context definition (see the +CGDC ONT and +CGDSCONT commands)

5.11 3G Quality of Service Profile (Minimum acceptable) +CGEQMIN

This command allows the TE to specify a minimum acceptable profile, which is checked by the MT against the negotiated profile returned in the Activate/Modify PDP Context Accept message.

- Set command specifies a profile for the context identified by the (local) context identi- fication parameter, <cid>. The specified profile will be stored
- The read command returns the current settings for each defined context.
- Test command returns values supported as a compound value. If the MT supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line.

5.11.1 Syntax of the Command

Command syntax :
AT+ CGEQMIN

Command	Possible Response(s)
AT+CGEQMIN=[<cid> [,<Traffic_class> [,<Maximum _bitrate_UL> [,<Maximum_bitrate_DL> [,<Guaranteed_bitrate_UL> [,<Guaranteed_bitrate_ DL> [,<Delivery_order> [,<Maximum_SDU_size> [,<SDU_error_ratio> [,<Residual_bit_error_ratio> [,<Delivery_of_erroneous_SDUs> [,<Transfer_delay> [,<Traffic_handling_priority> [,<Source_statistics_ descriptor> [,<Signalling_indication>]]]]]]]]]]]]]]	OK ERROR
AT+CGEQMIN?	+CGEQMIN: <cid>, <Traffic_class> ,<Maximum_bitrate_UL>, <Maximum_bitrate_DL> ,<Guaranteed_bitrate_UL> ,<Guaranteed_bitrate_DL>, <Delivery_order> ,<Maximum_SDU_size> , <SDU_error_ratio> ,<Residual_bit_error_ratio> ,<Delivery_of_erroneous_SDUs> ,<Transfer delay> ,<Traffic_handling_priority> [,<Source_statistics_descriptor> ,<Signalling_indication>] [<CR><LF> +CGEQMIN: <cid>, <Traffic_class> , <Maximum_bitrate_UL> ,<Maximum_bitrate_DL>,<Guaranteed_bitrate_UL> ,<Guaranteed_bitrate_DL>,<Delivery_order> ,<Maximum_SDU_size> ,<SDU_error_ratio> ,<Residual_bit_error_ratio> ,<Delivery_of_erroneous_SDUs> ,<Transfer_delay>,<Traffic_handling_priority> [,<Source_statistics_descriptor> ,<Signalling_indication>][...]] Error

AT+CGEQMIN=?	+CGEQMIN: <PDP_type>, (list_of supported <Traffic _class>s) ,(list of supported <Maximum_bitrate_ UL>s) , (list of supported <Maximum_bitrate_D L>s), (list of supported <Guaranteed_bitrate_UL> s), (list of supported <Guaranteed_bitrate_DL> s) ,(list of supported <Delivery_order>s) ,(list of supported <Maximum_SDU_size>s) ,(list of sup- ported <SDU_error_ratio>s) , (list of supported <Residual_bit_error_ratio>s) ,(list of supported < Delivery_of_erroneous_SDUs>s) , (list of supported <Transfer_delay>s) ,(list of supported <Traffic_ handling_priority>s) [,(list of supported <Source_ statistics_descriptor>s) ,(list of supported <Signalling _indication>s)] [<CR><LF> +CGEQMIN: <PDP_type>, (list of supported <Traffic_class>s) ,(list of supported <Maximum_bitrate_UL>s), (list of supported < Maximum_bitrate_DL>s) ,(list of supported < Guaranteed_bitrate_UL>s), (list of supported < Guaranteed_bitrate_DL>s) ,(list of supported < Delivery_order>s) ,(list of supported <Maximum_ SDU_size>s) ,(list of supported <SDU_error_ratio>s) ,(list of supported <Residual_bit_error_ratio>s) ,(list of supported <Delivery_of_erroneous_SDUs>s) ,(list of supported <Transfer_delay>s) ,(list of supported <Traffic_handling_priority>s) [,(list of supported < Source_statistics_descriptor>s) ,(list of supported <Signalling_indication>s)] [...]] Error

5.11.2 Defined values

<cid>

a numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands). The following parameters are defined in 3GPP TS 23.107 [46].

<Traffic_class>

a numeric parameter that indicates the type of application for which the UMTS bearer service is onfirmat. 0 conversational 1 streaming 2 interactive 3 background Other values are reserved.

<Maximum_bitrate_UL>:

a numeric parameter that indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQMIN=...,32, ...) (refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Maximum_bitrate_DL>:

a numeric parameter that indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as
'32' (e.g. AT+CGEQMIN=...,32, ...) (refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Guaranteed_bitrate_UL>:

a numeric parameter that indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQMIN=...,32, ...) (refer 3GPP TS
24.008 [8] subclause 10.5.6.5).

<Guaranteed_bitrate_DL>:

a numeric parameter that indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+CGEQMIN=...,32, ...) (refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Delivery_order>:

a numeric parameter that indicates whether the UMTS bearer shall provide in-sequence
SDU delivery or not. 0 no

1 yes

Other values are reserved.

<Maximum_SDU_size>

a numeric parameter (1,2,3,...) that indicates the maximum allowed SDU size in octets
(refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<SDU_error_ratio>

a string parameter that indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as 'mEe'. As an example a target SDU error ratio of 5.10-3 would be specified as '5E3' (e.g. AT+CGEQMIN=...,"5E3",...) (refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Residual_bit_error_ratio>

a string parameter that indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as 'mEe'. As an example

a target residual bit error ratio of 5.10-3 would be specified as 'E3' (e.g. AT+CGEQMI N=....,"5E3",...) (refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Delivery_of_erroneous_SDUs>

a numeric parameter that indicates whether SDUs detected as erroneous shall be deliv- ered or not. 0 no

1 yes

2 no detect

Other values are reserved.

<Transfer_delay>

a numeric parameter (0,1,2,...) that indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds (refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Traffic_handling_priority>

a numeric parameter (1,2,3,...) that specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers (refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Source_Statistics_Descriptor>

Supported in R7 P S a numeric parameter that specifies characteristics of the source of the submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as conversational or streaming (refer 3GPP TS 24.008 [8] subclause
10.5.6.5). 0 Characteristics of SDUs is unknown (default value)

1 Characteristics of SDUs corresponds to a speech source

Other values are reserved.

<Signalling_Indication>

Supported in R7 P S a numeric parameter used to indicate confirmat content of submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as interactive (refer 3GPP TS 24.008 [8] subclause 10.5.6.5). 0 PDP context is not optimized for confirmat (default value)

1 PDP context is optimized for confirmat

<PDP_type>

(see +CGDCONT and +CGDSCONT commands). If a value is omitted for a particular class then the value is considered to be unspecified.

5.12 3G Quality of Service Profile (Requested) +CGEQR EQ

This command allows the TE to specify a UMTS Quality of Service Profile that is used when the MT sends an Activate PDP Context Request message to the network.

- Set command specifies a profile for the context identified by the (local) context identi- fication parameter, <cid>. The specified profile will be stored in the MT and sent to the network only at activation or MS-initiated modification of the related context.
- Read command returns the current settings for each defined context.
- Test command returns values supported as a compound value. If the MT supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line.

5.12.1 Syntax of the Command

Command syntax : AT+ CGEQREQ

Command	Possible Response(s)
AT+cgeqreq=[<cid> [,<Traffic_class> [, <Maximum _bitrate _UL> [,<Maximum_bitrate_DL> [,< Guaranteed_bitrate_UL> [,<Guaranteed_bitrate_ DL> [,<Delivery_order> [,<Maximum_SDU_size> [,<SDU_error_ratio> [,<Residual_bit_error_ratio> [, <Delivery_of_erroneous_SDUs> [,<Transfer_delay> [,<Traffic_handling_priority> [,<Source_statistics_ descriptor> [,<Signalling_indication>]]]]]]]]]]]]]]	OK ERROR

AT+cgeqreq?	+cgeqreq: <cid>, <Traffic_class> ,<Maximum_ bitrate_UL>, <Maximum_bitrate_DL> ,<Guaranteed _bitrate_UL> ,<Guaranteed_bitrate_DL>, <Delivery _order> ,<Maximum_SDU_size> , <SDU_error_ ratio> ,<Residual_bit_error_ratio> ,<Delivery_of _erroneous_SDUs> ,<Transfer_delay> ,<Traffic_ handling_priority> [,<Source_statistics_descriptor> ,<Signalling_indication>] [<CR><LF>+cgeqreq: <cid>, <Traffic_class> , <Maximum_bitrate _UL> ,<Maximum_bitrate_DL> , <Guaranteed_bitrate_UL> ,<Guaranteed_bitrate _DL>, <Delivery_order> ,<Maximum_SDU_size> , <SDU_error_ratio> ,<Residual_bit_error_ratio> , <Delivery_of_erroneous_SDUs> , <Transfer_delay> , <Traffic_handling_priority> [, <Source_statistics_ descriptor> , <Signalling_indication>][...]]

Command	Possible Response(s)
AT+cgeqreq=?	+cgeqreq: <PDP_type>, (list_of supported <Traffic _class>s) ,(list of supported <Maximum_bitrate_ UL>s) ,(list of supported <Maximum_bitrate_DL> s), (list of supported <Guaranteed_bitrate_UL> s), (list of supported <Guaranteed_bitrate_DL> s) ,(list of supported <Delivery_order>s) ,(list of supported <Maximum_SDU_size>s) ,(list of supported <SDU_error_ratio>s) , (list of supported <Residual_bit_error_ratio>s) ,(list of supported < Delivery_of_erroneous_SDUs>s) ,(list of supported <Transfer_delay>s) ,(list of supported <Traffic_ handling_priority>s) [,(list of supported <Source_ statistics_descriptor>s) ,(list of supported <Signalling _indication>s)] [<CR><LF>+cgeqreq: <PDP_type>, (list of supported <Traffic_class>s) ,(list of supported < Maximum_bitrate_UL>s), (list of supported < Maximum_bitrate_DL>s) ,(list of supported < Guaranteed_bitrate_UL>s), (list of supported < Guaranteed_bitrate_DL>s) ,(list of supported < Delivery_order>s) ,(list of supported <Maximum_ SDU_size>s) ,(list of supported <SDU_error_ratio>s) ,(list of supported <Residual_bit_error_ratio>s) ,(list of supported <Delivery_of_erroneous_SDUs>s) ,(list of supported <Transfer_delay>s) ,(list of supported <Traffic_handling_priority>s) [,(list of supported < Source_statistics_descriptor>s) ,(list of supported <Signalling_indication>s)] [...]]

5.12.2 Defined values

<cid>

A numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands). The following parameters are defined in 3GPP TS 23.107 [46].

<Traffic_class>

A numeric parameter that indicates the type of application for which the UMTS bearer service is onfirmat. 0 conversational (default)

1 streaming

2 interactive

3 background

Other values are reserved.

<Maximum_bitrate_UL>:

A numeric parameter that indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+cgeqreq=...,32, ...) (refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Maximum_bitrate_DL>:

A numeric parameter that indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP. As an example a bitrate of 32kbit/s would be specified as
'32' (e.g. AT+cgeqreq=...,32, ...) (refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Guaranteed_bitrate_UL>:

A numeric parameter that indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+cgeqreq=...,32, ...) (refer 3GPP TS
24.008 [8] subclause 10.5.6.5).

<Guaranteed_bitrate_DL>:

A numeric parameter that indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. AT+cgeqreq=...,32, ...) (refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Delivery_order>:

A numeric parameter that indicates whether the UMTS bearer shall provide in-sequence
SDU delivery or not. 0 no

1 yes

Other values are reserved.

<Maximum_SDU_size>

A numeric parameter (1,2,3,...) that indicates the maximum allowed SDU size in octets
(refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<SDU_error_ratio>

A string parameter that indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as 'mEe'. As an example a target SDU error ratio of 5.10-3 would be specified as '5E3' (e.g. AT+cgeqreq=...,"5E3",...) (refer 3GPP TS 24.008 [8] subclause 10.5.6.5)

<Residual_bit_error_ratio>

A string parameter that indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as 'mEe'. As an example a target residual bit error ratio of 5.10-3 would be specified as 'E3' (e.g. AT+cgeqreq=....,"5E3",...) (refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Delivery_of_erroneous_SDUs>

A numeric parameter that indicates whether SDUs detected as erroneous shall be delivered or not. 0 no

1 yes

2 no detect

Other values are reserved.

<Transfer_delay>

A numeric parameter (0,1,2,...) that indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds (refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Traffic_handling_priority>

A numeric parameter (1,2,3,...) that specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers (refer 3GPP TS 24.008 [8] subclause 10.5.6.5).

<Source_Statistics_Descriptor>

Supported in R7 P S a numeric parameter that specifies characteristics of the source of the submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as conversational or streaming (refer 3GPP TS 24.008 [8] subclause
10.5.6.5). 0 Characteristics of SDUs is unknown (default value)

1 Characteristics of SDUs corresponds to a speech source

Other values are reserved.

<Signalling_Indication>

Supported in R7 P S a numeric parameter used to indicate confirmat content of submitted SDUs for a PDP context. This parameter should be provided if the Traffic class is specified as interactive (refer 3GPP TS 24.008 [8] subclause 10.5.6.5). 0 PDP context is not optimized for confirmat (default value)

1 PDP context is optimized for confirmat

<PDP_type> (see +CGDCONT and +CGDSCONT commands).

If a value is omitted for a particular class then the value is considered to be unspecified.

5.13 3G Quality of Service Profile (Negotiated) +CGEQN EG

This command allows the TE to retrieve the negotiated QoS profiles returned in the

Activate PDP Context Accept message.

- Set command allows the TE to retrieve the negotiated QoS profiles returned in the

  Activate PDP Context Accept message.

- Test command returns a list of <cid>s associated with active contexts.

5.13.1 Syntax of the Command

Command	Possible Response(s)
AT+CGEQNEG =[<cid>[,<cid>[,...]]]	+CGEQNEG: <cid>, <Traffic class> , <Maximum bi-trate UL>, <Maximum bitrate DL> , <Guaranteed bitrate UL>, <Guaranteed bitrate DL>, <Delivery order> ,<Maximum SDU size> , <SDU error ratio> , <Residual bit error ratio> , <Delivery of erroneous S DUs> , <Transfer delay> , <Traffic handling priority> [<CR><LF>+CGEQNEG: <cid>, <Traffic class> , <Maximum bitrate UL>, <Maximum bitrate DL> , <Guaranteed bitrate UL>, <Guaranteed bitrate DL> , <Delivery order> , <Maximum SDU size> , <SDU error ratio> , <Residual bit error ratio> , <Delivery of erroneous SDUs> , <Transfer delay> , <Traffic handling priority> [....]]
AT+CGEQNEG=?	+CGEQNEG: (list of <cid>s associated with active contexts)

5.13.2 Defined values

<cid>

a numeric parameter which specifies a particular PDP context definition (see +CGDCONT

and +CGDSCONT commands).

The following parameters are defined in 3GPP TS 23.107 [46]

<Traffic class>

a numeric parameter that indicates the type of application for which the UMTS bearer service is vailable. 0 conversational (default)

1 streaming

2 interactive

3 background

Other values are reserved.

<Maximum bitrate UL>

a numeric parameter that indicates the maximum number of kbits/s delivered to UMTS (up-link traffic) at a SAP. As an example a bitrate of 32 kbit/s would be specified as '32' (e.g. +CGEQNEG:...,32, ...) (refer TS 24.008 [8] subclause 10.5.6.5).

<Maximum bitrate DL>

a numeric parameter that indicates the maximum number of kbits/s delivered by UMTS (down-link traffic) at a SAP As an example a bitrate of 32 kbit/s would be specified as

'32' (e.g. +CGEQNEG:...,32, ...) (refer TS 24.008 [8] subclause 10.5.6.5).

<Guaranteed bitrate UL>

a numeric parameter that indicates the guaranteed number of kbits/s delivered to UMTS (up-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32kbit/s would be specified as '32' (e.g. +CGEQNEG: ...,32, ...) (refer TS 24.008 [8] subclause 10.5.6.5).

<Guaranteed bitrate DL>

a numeric parameter that indicates the guaranteed number of kbits/s delivered by UMTS (down-link traffic) at a SAP (provided that there is data to deliver). As an example a bitrate of 32 kbit/s would be specified as '32' (e.g. +CGEQNEG: ...,32, ...) (refer TS

24.008 [8] subclause 10.5.6.5).

<Delivery order>

a numeric parameter that indicates whether the UMTS bearer shall provide in-sequence

SDU delivery or not. 0 no

1 yes

Other values are reserved.

<Maximum SDU size>

a numeric parameter that (1,2,3,...) indicates the maximum allowed SDU size in octets

(refer TS 24.008 [8] subclause 10.5.6.5).

<SDU error ratio>

a string parameter that indicates the target value for the fraction of SDUs lost or detected as erroneous. SDU error ratio is defined only for conforming traffic. The value is specified as 'mEe'. As an example a target SDU error ratio of 5.10-3 would be specified as '5E3' (e.g. +CGEQNEG:....,"5E3",...) (refer TS 24.008 [8] subclause 10.5.6.5).

<Residual bit error ratio>

a string parameter that indicates the target value for the undetected bit error ratio in the delivered SDUs. If no error detection is requested, Residual bit error ratio indicates the bit error ratio in the delivered SDUs. The value is specified as

'mEe'. As an example a target residual bit error ratio of 5.10-3 would be specified as '5E3' (e.g.

+CGEQNEG:...,"5E3",...) (refer TS 24.008 [8] subclause 10.5.6.5).

<Delivery of erroneous SDUs>

a numeric parameter that indicates whether SDUs detected as erroneous shall be deliv- ered or not. 0 no

1 yes

2 no detect

Other values are reserved.

<Transfer delay>

a numeric parameter (0,1,2,...) that indicates the targeted time between request to transfer an SDU at one SAP to its delivery at the other SAP, in milliseconds (refer TS 24.008 [8] subclause 10.5.6.5).

<Traffic handling priority>

a numeric parameter (1,2,3,...) that specifies the relative importance for handling of all SDUs belonging to the UMTS bearer compared to the SDUs of other bearers (refer TS 24.008 [8] subclause 10.5.6.5

5.14 Show PDP Address +CGPADDR

The command lists PDP addresses for the specified context identifiers.

- The set command returns a list of PDP addresses for the specified context identifiers.
- Test command returns a list of defined <cid>s.

5.14.1 Syntax

Command syntax: AT+CGPADDR=[<cid> [,<cid>[,...]]]

Command	Possible Response(s)
+CGPADDR=[<cid> [,<cid>[,...]]]	+CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]] [<CR><LF> +CGPADDR: <cid>[,<PDP_addr_1>[,<PDP_addr_2>]]][...]] OK
+ CGPADDR=?	+CGPADDR: (list of defined <cid>s) OK

5.14.2 Defined Values

<cid>

A numeric parameter which specifies a particular PDP context definition (see the +CGDC ONT and +CGDSCONT commands). If no <cid> is specified, the addresses for all defined contexts are returned.

<PDP_addr_1> and <PDP_addr_2>:

each is a string 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 <PD P_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.

Note: IPv6 address obtained on LTE will be prefixed with a constant 8 byte address "FE.80.00.00.00.00.00.00" if network has not provided.

5.15 Radio Link Protocol +CRLP

This command is used to change the radio link protocol (RLP) parameters used when nontransparent data-calls are originated.

- Set command is used to change the radio link protocol(RLP) parameters.
- Read command returns the current CRLP settings.
- Test command returns lists of supported <iws>, <mws>,<T1>, <N2>
- Ver 2 of RLP not supported

5.15.1 Syntax

Command syntax: AT+CRLP= [<iws>[,<mws>[,<T1>[,<N2>]]]]

Command	Possible Response(s)
AT+CRLP=61,61,48,6,0,30	OK or CME ERROR: <error>
AT+CRLP?	+CRLP: <iws>,<mws>,<T1>,<N2> OK
AT+CRLP=?	+CRLP: (0-61),(0-61),(39-255),(1-255) i.e. lists of supported <iws>, <mws>, <T1>, <N2> OK

5.15.2 Defined Values

<iws>

IWF to MS window size

<mws>

MS to IWF window size

<T1>

acknowledgement timer T1 (in units of 10ms)

<N2>

retransmission attempts

5.16 Set Type of Authentication +XGAUTH

This proprietary command allows to enter the type of authentication for a user-name
(using a password) for the specified PDP context

- Set command allows to enter the type of authentication for a user-name (using a password) for the specified PDP context.
- Test command rerturns (list of supported <cid>s),(list of supported <auth>s),lname, lpwd.

5.16.1 Syntax

Command syntax: AT+XGAUTH=<cid>,<auth>,<name>,<pwd>

Command	Possible Response(s)
AT+XGAUTH=1,1,"GSM","1234"	OK or CME ERROR: <error>
AT+XGAUTH=?	+XGAUTH: (1-20),(0-1),20,32 ie..(list of supported <cid>s),(list of supported <auth>s),lname,lpwd OK

5.16.2 Defined Values

<cid>

PDP context identifier

<auth>

authentication may be: 0 meaning authentication protocol not used (NONE: see also 2.1
<APN>) (default)

1 meaning personal authentication protocol (PAP: see also 2.1 <APN>)

2 meaning handshake authentication protocol (CHAP: see also 2.1 <APN>)

<name>

user name as string with length <lname>

<pwd>

password as string with maximum length <lpwd>

5.17 Dynamic DNS Request +XDNS

This command enables / disables a dynamic DNS (Domain Name Service) request before context activation. After context activation the DNS addresses of all activated contexts can be read out.

- Set command enables/ disables a dynamic DNS (Domain Name Service) request before context activation.
- Read command is used to read DNS addresses of all activated contexts after context activation.
- Test command rerturns (list of supported <cid>s), (list of supported <mode>s)

5.17.1 Syntax

Command syntax :
AT+XDNS=<cid>,<mode>

Command	Possible Response(s)
AT+XDNS=1,1	OK or CME ERROR: <error>
AT+XDNS?	+XDNS: <cid>, <primary DNS>, <secondary DNS> [+XDNS: <cid>, <primary DNS>, <secondary DNS> [...]] OK
AT+XDNS=?	+XDNS: (1-20) , (0-3) i.e. (list of supported <cid>s), (list of supported <mode>s) OK

5.17.2 Defined Values

<mode> may be

0 disable dynamic DNS Request (default)

1 enable dynamic DNS Request (Ipv4)

2 enable dynamic DNS Request (Ipv6)

3 enable dynamic DNS Requet (Ipv4v6)

Note: Modes 2 & 3 will be supported only if the feature FEAT_IPV6_SUPPORT is enabled.

<primary DNS>, <secondary DNS>

are the strings which represents the DNS addresses, and given as dot-separated numeric
(0-255) parameter of the form: a1.a2.a3.a4 for IPv4

a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a

16 for IPv6 and

a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.a17.a18.a19.a20
for IPv4v6.(here a1 to a4 represent IPV4 and a5 to a20 represent IPv6)

The DNS address is by default "0.0.0.0" which is not a valid address.

Note: IPv6 address obtained on LTE will be prefixed with a constant 8 byte address
"FE.80.00.00.00.00.00.00" if network has not provided.

5.18 Notify DUN Status +XNOTIFYDUNSTATUS

This command enables / disables unsolicited notification of the Dial Up Network status. The DUN is assumed to be a data call with PPP as L2P protocol. This is even enabled in a CDC-ECM data connection (see CGDATA).

- Set command enables/ disables the unsolicited notification of DUN status.
- Read command is used to read if DUN notification unsolicited indications are enabled or disabled.
- Test command rerturns (list of

supported <mode>s)

5.18.1 Syntax

Command syntax : AT+ XNOTIFYDUNSTATUS =<mode>

Command	Possible Response(s)
AT+ XNOTIFYDUNSTATUS =1	OK or CME ERROR: <error>
AT+ XNOTIFYDUNSTATUS?	+ XNOTIFYDUNSTATUS: <mode> OK
AT+ XNOTIFYDUNSTATUS =?	+ XNOTIFYDUNSTATUS: (0,1) OK i.e. modes supported

5.18.2 Defined Values

<mode> may be

0 disable unsolicited notification of DUN status (default)

1 enable unsolicited notification of DUN status

Following unsolicited notifications can be expected:

+XNOTIFYDUNSTATUS: <status>

<status> may be

0: DUN activation in progress

1: DUN deactivation in progress

2: DUN activated

3: DUN deactivated

5.19 Set Multi Slot Class +XMULTISLOT

This proprietary command allows selective setting the multi slot class either for GPRS or

EGPRS or both.

- Set command allows to set the multi slot class either for GPRS or EGPRS or both.
- Read command gives the current set multislot class.
- Test command rerturns (list of supported <GPRS_multislot_class>es), (list of supported
  <EGPRS_multislot_class>es), (list of supported
  <DTM_GPRS_multislot_class>es), (list of supported
  <DTM_EGPRS_multislot_class>es).

5.19.1 Syntax

Command Syntax:
AT+XMULTISLOT=[GPRS_multi_slot_class>][,[<EGPRS_multi_slot_
class>] [,[<DTM_GPRS_multi_slot_class>][,<DTM_EGPRS_multi_slot_class>]]]

Command	Possible response(s)
AT+XMULTISLOT=1,1,5,5	OK or CME ERROR: <error>
AT+XMULTISLOT?	+XMULTISLOT: 1,1,5,5 OK
AT+XMULTISLOT=?	+XMULTISLOT: (1-29),(1-29), (0,5,9,11),(0,5,9,11) i.e. (list of supported <GPRS_multislot_class>es),(list of supported <EGPRS_multislot_class>es), (list of supported <DTM_GPRS_multislot_class>es),(list of supported <DTM_EGPRS_multislot_class>es) OK

5.19.2 Defined Values

<GPRS_multislot_class>

user selected GPRS related multi slot class which may be in range of 1-29

<EGPRS_multislot_class>

user selected EGPRS related multi slot class which may be in range of 1-29

<DTM_GPRS_multislot_class>

user selected DTM_GPRS related multi slot class which may be 0,5,9 or 11

<DTM_EGPRS_multislot_class>

user selected DTM_EGPRS related multi slot class which may be 0,5,9 or 11

Note:

1.Every parameter can be stated separately, preceding commas are required.

2.If dtm_gprs_multi_slot_class is set to zero no dtm_egprs_multi_slot_class not equal to zero can be stated, (dtm_gprs_multi_slot_class=0 means no DTM at all is supported)

3.Not all possible values may be available in any build: the supported values are depen- dend on the supported classes / DTM which are configured via features/compilerswitches.

5.20 Read Counter of sent or received GPRS data +XGCNTRD

This command allows the application to check for each defined context, how much bytes are sent or received. There are two counters defined for each context. One displays the sent/received bytes for the current/last session (session counter) and the other displays the total number of sent/received bytes (total counter) per context.

5.20.1 Syntax of the Command

Command syntax: AT+XGCNTRD

Command	Possible Response(s)
AT+XGCNTRD	+XGCNTRD: cid>,<bytes_sent>,<bytes_received>,<total_bytes_sent>,<total_bytes_received><CR><LF> ... (repetition line for each defined context) +XGCNTRD: <cid>,<bytes_sent>,<bytes_received>,<total_bytes_sent>,<total_bytes_received> <CR><LF> OK or CME ERROR: <error>
AT+XGCNTRD =?	OK

5.20.2 Defined values

<cid>

context identifier

<bytes_sent>

long unsigned integer containing the amount of sent bytes for the current, if the context is active, or the last active context;

<bytes_received>

long unsigned integer containing the amount of received bytes for the current, if the context is active, or the last active context;

<total_bytes_sent>

long unsigned integer containing the total amount of sent bytes for the context since definition or last reset;

<total_bytes_received>

long unsigned integer containing the total amount of received bytes for the context since definition or last reset;

5.21 Data call status reporting +XDATASTAT

This command shall be used to enable/disable the unsolicited data call status event notifications.

- Set command enables/disables unsolicited data call status event notifications.
- Read command returns current <stat> and unsolicited event notification status<n>
- Test command returns list of supported <n>s.

5.21.1 Syntax

Command syntax: AT+XDATASTAT=<n> Unsolicited result: +XDATASTAT: <stat>

Command	Possible response(s)

AT+XDATASTAT=n	OK or CME ERROR: <error>
AT+XDATASTAT?	+ XDATASTAT: <stat>,<n> OK or CME ERROR: <error>
AT+ XDATASTAT =?	+ XDATASTAT: (list of supported modes) OK or CME ERROR: <error>

5.21.2 Defined Values

<n>

1: data call status event notification is enabled

0: data call status event notification is disabled (default)

<stat>

1: GPRS session is resumed

0: GPRS session is suspended

5.22 Set1reset counter of sent or received GPRS data +XGCNTSET

The command AT+XGCNTSET allows to set the counter for total sent/received bytes for each defined context to zero or any other offset value. Whenever the total counter for a
<cid> is set (to zero or a certain value), the session counter for this <cid> will be set to zero. If the <cid> equals zero than the total counter for every defined context is set to zero. Given offset parameters are ignored in this case.

5.22.1 Syntax

Command syntax:
AT+XGCNTSET=<cid>,[<total_bytes_sent_offset>,<total_bytes_received_offset>]

Command	Possible responses
AT+XGCNTSET=1,20,20	OK or CME ERROR: <error>
AT+XGCNTSET=?	+XGCNTSET: (0-20),(0-2147483646),(0-2147483646) i.e. (range of <cid>s),(range of <total_bytes_sent_offset>),(range of <total_bytes_received_offset>) OK

5.22.2 Defined values

<cid>:

integer containing the local PDP context identifier in range of 0-255;

<total_bytes_sent_offset>:

long integer containing the offset of total sent bytes used for counting in range 0-0x7FF FFFFE;

<total_bytes_received_offset>:

long integer containing the offset of total received bytes used for counting in range
0-0x7FFFFFFE.

5.23 Establish ECM Data Connection +XCEDATA

This execution command causes the MT to perform whatever actions are necessary to establish data communication between the TE and the network over CDC-ECM. This may include performing a GPRS attach and PDP context activation. If the parameters are accepted, MT will establish a GPRS connection on the CEC-ECM channel specified as part of this command. After data transfer is complete, the MT re-enters the command state and the final result code is displayed on TE. In error case, the final result code NO CARRIER or CME ERROR : <error> is displayed. PS attachment and PDP context activation procedures may

take place prior to or during the PDP startup if they have not already been performed using the +CGATT and +CGACT commands. This command is available only if the feature flag FEAT_CDCECM is enabled.

- Set command specifies the <cid> and <ECM_id> to be establish a data call
- Read command the mapped values.
- Test command returns the supported cid's and ECM id's.

5.23.1 Syntax

Command syntax:
AT+XCEDATA = <cid>, <ECM_id>

Command	Possible Response(s)
+XCEDATA = <cid>, <ECM_id>	OK or CME ERROR: <error>
+XCEDATA?	+XCEDATA: [(mapped cid and ECM id pair),] [(mapped cid and ECM id pair),][(mapped cid and ECM id pair)] OK
+XCEDATA=?	+XCEDATA: (1-20), (0-2) i.e. (list of supported cid's), (list of supported ECM id's) OK

5.23.2 Defined Values

<cid>

a numeric parameter which specifies a particular PDP context definition (see the +CGDC ONT and +CGDSCONT commands). It ranges from 1 to 20.

<ECM_id>

a numeric parameter which specifies one of the three CDC ECM interfaces. These interfaces are supported as a part of the Datacard feature. It ranges from 0 to 2.

Note: This command is available only if CDC ECM is enabled.

5.24 Set Call Reject Cause +XSETCAUSE

This command sets the Call Reject cause.

- Set command sets the Call Reject Cause.
- Read Command reads the currently selected <oper>,<cause>
- Test command returns list of all supported <oper>,<cause>

5.24.1 Syntax of the Command

AT+XSETCAUSE=<oper>,<cause>

Command	Possible responses
AT+XSETCAUSE=<oper>,<cause>	OK
AT+XSETCAUSE?	+XSETCAUSE: <oper>,<cause> OK
AT+XSETCAUSE=?	+XSETCAUSE: (0,1),(1,3,6,8,16-19,21,22,25-31,34,38,41-44,47,49,50,55,57,58,63,65,68-70,79,81,87,88,91,95-102,111,127)

5.24.2 Defined values

<oper>

1 Set Call reject cause for voice call (defavult)

<cause>

Causes are according to 3GPP spec 24.008 Table 10.5.123:

Causes	Description
1	Unassigned (unallocated) number
3	No route to destination
6	Channel unacceptable

8	Operator determined barring
16	Normal Call Clearing (default)
17	User Busy
18	User not responding
19	User alerting no answer
21	Call rejected
22	Number changed
25	Pre-emption
26	Non selected user clearing
27	Destination out of order
28	Invalid number format(incomplete number)
29	Facility rejected
30	Response to STATUS ENQUIRY
31	Normal , Unspecified
34	No circuit/channel available
38	Network out of order
41	Temporary failure
42	Switching equipment congestion
43	Access information discarded
44	Requested circuit/channel not available
47	Resources unavailable, unspecified
49	Quality of service unavailable
50	Requested facility not subscribed
55	Incoming calls barred within the CUG
57	Bearer capability not authorized
58	Bearer capability not presently available
63	Service or option not available, unspecified
65	Bearer service not implemented
68	ACM equal to or greater than ACMmax
69	Requested facility not implemented
70	Only restricted digital information bearer capability is available
79	Service or option not implemented, unspecified
81	Invalid transaction identifier value
87	User not member of CUG
88	Incompatible destination

91	Invalid transit network selection
95	Semantically incorrect message
96	Invalid mandatory information
97	Message type non-existent or not implemented
98	Message type not compatible with protocol state
99	Information element non-existent or not implemented

100	Conditional IE error
101	Message not compatible with protocol state
102	Recovery on timer expiry
111	Protocol error, unspecified
127	Internetworking unspecified

5.25 Manual response to a network request for PDP con- text activation +CGANS

This command requests the MT to respond to a network request for Packet Domain PDP context activation which has been vailabl to the TE by the RING or +CRING unsolicited result code.

- The set command requests the MT to respond to a network request for Packet Domain PDP context activation which has been vailabl to the TE by the RING or +CRING unsolicited result code.
- The test command returns the values of <response> and <L2P> supported by the MT as compound values.

5.25.1 Syntax

Command syntax:
AT+CGANS=[<response>,[<L2P> ,[<cid>]]]

Command	Possible Response(s)
+CGANS=[<response>,[<L2P> ,[<cid>]]]	OK Or CME ERROR : <error>

+CGANS=?	+CGANS: (list of supported <response>s), (list of supported <L2P>s) OK

5.25.2 Defined Values

<response>:

a numeric parameter which specifies how the request should be responded to.

0 reject the request

1 accept and request that the PDP context be activated

If <response> is omitted it is assumed to be 0. Other values are reserved and will result in the ERROR response.

<L2P>:

a string parameter which indicates the layer 2 protocol to be used (see +CGDATA
command).

<cid>:

a numeric parameter which specifies a particular PDP context definition (see the +CGDC ONT and +CGDSCONT commands). The <response> parameter allows the TE to accept or reject the request.

If <response> is 0, the request is rejected and the MT returns OK to the TE. If <response> is 1, the following procedure is followed by the MT.

Commands following the +CGANS command in the AT command line shall not be processed by the MT.

If the <L2P> parameter value is unacceptable to the MT, the MT shall return an ERR OR or +CME ERROR response. Otherwise, the MT issues the intermediate result code CONNECT and enters V.250 online data state. If no <cid> is given or if there is no matching context definition, the MT will attempt to activate the context using the values for PDP type and PDP address provided by the network, together with any other relevant information known to the MT. The other context parameters will be set to their default values.

If the activation is successful, data transfer may proceed NOTE: This is not the same as if the MT issues a +CGDATA (or +CGACT) command after receiving a +CRING unsolicited result code. A +CGDATA (or +CGACT) does not command the MT to acknowledge the network request but rather to make a new request for context activation. The network request would be ignored.

5.26 Define PDP Context +CGDCONT

This command allows to specify specific PDP context parameter values for a PDP context, identified by the local context identification parameter <cid>.

If the command is used only with the one parameter <cid>, it means that the corre- sponding PDP context becomes undefined.

Check of ACL(APN Control List): The ACL will be checked Only if an USIM is inserted. Before performing of context definition it will be checked if the ACL-service is enabled and activated [3GPP TS 31.102 version 9.3.0 , sections 4.2.8 and 4.2.47]. If yes all APNs from ACL of EFACL of USIM will be read out and compared with the requested APN.

- If the requested APN is listed in the ACL the context definition will be performed.
- If the requested APN is empty ("") and ACL contains "network provided APN" the context definition will also be requested.
- If the APN is not listed in the ACL the command returns the error: CME ERROR: 4 or
  CME ERROR: Operation not supported
- If the ACL-service is not enabled or not activated in the USIM or a GSM-SIM is inserted the context definition will be performed without any checks.
- Set command specifies PDP context parameter values for a PDP context identified by the (local) context identification parameter, <cid>.
- Read command returns the current settings for each defined context.
- Test command returns values supported as a compound value.

5.26.1 Syntax

Command syntax:

AT+CGDCONT= [<cid> [, <PDP_type> [, <APN> [, <PDP_addr>[,<d_comp> [, <h_comp>>[,<IPv4AddrAlloc>[,<emergency_indication>[,<PCSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>]]]]]]]]]

Command	Possible Response(s)
AT+CGDCONT=	[<cid> [, <PDP_type> [, <APN> [, <PDP_addr> [, <d_comp> [, <h_comp>>[,<IPv4AddrAlloc>[, <emergency_indication>[,<PCSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>]]]]]]]]] OK Or ERROR
AT+CGDCONT?	+CGDCONT: <cid>, <PDP_type>, <APN>,<PDP_addr>, <d_comp>, <h_comp>[,<IPv4AddrAlloc>[, <emergency_indication>[,<PCSCF_discovery>[,<IM_CN_Signalling_Flag_Ind>]]]] OK
AT+CGDCONT=?	+CGDCONT: (range of supported <cid>s), <PDP_type>,,,(list of supported <d_comp>s), (list of supported <h_comp>s)),(list ofsupported <IPv4AddrAlloc>s),(list of supported<emergency_indication>s),(list of supported <PCSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s) [<CR><LF>+CGDCONT: (range of supported <cid>s), <PDP_type>,,,(list of supported <d_comp>s), (list of supported <h_comp>s)),(list ofsupported <IPv4AddrAlloc>s),(list of supported<emergency_indication>s),(list of supported <PCSCF_discovery>s),(list of supported <IM_CN_Signalling_Flag_Ind>s) [...]] OK

5.26.2 Defined Values

<cid> (PDP Context identifier)

It is a numeric parameter, which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of the permitted values (minimum value = 1) is returned by the TEST command.

<PDP_type>

(A string parameter which specifies the Packet Data Protocol-Type) IP Internet Protocol (IETF STD 5)

IPV6 Internet Protocol, version 6 (IETF RFC 2460)

IPV4V6 Virtual <PDP_type>introduced to handle dual IP stack UE capability (see

3GPP TS 24.301[83])

Note: The <PDP_type>s IPV6 and IPV4V6 are supported only if the feature FEAT_IPV6_ SUPPORT is enabled

<APN> (Access Point Name)

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

<PDP_address>

It is the string parameter that identifies the MT in the address space applicable to the PDP. If the value is null or omitted then a value may be provided by the TE during the PDP startup procedure or, failing that, a dynamic address will be requested. The READ command will continue to return the null string even if an address has been allocated during the PDP startup procedure. The allocated address may be read using the command +CGPADDR command.

Note: IPv6 address obtained on LTE will be prefixed with a constant 8 byte address "FE.80.00.00.00.00.00.00" if network has not provided.

<d_comp>

(a numeric parameter that controls PDP data compression (applicable for SNDCP only))

0 off (default if value is omitted)

1 on (manufacturer preferred compression)

2 V.42 bis

Other values are reserved.

<h_comp>

(a numeric parameter that controls PDP header compression)

0 off (default if value is omitted)

1 on (manufacturer preferred compression)

2 RFC1144 (applicable for SNDCP only)

3 RFC2507

4 RFC3095 (applicable for PDCP only) Other values are reserved.

<IPv4AddrAlloc>

a numeric parameter that controls how the MT/TA requests to get the IPv4 address information

0 IPv4 Address Allocation through NAS Signalling

1 IPv4 Address Allocated through DHCP

<emergency_indication>

a numeric parameter used to indicate whether the PDP context is for emergency bearer services or not.

0 PDP context is not for emergency bearer services

1 PDP context is for emergency bearer services

<P-CSCF_discovery>

a numeric parameter influences how the MT/TA requests to get the P-CSCF address, see
3GPP TS 24.229 [89] annex B and annex L.

0 Preference of P-CSCF address discovery not influenced by +CGDCONT

1 Preference of P-CSCF address discovery through NAS Signalling

<IM_CN_Signalling_Flag_Ind>

a numeric parameter used to indicate to the network whether the PDP context is for IM CN subsystem-related signalling only or not.

0 UE indicates that the PDP context is not for IM CN subsystem-related signaling only

1 UE indicates that the PDP context is for IM CN subsystem-related signaling only

Note: The parameters <IPv4AddrAlloc>, <P-CSCF_discovery> and <IM_CN_Signalling_ Flag_Ind> , can be over-ridden by AT+XPCO command (meaning AT+CGDCONT values for these parameters can be over-ridden by issuing AT+XPCO later).

5.27 Define Secondary PDP Context +CGDSCONT

This command is used to define a secondary PDP context by specifying the PDP context parameter values for a <cid> (local context identification parameter). If the command is used only with the one parameter <cid>, it means that the corresponding PDP context becomes undefined.

- Set command specifies PDP context parameter values for a Secondary PDP context identified by the (local) context identification parameter, <cid>.
- Read command returns the current settings for each defined context.
- Test command returns values supported as a compound value.

5.27.1 Syntax

Command syntax:
AT+CGDSCONT= [<cid>, <p_cid> [, <d_comp> [, <h_comp>[, <IM_CN_Signalling_Flag_Ind>]]]]

Command	Possible Response(s)
+CGDSCONT=	[<cid>, <p_cid> [,<d_comp> [,<h_comp>[,<IM_CN_Signalling_Flag_Ind>]]]] OK Or ERROR
+CGDSCONT?	+CGDSCONT: <cid>, <p_cid>, <d_comp>, <h_comp>[,<IM_CN_Signalling_Flag_Ind>] OK
+CGDSCONT=?	+CGDSCONT: (range of <cid>s),(list of <cid>s for defined primary contexts),<PDP_type>,,,(list of supported <d_comp>s),(list of supported <h_comp>s) ,(list of supported <IM_CN_Signalling_Flag_Ind>s) [<CR><LF>+CGDSCONT: (range of <cid>s),(list of <cid>s for defined primary contexts),<PDP_type>,,, (list of supported <d_comp>s),(list of supported <h_comp>s) ,(list of supported <IM_CN_Signalling_Flag_Ind>s) [...]] OK

5.27.2 Defined Values

<cid> (PDP Context identifier)

It is a numeric parameter, which specifies a particular PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands. The range of the permitted values (minimum value = 1) is returned by the

TEST command.

<p_cid> (Primary PDP context identifier)

It is a numeric parameter which specifies a particular PDP context definition which has been specified by use of the +CGDCONT command. The parameter is local to the TE-MT interface. The list of permitted values is returned by the test form of the command.

<d_comp>

a numeric parameter that controls PDP data compression (applicable for SNDCP only)

0 off (default if value is omitted)

1 on (manufacturer preferred compression)

2 V.42 bis

Other values are reserved.

<h_comp>

a numeric parameter that controls PDP header compression

0 off (default if value is omitted)

1 on (manufacturer preferred compression)

2 RFC1144 (applicable for SNDCP only)

3 RFC2507

4 RFC3095 (applicable for PDCP only) Other values are reserved.

<IM_CN_Signalling_Flag_Ind>

a numeric parameter used to indicate to the network whether the PDP context is

for IM CN subsystem-related signaling only or not.

0 UE indicates that the PDP context is not for IM CN subsystem-related signalling only

1 UE indicates that the PDP context is for IM CN subsystem-related signalling only

Note: The parameter <IM_CN_Signalling_Flag_Ind> , can be over-ridden by AT+XPCO command (meaning AT+CGDSCONT values for these parameters can be over-ridden by issuing AT+XPCO later).

5.28 Traffic Flow Template +CGTFT

This command allows the TE to specify a Packet Filter PF for a Traffic Flow Template - TFT that is used in the GGSN in UMTS/GPRS and Packet GW in EPS for routing of packets onto different QoS flows towards the TE. The concept is further described in the 3GPP TS 23.060 [47]. A TFT consists of from one and up to 16 Packet Filters, each identified by a unique <packet filter identifier>. A Packet Filter also has an <evaluation precedence index> that is unique within all TFTs associated with all PDP contexts that are associated with the same PDP address.

- The set command specifies a Packet Filter that is to be added to the TFT stored in the MT and used for the context identified by the (local) context identification parameter, <cid>. The specified TFT will be stored in the GGSN in UMTS/GPRS and Packet GW in EPS only at activation or MS-initiated modification of the related context. Since this is the same parameter that is used in the +CGDCONT and +CGDSCONT commands, the +CGTFT command is effectively an extension to these commands. The Packet Filters consist of a number of parameters, each of which may be set to a separate value. A special form of the set command, +CGTFT= <cid> causes all of the Packet Filters in the TFT for context number <cid> to become undefined. At any time there may exist only one PDP context with no associated TFT amongst all PDP contexts associated to one PDP address. At an attempt to delete a TFT, which would violate this rule, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the+CMEE command.
- The read command returns the current settings for all Packet Filters for each defined context.
- The test command returns values supported as a compound value. If the MT supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line. TFTs shall be used for PDP-type IP and PPP only. For PDP-type PPP a TFT is applicable only when IP traffic is carried over PPP. If PPP carries header-compressed IP packets, then a TFT cannot be used.

5.28.1 syntax

Command syntax:
AT+CGTFT = [<cid>, [<packet filter identifier>, <evaluation prece- dence index> [, <source address and subnet mask> [,<protocol number (ipv4) / next header (ipv6)> [,<destination port range> [,<source port range> [,<ipsec security pa- rameter index (spi)> [,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask> [,<flow label (ipv6)> [,<direction>]]]]]]]]]

Command	Possible Response(s)
+CGTFT=[<cid>, [<packet filter identifier>, <evaluation precedence index> [,<source address and subnet mask> [,<protocol number (ipv4) / next header (ipv6)> [,<destination port range> [,<source port range> [,<ipsec security parameter index (spi)> [,<type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask> [, <flow label (ipv6)> [,<direction>]]]]]]]]]	OK ERROR
+CGTFT?	+CGTFT: <cid>, <packet filter identifier>, <evaluation precedence index>, <source address and subnet mask>, <protocol number (ipv4) / next header (ipv6)>, <destination port range>, <source port range>, <ipsec security parameter index (spi)>, <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>, <flow label (ipv6)>, <direction> [<CR><LF>+CGTFT: <cid>, <packet filter identifier>, <evaluation precedence index>, <source address and subnet mask>, <protocol number (ipv4) / next header (ipv6)>, <destination port range>, <source port range>, <ipsec security parameter index (spi)>, <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>, <flow label (ipv6)>, <direction> [...]]

+CGTFT=?	+CGTFT: <PDP_type>, (list of supported <packet filter identifier>s) , (list of supported <evaluation precedence index>s), (list of supported <source address and subnet mask>s), (list of supported <protocol number (ipv4) / next header (ipv6)>s), (list of supported <destination port range>s), (list of supported <source port range>s), (list of supported <ipsec security parameter index (spi)>s), (list of supported <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>s), (list of supported <flow label (ipv6)>s), (list of supported <direction>s) [<CR><LF>+CGTFT: <PDP_type>, (list of supported <packet filter identifier>s), (list of supported <evaluation precedence index>s), (list of supported <source address and subnet mask>s), (list of supported <protocol number (ipv4) / next header (ipv6)>s), (list of supported <destination port range>s),(list of supported <source port range>s), (list of supported <ipsec security parameter index (spi)>s), (list of supported <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>s), (list of supported <flow label (ipv6)>s), (list of supported <direction>s) [...]]

5.28.2 Defined values

<cid>:

a numeric parameter which specifies a particular PDP context definition (see the +CGD CONT and +CGDSCONT commands). The following parameters are defined in 3GPP TS 23.060 [47]:

<packet filter identifier>:

a numeric parameter, value range from 1 to 16.

<evaluation precedence index>:

a numeric parameter. The value range is from 0 to 255.

<source address and subnet mask>:

string type. The string is given as dot-separated numeric (0-255) parameters on the form:

"a1.a2.a3.a4.m1.m2.m3.m4" for IPv4 or "a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16", for IPv6.

<protocol number (ipv4) 1 next header (ipv6)>:

a numeric parameter, value range from 0 to 255.

<destination port range>:

string type. The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".

<source port range>:

string type. The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".

<ipsec security parameter index (spi)>:

numeric value in hexadecimal format. The value range is from 00000000 to FFFFFFFF.

<type of service (tos) (ipv4) and mask 1 traffic class (ipv6) and mask>:

string type. The string is given as dot-separated numeric (0-255) parameters on the form "t.m".

<flow label (ipv6)>:

numeric value in hexadecimal format. The value range is from 00000 to FFFFF. Valid for IPv6 only.

<direction>:

a numeric parameter which specifies the transmission direction in which the packet filter shall be applied. 0 Pre-Release 7 TFT filter (see 3GPP TS 24.008 [8], table 10.5.162)

1 Uplink

2 Downlink

3 Birectional (Up & Downlink) (default if omitted)

Some of the above listed attributes may coexist in a Packet Filter while others mutually exclude each other, the possible combinations are shown in 3GPP TS 23.060 [47].

5.29 GPRS Network Registration Status +CGREG

- This command gives the information of state of GPRS network registration. This set command controls the presentation of an unsolicited result code +CGREG: <stat> when
  <n>=1 and there is a change in the MT's GPRS network registration status, or code
  +CGREG: <stat>[,<lac>,<ci>] [,<AcT>,<rac>]when <n>=2 and there is a change in the network cell.
- Read command returns information on the network registration mode along with status of the network. It also gives information of location area code, cell id if available, access Technology and routing area code.
- Test command returns the range of supported network registration mode (i.e. <n>).

5.29.1 Syntax of the Command

Command syntax: AT+CGREG= [<n>]

Command	Possible Response(s)
AT+CGREG=[<n>]	OK or CME ERROR: <error>
AT+CGREG?	+CGREG: <n>,<stat>[,<lac>,<ci>[,<AcT>,<rac>]] OK
AT+CGREG=?	+CGREG : (0-2) Note: i.e. list of supported <n>s OK

5.29.2 Defined values

<n> can be

0 disable network registration unsolicited result code (default)

1 enable network registration unsolicited result code +CGREG: <stat>

2 enable network registration information unsolicited result code +CGREG: <stat>[,
<lac>,<ci>[,<AcT>,<rac>]]

Possible <stat> values are

0 not registered, home network

1 registered, home network

2 not registered, but ME is currently searching a new operator to register to

3 registration denied

4 unknown

5 registered, roaming

8 attached for emergency bearer services only (see NOTE 2) (applicable only when
<AcT> indicates 2,4,5,6).

<lac>

string type; two byte location area code in hexadecimal format (e.g.
"00C3" equals 195 in decimal)

<ci>

string type ; four byte GERAN/UTRAN/E-UTRAN cell ID in hexadecimal format

<AcT>

is a Release 7 feature and describes access technology of the registered network. Possible values of <AcT> are

0 GSM

1 GSM Compact

2 UTRAN

3 GSM w/EGPRS

4 UTRAN w/HSDPA

5 UTRAN w/HSUPA

6 UTRAN w/HSDPA and HSUPA

7 E-UTRAN

<rac>:

is Release 7 feature, string type; one byte routing area code in hexadecimal format

5.30 PDP Context Read Dynamic Parameters +CGCONTRDP

- The set command returns the relevant information about <bearer_id>, <apn>, <source_addr and=”” subnet_mask>=””>, <gw_addr>, <DNS_prim_addr>, <DNS_sec_addr>, <P-CSCF_prim_addr> and <P-CSCF_sec_addr> for a non secondary PDP Context established by the network with the primary context identifier <cid>. If the context cannot be found an ERROR response is returned. If the MT has dual stack capabilities, two lines of information are returned per <cid>. First one line with the IPv4 parameters followed by one line with the IPv6 parameters. If the parameter <cid> is omitted, the relevant information for all established PDP contexts are returned.
- The test command returns a list of <cid>s associated with active contexts

5.30.1 Syntax of Command

Command syntax: AT+CGCONTRDP= [<cid>]

Command	Possible response(s)
+CGCONTRDP=[<cid>]	+CGCONTRDP: <cid>, <bearer_id>, <apn> [, <source_addr and subnet_mask>[, <gw_addr> [, <DNS_prim_addr>[, <DNS_sec_addr>[, <PCSCF_ prim_addr> [, <P-CSCF_sec_addr>]]]]]] [<CR><LF>+CGCONTRDP: <cid>, <bearer_id>, <apn> [,<source_addr and subnet mask> [, <gw_addr>[, <DNS_prim_addr>[, <DNS_sec_ addr> [, <P-CSCF_prim_addr>[, <P-CSCF_sec_addr>]]]]]] [...]]
+CGCONTRDP=?	+CGCONTRDP: (list of <cid>s associated with active contexts)

5.30.2 Defined values

<cid>:

a numeric parameter which specifies a particular non secondary PDP context definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands.

<bearer_id>:

a numeric parameter which identifies the bearer, i.e. the EPS bearer in EPS and the NSAPI in UMTS/GPRS.

<APN>:

a string parameter which is a logical name that was used to select the GGSN or the external packet data network.

<source_addr and subnet_mask>:

string type. It shows the IP address and subnet mask of the MT.

The string is given as dot-separated numeric (0-255) parameters on the form: "a1.a2.a3.a4.m1.m2.m3.m4" for IPv4 or "a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.m15.m16", for IPv6

<gw_addr>:

a string parameter which shows the gateway address of the MT. The string is given as dot-separated numeric (0-255) parameters.

<DNS_prim_addr>:

A string parameter which shows the IP address of the primary DNS server.

<DNS_sec_addr>:

A string parameter which shows the IP address of the secondary DNS server.

<P_CSCF_prim_addr>:

a string parameter which shows the IP address of the primary P-CSCF server.

<P_CSCF_sec_addr>:

A string parameter which shows the IP address of the secondary

P-CSCF server. Note 1: This command is available only from

release 8.

Note 2: IPv6 addresses obtained on LTE will be prefixed with a constant 8 byte address
"FE.80.00.00.00.00.00.00" if network has not provided.

5.31 Secondary PDP Context Read Dynamic Parameters +CGSCONTRDP

- This execution command returns <p_cid> and <bearer_id> for a given <cid>. If the context cannot be found an ERROR response is returned. If the parameter <cid> is omitted, the <cid>, <p_cid> and <bearer_id> are returned for all established PDP contexts.
- The test command returns a list of <cid>s associated with active contexts.

5.31.1 Syntax of Command

Command syntax: AT+CGSCONTRDP= [<cid>]

Command	Possible response(s)
+CGSCONTRDP=[<cid>]	+CGSCONTRDP: <cid>, <p_cid>, <bearer_id> [<CR><LF>+CGSCONTRDP: <cid>, <p_cid>, <bearer_id> […]]
+CGSCONTRDP=?	+CGSCONTRDP: (list of <cid>s associated with active contexts)

5.31.2 Defined values

<cid>:

a numeric parameter which specifies a particular PDP context or Traffic Flows definition. The parameter is local to the TE-MT interface and is used in other PDP context-related commands.

<p_cid>:

a numeric parameter which specifies a particular PDP context definition or default EPS context Identifier which has been specified by use of the +CGDCONT command. The parameter is local to the TE-MT interface.

<bearer_id>:

a numeric parameter which identifies the bearer, EPS Bearer in EPS and NSAPI in UMTS/GPRS.

Note 1: Parameters for network initiated PDP contexts are returned as well. The dynamic part of the PDP context will only exist if established by the network.

Note 2: This command is available only from release 8.

5.32 Traffic Flow Template Read Dynamic Parameters +CGTFTRDP

- The execution command returns the relevant information about Traffic Flow Template of <cid> together with the additional network assigned values when established by the network. If the context cannot be found an ERROR response is returned. If the parameter <cid> is omitted, the Traffic Flow Templates for all established PDP contexts are returned. Parameters of both network and MT/TA initiated PDP contexts will be returned.
- The test command returns a list of <cid>s associated with active contexts.

5.32.1 Syntax

Command syntax: AT+CGTFTRDP=[<cid>]

Command	Possible Response(s)
+CGTFTRDP=[<cid>]	CME ERROR : <error> +CGTFTRDP: <cid>, <packet filter identifier>, <evaluation vailable index>, <source address and vaila mask>, <protocol vaila (ipv4) / next header (ipv6)>, <destination port range>, <source port range>, <ipsec security parameter index (spi)>, <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>, <flow label (ipv6)>, <direction>, <NW packet filter Identifier> [<CR><LF>+CGTFTRDP: <cid>, <packet filter identifier>, <evaluation vailable index>, <source address and vaila mask>, <protocol vaila (ipv4) / next header (ipv6)>, <destination port range>, <source port range>, <ipsec security parameter index (spi)>, <type of service (tos) (ipv4) and mask / traffic class (ipv6) and mask>, <flow label (ipv6)>, <direction>, <NW packet filter Identifier> [...]]
+ CGTFTRDP =?	+CGTFTRDP: (list of <cid>s associated with active contexts)

5.32.2 Defined Values

<cid>:

a numeric parameter which specifies a particular PDP context definition or Traffic Flows definition (see +CGDCONT and +CGDSCONT commands).

The following parameters are defined in 3GPP TS 23.060 [47]

<packet filter identifier>:

a numeric parameter. The value range is from 1 to 16.

<evaluation precedence index>:

a numeric parameter. The value range is from 0 to 255.

<source address and subnet mask>:

string type. The string is given as dot-separated numeric (0-255) parameters on the form:

"a1.a2.a3.a4.m1.m2.m3.m4" for Ipv4 or

"a1.a2.a3.a4.a5.a6.a7.a8.a9.a10.a11.a12.a13.
a14.a15.a16.m1.m2.m3.m4.m5.m6.m7.m8.m9.m10.m11.m12.m13.m14.
m15.m16", for Ipv6.

Note: IPv6 address obtained on LTE will be prefixed with a constant 8 byte address
"FE.80.00.00.00.00.00.00" if network has not provided.

<protocol number (ipv4) 1 next header (ipv6)>:

a numeric parameter, value range from 0 to 255.

<destination port range>:

string type. The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".

<source port range>:

string type. The string is given as dot-separated numeric (0-65535) parameters on the form "f.t".

<ipsec security parameter index (spi)>:

numeric value in hexadecimal format. The value range is from 00000000 to FFFFFFFF.

<type of service (tos) (ipv4) and mask 1 traffic class (ipv6) and mask>:

string type. The string is given as dot-separated numeric (0-255) parameters on the form "t.m".

<flow label (ipv6)>:

numeric value in hexadecimal format. The value range is from 00000 to FFFFF. Valid for
Ipv6 only.

<direction>:

a numeric parameter which specifies the transmission direction in which the Packet Filter shall be applied. 0 Pre Release 7 TFT Filter (see 3GPP TS 24.008 [8], table 10.5.162)
1 Uplink
2 Downlink
3 Bidirectional (Used for Uplink and Downlink)

<NW packet filter Identifier>:

a numeric parameter. The value range is from 1 to 16. In EPS the value is assigned by the network when established.

Note 1: Some of the above listed attributes can coexist in a Packet Filter while others mutually exclude each other. The possible combinations are shown in 3GPP TS 23.060 [47].

Note 2: This command is available only from release 8.

5.33 Define EPS Quality Of Service +CGEQOS

- The set command allows the TE to specify the EPS Quality of Service parameters <cid>, <QCI>, [<DL_GBR> and <UL_GBR>] and [<DL_MBR> and <UL_MBR>] for a PDP context or Traffic Flows. When in UMTS/GPRS the MT applies a mapping function to UTMS/GPRS Quality of Service. A special form of the set command, +CGEQOS= <cid> causes the values for context number <cid> to become undefined.
- The read command returns the current settings for each defined QoS.
- The test command returns the ranges of the supported parameters.

5.33.1 Syntax

Command syntax: AT+CGEQOS=[<cid> [,<QCI> [,<DL_GBR>, <UL_GBR> [,<DL_MB R>,<UL_MBR]]]]

Command	Possible Response(s)
+CGEQOS=[<cid> [,<QCI> [,<DL_GBR>, <UL_GBR> [,<DL_MBR>,<UL_MBR]]]]	ERROR OR OK
+ CGEQOS?	+CGEQOS: <cid>, <QCI>, [<DL_GBR>,<UL_GBR>], [<DL_MBR>,<UL_MBR>] [<CR>>LF>+CGEQOS: <cid>, <QCI>, [<DL_GBR>,<UL_GBR>], [<DL_MBR>,<UL_MBR>] […]]
+ CGEQOS =?	+CGEQOS: (range of supported <cid>s) ,(list of supported <QCI>s) ,(list of supported <DL_GBR>s), (list of supported <UL_GBR>s), (list of supported <DL_MBR>s) ,(list of supported <UL_MBR>s)

5.33.2 Defined Values

<cid>:

a numeric parameter which specifies a particular EPS Traffic Flows definition in EPS and a PDP Context definition in UMTS/GPRS.

<QCI>:

a numeric parameter that specifies a class of EPS QoS. (see 3GPP TS 23.203 [85]) 0 QCI
is selected by network

[1-4] value range for guranteed bit rate Traffic Flows

[5-9] value range for non-guarenteed bit rate Traffic Flows

<DL_GBR>:

a numeric parameter which indicates DL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI. (see 3GPP TS 24.301 [83])

<UL_GBR>:

a numeric parameter which indicates UL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI. (see 3GPP TS 24.301 [83])

<DL_MBR>:

a numeric parameter which indicates DL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI. (see 3GPP TS 24.301 [83])

<UL_MBR>:

a numeric parameter which indicates UL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI. (see 3GPP TS 24.301 [83])

Note: This command is available only from release 8.

5.34 EPS Quality Of Service Read Dynamic Parameters +CGEQOSRDP

- The execution command returns the Quality of Service parameters <QCI>, [<DL_GB R> and <UL_GBR>] and [<DL_MBR> and <UL_MBR>]of the established PDP Context associated to the provided context identifier <cid>. If the context cannot be found an ERROR response is returned. If the parameter <cid> is omitted, the Quality of Service parameters for all established PDP contexts are returned. Parameters of both network and MT/TA initiated PDP contexts will be returned.
- The test command returns a list of <cid>s associated with active contexts.

5.34.1 Syntax

Command syntax: AT+CGEQOSRDP=[<cid>]

Command	Possible Response(s)
AT+CGEQOSRDP = [<cid>]	+CGEQOS: <cid>, <QCI>, [<DL_GBR>,<UL_GBR>], [<DL_MBR>,<UL_MBR>][<CR><LF>+CGEQOS: <cid>, <QCI>,[<DL_GBR>,<UL_GBR>],[<DL_MBR>, <UL_MBR>] [...]]
AT++CGEQOSRDP =?	+CGEQOSRDP: (list of <cid>s associated with active contexts)

5.34.2 Defined Values

a numeric parameter which specifies a particular Traffic Flows definition in EPS and a
PDP Context definition in UMTS/GPRS.

<QCI>:

a numeric parameter that specifies a class of EPS QoS. (see 3GPP TS 23.203 [85]) 0 QCI
is selected by network

1 to 4 value range for guranteed bit rate Traffic Flows

5 to 9 value range for non-guarenteed bit rate Traffic Flows

<DL_GBR>:

a numeric parameter which indicates DL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI. (see 3GPP TS 24.301 [83])

<UL_GBR>:

a numeric parameter which indicates UL GBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI. (see 3GPP TS 24.301 [83])

<DL_MBR>:

a numeric parameter which indicates DL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI. (see 3GPP TS 24.301 [83])

<UL_MBR>:

a numeric parameter which indicates UL MBR in case of GBR QCI. The value is in kbit/s. This parameter is omitted for a non-GBR QCI. (see 3GPP TS 24.301 [83])

Note: This command is available only from release 8.

5.35 Packet Domain Event Reporting +CGEREP

This command is used to enable or disable sending of unsolicited result codes, +CGEV: XXX from MT to TE in the case of events occurring in the Packet Domain

- The Set command enables or disables sending of unsolicited result codes, +CGEV: XXX from MT to TE in the case of certain events occurring in the Packet Domain MT or the network.
- The read command returns the current value of <mode> and <bfr> parameters.
- The test command lists the supported values for <mode> and for <bfr>.

5.35.1 Syntax

Command syntax: AT +CGEREP=[<mode>[,<bfr>]]

Command	Possible Response(s)

+CGEREP=[<mode>[,<bfr>]]	OK or Error
+CGEREP?	+CGEREP: <mode>, <bfr> OK or Error
+CGEREP=?	+CGEREP: (list of supported <mode>s),(list of supported<bfr>s) OK

5.35.2 Defined Values

<mode>

0 buffer unsolicited result codes in the MT; if MT result code buffer is full, the oldest ones can be discarded. No codes are forwarded to the TE. (default)

1 discard unsolicited result codes when MT-TE link is reserved (e.g. in on-line data mode); otherwise forward them directly to the TE

2 buffer unsolicited result codes in the MT when MT-TE link is reserved (e.g. in on-line data mode) and flush them to the TE when MT-TE link becomes available; otherwise forward them directly to the TE

<bfr>
0 MT buffer of unsolicited result codes defined within this command is cleared when
<mode> 1 or 2 is
entered (default)

1 MT buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1 or

2 is entered (OK response shall be given before
flushing the codes)

3 circuit switched preferred (use Packet Domain if circuit switched not available)

5.35.3 Defined events

The events are valid for GPRS/UMTS and LTE unless explicitly mentioned.

For network attachment, the following unsolicited result codes and the corresponding events are defined:

+CGEV: NW DETACH

The network has forced a PS detach. This implies that all active contexts have been deactivated. These are not reported separately.

The mobile termination has forced a PS detach. This implies that all active contexts have been deactivated. These are not reported separately.

For MT class, the following unsolicited result codes and the corresponding events are defined:

+CGEV: NW CLASS <class>

The network has forced a change of MT class. The highest available class is reported (see +CGCLASS). The format of the parameter <class> is found in command +CGCLASS.

+CGEV: ME CLASS <class>

The mobile termination has forced a change of MT class. The highest available class is reported (see +CGCLASS). The format of the parameter <class> is found in command +CGCLASS. For PDP context activation, the following unsolicited result codes and the corresponding events are defined:

+CGEV: ME PDN ACT <cid>[,<reason>]

The mobile termination has activated a context. The context represents a PDN connection in LTE or a Primary PDP context in GSM/UMTS. The <cid> for this context is provided to the TE. This event is sent either in result

o
f

e
x
p

Illicit context activation request (+CGACT), or in result of

implicit context activation request associated to attach r

equest (+CGATT=1). The format of the parameters <cid>,<cid_

other> are found in command +CGDCONT.

<reason> integer type parameter indicates the reason why the context activation request for PDP type IPv4v6 was not granted. This parameter is only included if the requested PDP type associated with <cid> is IPv4v6, and the

PDP type assigned by the network for <cid> is either IPv4 or IPv6.

0 IPv4 only allowed

1 IPv6 only allowed

2 single address bearers only allowed.

3 single address bearers only allowed and MT initiated context activation for a second address type bearer was not successful

NOTE 1A: For legacy TEs supporting MT initiated context activation without TE requests, there is also a subsequent event +CGEV: ME PDN ACT <cid_other> returned to TE.

+CGEV: NW ACT <p_cid>, <cid>, <event_type>

The network has activated a context. The <cid> for this context is provided to the TE in addition to the

associated primary <p_cid>. The format of the parameters <p_cid> and <cid> are found in command +CGDSCONT.

<event_type>

integer type parameter indicates whether this is an informational event or whether the TE has to acknowledge it.
0 Informational event

1 Information request: Acknowledgement required. The acknowledgement can be accept or reject, see +CGANS.

+CGEV: ME ACT <p_cid>, <cid>, <event_type>

The network has responded to an ME initiated context activation. The <cid> for this context is provided to the TE in addition to the associated primary <p_cid>. The format of the parameters <p_cid> and <cid> are found in command +CGDSCONT. The format of the parameter <event_type> is defined above.

For PDP context deactivation, the following unsolicited result codes and the corresponding events are defined:

The network has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the MT. The format of the parameters <PDP_type>,
<PDP_addr> and <cid> are found in command +CGDCONT.

+CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>]

The mobile termination has forced a context deactivation. The <cid> that was used to activate the context is provided if known to the MT. The format of the parameters <PDP_type>, <PDP_addr> and <cid> are found in command +CGDCONT.

+CGEV: NW PDN DEACT <cid>

The network has deactivated a context. The context represents a PDN connection in LTE or a Primary PDP context in GSM/UMTS. The associated <cid> for this context is provided to the TE. The format of the parameter <cid> is found in command +CGDCONT.

NOTE 2: Occurrence of this event replaces usage of the event

+CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>].

+CGEV: ME PDN DEACT <cid>

The mobile termination has deactivated a context. The context represents a PDN connection in LTE or a Primary PDP context in GSM/UMTS. The <cid> for this context is provided to the TE. The format of the parameter <cid> is found in command +CGDCONT.

NOTE 3: Occurrence of this event replaces usage of the event +CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>]. ETSI 3GPP TS 27.007 version 10.5.0 Release 10 204 ETSI TS 127 007 V10.5.0 (2011-10)

The network has deactivated a context. The <cid> for this context is provided to the TE in addition to the associated primary <p_cid>. The format of the parameters <p_cid> and <cid> are found in command +CGDSCONT. The format of the parameter <event_type> is defined above.

NOTE 4: Occurrence of this event replaces usage of the event +CGEV: NW DEACT <PDP_type>, <PDP_addr>, [<cid>].

+CGEV: ME DEACT <p_cid>, <cid>, <event_type>

The network has responded to an ME initiated context deactivation request. The asso- ciated <cid> is provided to the TE in addition to the associated primary <p_cid>. The format of the parameters <p_cid> and <cid> are found in command +CGDSCONT. The format of the parameter

<event_type> is defined above.

NOTE 5: Occurrence of this event replaces usage of the event +CGEV: ME DEACT <PDP_type>, <PDP_addr>, [<cid>].

For PDP context modification, the following unsolicited result codes and the corresponding events are defined:

+CGEV: NW MODIFY <cid>, <change_reason>, <event_type>

The network has modifieda context. The associated <cid> is provided to the TE in addition to the <change_reason> and <event_type>. The format of the parameter <cid> is found in command +CGDCONT or +CGDSCONT. The format of the parameters <change_reason> and <event_type> are defined above. <change_reason> integer type parameter indicates what kind of change occurred.

0 Not available

1 TFT only changed

2 Qos only changed

3 Both TFT and QoS changed

+CGEV: ME MODIFY <cid>, <change_reason>, <event_type>

The mobile termination has modified a context. The associated <cid> is provided to the TE in addition to the <change_reason> and <event_type>. The format of the parameter <cid> is found in command +CGDCONT or +CGDSCONT. The format of the parameters <change_reason> and <event_type> are defined above.

5.36 Protocol configuration options +XPCO

This command is used to configure protocol configuration options (PCO) of a PDP context.

- Set command is used to set and get the PCO properties of a PDP context
- Test command returns available <mode>'s.

5.36.1 Syntax of the Command

Command syntax:
AT+XPCO=<mode>,<cid>[,<protocol_conf_options>[,<pcscfIPv6_addr_req>[,<ImCN>[,<DnsIPv6Addr_req>[,<ms_nw_req_bearer_ctrl_ind>[,<dsm_ipv6_home_agent_addr_req>[,<dsm_ipv6_home_nw_prefix_req>[,<dsm_ipv6v4_home_agent_addr_req>[,<ip_addr_alloc_nas_signalling>[,<ipv4_addr_alloc_dhcpv4>[,<pcscf_ipv4_addr_req>[,<dns_server_ipv4_addr_req>[,<msisdn_req>]]]]]]]]]]]]

Command	Possible Response(s)
AT+XPCO=<mode>,<cid>[,<protocol_conf_options>[,<pcscfIPv6_addr_req>[,<ImCN>[,<DnsIPv6Addr_req>[,<ms_nw_req_bearer_ctrl_ind>[,<dsm_ipv6_home_agent_addr_req>[,<dsm_ipv6_home_nw_prefix_req>[,<dsm_ipv6v4_home_agent_addr_req>[,<ip_addr_alloc_nas_signalling>[,<ipv4_addr_alloc_dhcpv4>[,<pcscf_ipv4_addr_req>[,<dns_server_ipv4_addr_req>[,<msisdn_req>]]]]]]]]]]]]	OK or +XPCO:<cid>[,<PcscfIPv6_addr>[,<ImCN>,[,<pDnsIPv6Addr>,<sDnsIPv6Addr>[,<PolCtrlRejCode>[,<BearerControlMode>[,<DSMIPv6Haar>[,<DSMIPv6Hnpr>[,<DSMIPv6v4Haar>[,<PcscfIPv4_addr>[,<DnsIpv4addr>[,<MSISDN>[,<pco_container>]]]]]]]]]]]] or +CME ERROR: <err>
AT+XPCO=?	+XPCO: list of supported <mode>'s OK or +CME ERROR: <err>

5.36.2 Defined values

defines the mode of the command set or get the PCO properties.

1 set the PCO properties

2 get the PCO properties

<cid>

is the PDP context id for which the PCO properties are to be set or fetched.

<protocol_conf_options>

is a string in hexadecimal format containing Configuration protocol options list's Container Information from MS to Network. The string is basically a hexadecimal representation from octet w+1 of Protocol configuration options IE (refer 3GPP 10.5.6.3 Protocol config- uration options, Table 10.5.154) and up to the last byte of Configuration protocol options list.

Note: When this string is set with some data, the Boolean's in the XPCO set command are neglected.

<pcscfIPv6_addr_req>

is a boolean indicating the P-CSCF IPv6 Address Request. This is as per

P-CSCF Server Discovery. Refer 3GPP TS 29.061 V8.7.0.

<ImCN>
is a Boolean indicating IM CN Subsystem Signaling Flag, where the PDP Context is to be used for IMS Signaling purpose. This is as per 3GPP 27.060 Sec. 13.4.

<DnsIPv6Addr_req>

is a boolean indicating DNS Server IPv6 Address Request. This is as per DNS Server
Discovery. Refer 3GPP TS 29.061 V8.7.0.

<ms_nw_req_bearer_ctrl_ind>

is a boolean indicating MS Support of Network Requested Bearer Control indicator

<dsm_ipv6_home_agent_addr_req>

is a Boolean indicating DSMIPv6 Home Agent Address Request. This is for obtaining the IPv6 address corresponding to a DSMIPv6 HA address (see 3GPP TS 24.303 and 3GPP TS 24.327)

<dsm_ipv6_home_nw_prefix_req>

is a Boolean indicating DSMIPv6 Home Network Prefix Request. This is for obtaining the IPv6 Home Network Prefix (see 3GPP TS 24.303 and 3GPP TS 24.327)

<dsm_ipv6v4_home_agent_addr_req>

is a Boolean indicating DSMIPv6 IPv4 Home Agent Address Request. This is for obtaining the IPv4 address corresponding to a DSMIPv6 IPv4 Home Agent address (see 3GPP TS 24.303 and 3GPP TS 24.327)

<ip_addr_alloc_nas_signalling>

is a Boolean indicating IP address allocation via NAS signalling

<ipv4_addr_alloc_dhcpv4>

is a Boolean indicating IPv4 address allocation via DHCPv4

<pcscf_ipv4_addr_req>

is a boolean indicating P-CSCF IPv4 Address Request. This is as per P-CSCF Server
Discovery. Refer 3GPP TS 29.061 V8.7.0.

<dns_server_ipv4_addr_req>

is a boolean indicating DNS Server IPv4 Address Request. This is as per DNS Server
Discovery. Refer 3GPP TS 29.061 V8.7.0.

<msisdn_req>

is a Boolean indicating MSISDN Request. This is as per MSISDN notification procedure. Refer 3GPP 24.008 Sec 6.4.

<PcscfIPv6_addr>

is the PCSCF IPV6 address.

<ImCN>

indicates IM CN signalling

is the primary DNS address of the server(IPv6)

<sDnsIPv6Addr>

is the secondary DNS address of the server(IPv6)

<PolCtrlRejCode>

is the policy control reject code

<BearerControlMode>

is the bearer control mode

<DSMIPv6Haar>

is the DSMIPv6 Home agent address

<DSMIPv6Hnpr>

is the Home network prefix address

<DSMIPv6v4Haar>

is the DSMIPv6 IPv4 Home agent address

<PcscfIPv4_addr>

is the PCSCF IPv4 address.

<DnsIpv4addr>

is the DNS server IPv4 address

<MSISDN>

is the MSISDN info

<pco_container>

Is a hexadecimal string representation of the Network Operator Specific Container Information containing only information related to container ID FF00H to FFFFH provided by the Network to the MS. Refer to 3GPP 24.008 v9 section 10.5.6.3 (Table 10.5.154, Network to MS direction)
Note 1: <pco_container> is available only after RELEASE 9 and R9_SUPPORT system def is enabled in build config.

Note 2: IPv6 address obtained on LTE will be prefixed with a constant 8 byte address
"FE.80.00.00.00.00.00.00 if network has not provided.

5.37 EPS network registration status +CEREG

- 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, or code +CEREG: <stat>[,<tac>,<ci>[,<AcT>]] when <n>=2 and there is a change of the network cell. NOTE 1: If the EPS MT 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> are returned only when <n>=2 and MT is registered in the network. Note: This command is supported only in R8 protocol with LTE.

5.37.1 Syntax of Command

Command syntax: AT+CEREG=[<n>]

Command	Possible response(s)
+CEREG=[<n>]	OK Or +CME ERROR: <err>
+CEREG?	+CEREG: <n>,<stat>[,<tac>,<ci>[,<AcT>]]
+CEREG=?	+CEREG: (list of supported <n>s)

5.37.2 Defined values

<n>:

0 disable network registration unsolicited result code (default)

1 enable network registration unsolicited result code +CEREG: <stat>

2 enable network registration and location information unsolicited result code +CEREG: <stat>[,<tac>,<ci>[,<AcT>]]

<stat>:

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

5 registered, roaming

8 attached for emergency bearer services only (see NOTE 2) (applicable only when <AcT> indicates 2,4,5,6).

<tac>:

string type; two byte tracking area code in hexadecimal format (e.g. "00C3" equals 195 in decimal)

<ci>:

string type; four byte GERAN/UTRAN/E-UTRAN cell ID in hexadecimal format

<AcT>:

access technology of the serving cell

0 GSM

1 GSM Compact

2 UTRAN

3 GSM w/EGPRS (see NOTE 2)

4 UTRAN w/HSDPA (see NOTE 3)

5 UTRAN w/HSUPA (see NOTE 3)

6 UTRAN w/HSDPA and HSUPA (see NOTE 3)

7 E-UTRAN

NOTE 2: 3GPP TS 44.060 [71] specifies the System Information messages which give the information about whether the serving cell supports EGPRS.
NOTE 3: 3GPP TS 25.331 [74] specifies the System Information blocks which give the information about whether the serving cell supports HSDPA or HSUPA.

5.38 Signaling Connection Status +CSCON

- The set command controls the presentation of an unsolicited result code +CSCON. If <n>=1, +CSCON:<mode> is sent from the MT when the connection mode of the MT is changed. If <n>=2 and there is a state within the current mode, +CSCON:<mode>[,<state>] is sent from the MT. When the MT is in UTRAN or E-UTRAN, the mode of the MT refers to idle when no PS signalling connection and to connected mode when a PS signalling connection between UE and network is setup. When the UE is in GERAN, the mode refers to idle when the MT is in either the IDLE state or the STANDBY state and to connected mode when the MT is in READY state. The <state> value indicates the state of the MT when the MT is in UTRAN connected mode.
- The read command returns the status of result code presentation and an integer <mode> which shows whether the MT is currently in idle mode or connected mode. State information <state> is returned only when <n>=2.
- Test command returns supported values as compound value.

5.38.1 Syntax of the Command

Command syntax:
AT+CSCON=[<n>]

Command	Possible Response(s)
AT+CSCON=[<n>]	OK or +CME ERROR: <err>
AT+CSCON?	+CSCON: : <n>,<mode>[,<state>] OK
AT+CSCON=?	+CSCON: (0-2) OK

5.38.2 Defined values

<n>:integer type

Enables or disables the presentation of an unsolicited result code

0 disable unsolicited result code. (default)

1 enable unsolicited result code +CSCON: <mode>.

2 enable unsolicited result code +CSCON: <mode>[,<state>].

<mode>:integer type

indicates the signalling connection status

0 idle

1 connected.

<state>: integer type

indicates the RRC state information if the MT is in connected Mode while in UTRAN.

0 UTRAN URA_PCH state

1 UTRAN Cell_PCH state

2 UTRAN Cell_FACH state

3 UTRAN Cell_DCH state

6 SIM Access Commands

6.1 Request SIM Card Identification +CCID

This command returns the ICCID of the SIM Card.

6.1.1 Syntax of the Command

Command syntax : AT+CCID

Command	Possible Response(s)
AT+CCID	+CCID: <ICCID> OK Or CME ERROR: <error>
AT+CCID?	+CCID: <ICCID> OK Or CME ERROR: <error>
AT+CCID=?	OK

6.1.2 Defined values

ICCID: Integrated Circuit Card ID of the SIM Card

6.2 Request International Mobile Subscriber Identity +CIMI

This command allows to requests the international mobile subscriber identity IMSI (International Mobile Subscriber Identity), which is intended to permit the TE user to identify the individual SIM which is attached to ME.

6.2.1 Syntax of the Command

Command syntax : AT+CIMI

Command	Possible Response(s)
AT+CIMI	<IMSI> OK Or CME ERROR: <error>
AT+CIMI=?	OK

6.2.2 Defined values

<IMSI> International Mobile Subscriber Identity

6.3 Enter PIN +CPIN

This command sends a password to the MT which is required before MT

can be operated. If no PIN request is pending, no action is taken towards ME and an corresponding error code is returned

- Set command sends a password to the MT which is necessary before it can be operated (SIM PIN, SIM PUK, PH-SIM PIN, etc.).
- Read command returns an alphanumeric string indicating whether some password is required or not.
- Test command returns OK.

6.3.1 Syntax of the Command

Command syntax: AT+CPIN= <pin> [, <newpin>]

Command	Possible Response(s)
+CPIN=<pin>[,<newpin>]	OK Or CME ERROR: <error>
READ+CPIN?	+CPIN:code +CME ERROR: <err>
TEST+CPIN=?	OK

6.3.2 Defined values

<pin>, <newpin>

string type values

<code>

values when queried using

READ command READY MT

is not pending for any

password SIM PIN MT is

waiting SIM PIN to be given

SIM PUK MT is waiting SIM

PUK to be given

SIM PIN2 MT is waiting SIM PIN2 to be given (this "code" is recommended to be returned only whenthe last executed command resulted in PIN2

authentication failure (i.+CME ERROR: 17); if PIN2 is not entered right after the failure, it is recom- mended that MT does not block its operation)

SIM PUK2 MT is waiting SIM PUK2 to be given (this "code" is recommended to be returned onlywhen the last executed command resulted in PUK2 authentication failure(i.e +CME ERROR: 18); if PUK2 and new PIN2 are not entered right after the failure, it is recommended that MT does not block its operation)

PH-NET PIN MT is waiting network personalization password to be given

PH-NET PUK MT is waiting network personalization unblocking password to be given

PH-NETSUB PIN MT is waiting network subset personalization password to be given

PH-NETSUB PUK MT is waiting network subset personalization unblocking password to be given

PH-SP PIN MT is waiting service provider personalization password to be given

PH-SP PUK MT is waiting service provider personalization unblocking password to be given

PH-CORP PIN MT is waiting corporate personalization password to be given

PH-CORP PUK MT is waiting corporate personalization unblocking password to be given

6.4 Generic SIM Access +CSIM

This command allows a direct control of the SIM by a distant application on the TE. Set command transmits to the MT the <command> it then shall send as it is to the SIM The
<response> is returned in the same manner to the TE.

6.4.1 Syntax of the Command

Command syntax:AT+CSIM=<length>,<command>

Command	Possible Response(s)
+CSIM=<length>,<command>	+CSIM: <length>,<response> OK Or CME ERROR: <error>
+CSIM=?	OK

6.4.2 Defined values

<length>

integer type; length of the characters that are sent to TE in <command> or <response>

<command>

command passed on by MT to SIM in hex format

<response>

response to the command passed on by the SIM to the MT

6.5 Enter PIN +CPIN 2

This command sends a password to the MT which is required to access FDN phonebook for verification of SIM PIN2.

- Set command sends a password to the MT which is necessary before it can be operated(SIM PIN2, SIM PUK2, etc.).
- Read command returns an alphanumeric string indicating whether some password is required or not
- Test command returns OK.

6.5.1 Syntax of the Command

Command syntax: AT+CPIN2= <puk2/oldpin2> [, <newpin2>]andAT+CPIN2=<oldpin2>

Command	Possible Response(s)

+CPIN2=<puk2/oldpin2>[,<newpin2>]	OK Or CME ERROR: <error>
READ +CPIN2?	+CPIN:code OK +CME ERROR: <err>
TEST +CPIN2=?	OK

6.5.2 Defined values

<puk21pin2>, <newpin2>

string type values

<code>

values when queried using READ command: READY MT is not pending for any password
SIM PIN2 MT is waiting SIM PIN2 to be given (this "code" is recommended to be returned only when the last executed command resulted in PIN2 authentication failure (i.e. +CME ERROR: 17); if PIN2 is not entered right after the failure, it is recommended that MT does not block its operation)

SIM PUK2 MT is waiting SIM PUK2 to be given (this "code" is recommended to be returned only when the last executed command resulted in PUK2 authentication failure (i.e. +CME ERROR: 18); if PUK2 and new PIN2 are not entered right after the failure, it is recommended that MT does not block its operation)

6.6 Per Unit and Currency Table +CPUC

This set command sets the parameters of Advise of Charge related price per unit and currency table in SIM file EF-PUCT. PUCT information can be used to convert the home units into currency units. SIM PIN2 is required to set the parameters.

- Set command is used to set the price per unit.
- Read command returns the current currency and price per unit value.

- Test command returns OK.

6.6.1 Syntax of the Command

Command syntax:
AT+CPUC=<currency>,<ppu>[,<passwd>]

Command	Possible Response(s)
AT+CPUC=<currency>,<ppu>[,<passwd>]	OK Or CME ERROR: <error>
Read command AT+CPUC?	+CPUC: <currency>,<ppu> OK
Test command AT+CPUC=?	ok

6.6.2 Defined values

<Currency>

string type containing the three-character currency code (e.g. "GBP","EUR")

<ppu>

string type containing the price per unit; dot is used as a decimal separator

<passwd>

string type containing the SIM PIN2.

6.7 Read Language +CLAN

This command reads the language from the SIM

- Read command returns the language from the SIM
- Test command returns OK.

6.7.1 Syntax of the Command

Command syntax: AT+CLAN ?

Command	Possible Response(s)
Read command AT+CLAN?	+CLAN: <ln>
Test command AT+CLAN=?	ok

6.7.2 Defined values

<ln>

is a two-letter abbreviation of the language. The language codes, as defined in ISO 639, consists of two characters, e.g. "sv", "en" etc.

6.8 Open Logical Channel +CCHO

This command causes the MT to return session id to allow the TE to identify a channel that is being allocated by the UICC, which is attached to ME. The UICC will open a new logical channel; select the application identified by the <dfname> received with this command and return a session Id as the response. The ME shall restrict the communication between the TE and the UICC to this logical channel.

6.8.1 Syntax of the Command

Command syntax :
AT+CCHO=<dfname>

Command	Possible Response(s)
AT+CCHO=<dfname>	<session_id> OK Or +CME ERROR: <err>
AT+CCHO=?	OK

6.8.2 Defined values

<dfname>

all selectable applications in the UICC are referenced by a DF name coded on 1 to 16 bytes.

<session_id>

A session Id to be used in order to target a specific application on the smart card using logical channels mechanism (string without double quotes that represents a decimal value).

Note: CCHO set command gives session_id when it receives sim application response status words as shown below.

SW1 SW2 Description

- '90' '00' - Normal ending of the command
- '91' 'XX' - Normal ending of the command, with extra information from the proactive UICC containing a command for the terminal.Length 'XX' of the response data
- '92' 'XX'- Normal ending of the command, with extra information concerning an ongoing data transfer session.

6.9 Close Logical Channel +CCHC

This command asks the ME to close a communication session with the UICC. The ME shall close the previously opened logical channel. The TE will no longer be able to send commands on this logical channel. Execution Command helps to close a logical channel.

6.9.1 Syntax of the Command

Command syntax :
AT+CCHC=<session_id>

Command	Possible Response(s)
AT+CCHC=<session_id>	OK Or +CME ERROR: <err>
AT+CCHC=?	OK

6.9.2 Defined values

<session_id>
A session Id to be used in order to target a specific application on the smart card using logical channels mechanism (string without double quotes that represents a decimal value)

6.10 Restricted UICC Logical Channel Access +CRLA

By using this command instead of Generic UICC Access +CGLA TE application has easier but more limited access to the UICC database. Set command transmits to the MT the UICC <command> and its required parameters. MT handles internally all UICC MT interface locking and file selection routines. As response to the command, MT sends the actual UICC information parameters and response data. MT error result code +CME ERROR may be returned when the command cannot be passed to the UICC, but failure in the execution of the command in the UICC is reported in <sw1> and <sw2> parameters.

6.10.1 Syntax of the Command

Command syntax : AT+CRLA=<sessionid>,<command>[,<file id>[,<P1>,<P2>,<P3>[, <data>[,<pathid>]]]]>

Command	Possible Response(s)

AT+CRLA=<sessionid>,<command>[,<file id>[,<P1>,<P2>,<P3>[,<data>[,<pathid>]]]]	+CRLA: <sw1>,<sw2>[,<response>] OK Or +CME ERROR: <err>

6.10.2 Defined values

<sessionid>

Integer type; this is the identifier of the session to be used in order to send the APDU commands to the UICC. It is mandatory in order to send commands to the UICC when targeting applications on the smart card using a logical channel other than the default channel (channel "0").

<command>

(command passed on by the MT to the UICC; refer 3GPP TS 31.101 [65]):

176 READ BINARY

178 READ RECORD

192 GET RESPONSE

214 UPDATE BINARY

220 UPDATE RECORD

242 STATUS

All other values are reserved

<fileid>

Integer type; this is the identifier of a elementary datafile on UICC. Mandatory for every command except STATUS.

<P1>, <P2>, <P3>

integer type; parameters passed on by the MT to the UICC. These parameters are mandatory for every command, except GET RESPONSE

and STATUS.

<data>

information which shall be written to the SIM (hexadecimal character format)

<pathid>

string type; contains the path of an elementary file on the UICC in hexadecimal format .

<sw1>, <sw2>

integer type; information from the UICC about the execution of the actual command. These parameters are delivered to the TE in both cases, on successful or failed execution of the command

<response>

response of a successful completion of the command previously issued (hexadecimal character format).
STATUS and GET RESPONSE return data, which gives information about the current elementary datafield. This information includes the type of file and its size (refer 3GPP TS 31.101 [65]). After READ BINARY, READ RECORD or RETRIEVE DATA command the requested data will be returned.

6.11 Restricted SIM Access +CRSM

This command allows an easy access to the SIM database. By using this command instead of Generic SIM Access +CSIM DTE application has easier but more limited access to the SIM database.

- Set Command allows an easy access to the SIM database. MS handles internally all SIM-MS interface locking and file selection routines. As response to the command, MS sends the actual SIM information parameters and response data. MS error result code +CME ERROR may be returned when the command cannot be passed to the SIM, but failure in the execution of the command in the SIM is reported in <sw1> and <sw2> vailable rs.

- Test command returns "OK" string.

6.11.1 Syntax of the Command

Command syntax:
AT+CRSM=<command>[,<fileid>[,<P1>,<P2>,<P3>[,<data>[,<pathid>]]]]

Command	Possible Response(s)
AT+CRSM=176,28471,0,0,3 Note:read ACMmax AT+CRSM=176,28423,0,0,9 Note: read IMSI AT+CRSM=178,28473,0,4,3 Note: read ACM AT+CRSM=176,28481,0,0,5 Note : read PUKT	+CRSM: <sw1>,<sw2>[,<response>] OK Or +CME ERROR: <err>

6.11.2 Defined values

<command>

176 READ BINARY

178 READ RECORD

192 GET RESPONSE

214 UPDATE BINARY

220 UPDATE RECORD

242 STATUS

<fileid>

integer type; this is the identifier of a elementary datafile on SIM. Mandatory for every command except STATUS and may be e.g. : 28471 meaning ACMmax file (6F37)

28423 meaning IMSI file (6F07)

28473 meaning ACM file (6F39)

28481 meaning PUKT file (6F41)

28482 meaning SMS file (6F42)

<P1>, <P2>, <P3>
integer type defining the request. These parameters are mandatory for every command, except GET RESPONSE and STATUS. The values are described in GSM 51.011.

<data>

information which shall be written to the SIM (hexadecimal character format; refer
+CSCS - string containing hexadecimal characters -)

<sw1>, <sw2>

integer type containing the SIM information and can be:

0x90 0x00 normal entry of the command

0x9F 0xXX length XX of the response data

0x92 0x0X update successful but after using an internal retry routine X times

0x92 0x40 memory problem

0x94 0x00 no EF selected

0x94 0x02 out of range (invalid address)

0x94 0x04 file ID not found; pattern not found

0x94 0x08 file is inconsistent with the command

0x98 0x02 no CHV initialized

0x98 0x04 access cond. Not fullfiled / unsucc. CHV verify / authent.failed

0x98 0x08 in contradiction with CHV status

0x98 0x10 in contradiction with invalidation status

0x98 0x40 unsucc. CHV-verif. Or UNBLOCK CHF / CHV blocked /UNBL.blocked

0x98 0x50 increase can not be performed. Max. value reached

0x61 0xXX SW2 indicates the number of response bytes still available. Use GET RESPO NSE to access this data.

0x62 0xXX Warning - state unchanged

0x62 0x00 Warning - no information provided

0x62 0x81 Warning - part of returned data may be corrupt

0x62 0x82 Warning - end of file/record reached (bad cmd)

0x62 0x83 Warning - selected file invalidated

0x62 0x84 Warning - bad file control information format

0x63 0xXX Warning - state unchanged

0x63 0x00 Warning - no information provided

0x63 0x81 Warning - file filled up with last write

0x63 0xCx Warning - counter value is x

0x64 0xXX Error - state unchanged

0x65 0xXX Error - state changed

0x65 0x00 Error - no information provided

0x65 0x81 Error - memory failure 66 xx Security Error

0x66 0xXX Security Error

0x67 0xXX incorrect parameter P3

0x68 0xXX Check Error - CLA function not supported

0x68 0x00 Check Error - no information provided

0x68 0x81 Check Error - logical channel not supported

0x68 0x82 Check Error - secure messaging not supported

0x69 0xXX Check Error - command not allowed

0x69 0x00 Check Error - no information provided

0x69 0x81 Check Error - command incompatible with file structure

0x69 0x82 Check Error - security status not satisfied

0x69 0x83 Check Error - authentication method blocked

0x69 0x84 Check Error - referenced data invalidated

0x69 0x85 Check Error - conditions of use not satisfied

0x69 0x86 Check Error - command not allowed (no current EF)

0x69 0x87 Check Error - expected SM data objects missing

0x69 0x88 Check Error - SM data objects incorrect

0x6A 0xXX Check Error - wrong parameters

0x6A 0x00 Check Error - no information provided

0x6A 0x80 Check Error - incorrect parameters in data field

0x6A 0x81 Check Error - function not supported

0x6A 0x82 Check Error - file not found

0x6A 0x83 Check Error - record not found

0x6A 0x84 Check Error - not enough memory space in the file

0x6A 0x85 Check Error - Lc vailable on with TLV structure

0x6A 0x86 Check Error - vailable on parameters P1-P2

0x6A 0x87 Check Error - Lc vailable on with P1-P2

0x6A 0x88 Check Error - referenced data not found

0x6B 0xXX incorrect parameter P1 or P2

0x6C 0xXX Check Error - wrong length - xx is the correct length

0x6D 0xXX unknown instruction code given in the command

0x6E 0xXX wrong instruction class given in the command

0x6F 0xXX technical problem with no diagnostic given

<response>

response of successful completion of the command previously issued (hexadecimal character format; refer +CSCS - string containing hexadecimal characters -). STATUS and GET RESPONSE return data, which gives information about the current elementary datafield. This information includes the type of file and its size (refer GSM 51.011 [28]). After READ BINARY or READ RECORD command the requested data will be returned. <response> is not returned after a successful UPDATE BINARY or UPDATE RECORD command.

<pathid>

string type; contains the path of an elementary file on the SIM/USIM in hexadecimal format as defined in ETSI TS 102 221 [60] (e.g. "7F205F70" in SIM and USIM case).

6.12 Generic UICC Logical Channel Access +CGLA

This command allows a direct control of the UICC by a distant application on the TE. The TE shall then take care of processing UICC information within the frame specified by GSM/UMTS. Execution Command transmits to the MT the <command> it then shall send as it is to the UICC.

6.12.1 Syntax of the Command

Command syntax : AT+CGLA=<sessionid>, <length>, <command>

Command	Possible Response(s)

AT+CGLA=<sessionid>, <length>, <command>	+CGLA: <length>,<response> OK Or +CME ERROR: <err>

6.12.2 Defined values

<sessionid>

Integer type; this is the identifier of the session to be used in order to send the APDU commands to the UICC. It is mandatory in order to send commands to the UICC when targeting applications on the smart card using a logical channel other than the default channel (channel "0").

<length>

integer type; length of the characters that are sent to TE in <command> or <response> (two times the actual length of the command or response).

<command>

command passed on by the MT to the UICC in the format as described in 3GPP TS 31.101 [65] (hexadecimal character format; refer +CSCS).

<response>

response to the command passed on by the UICC to the MT in the format as described in 3GPP TS 31.101 [65] (hexadecimal character format; refer +CSCS).

6.13 EAP authentication +CEAP

This command allows a TE to exchange EAP packets with the UICC or the ME.

6.13.1 Syntax of the Command

Command syntax : AT+CEAP=<dfname>,<EAPMethod>,<EAP packet data>[,<DFeap>]

Command	Possible Response(s)
AT+CEAP=<dfname>,<EAPMethod>,<EAP packet data>[,<DFeap>]	+CEAP: <EAPsessionid>,<EAP packet response> OK or +CME ERROR: <err>

6.13.2 Defined values

<dfname>

string type in hexadecimal character format. All selectable applications are represented in the UICC by an AID coded on 1 to 16 bytes.

<EAPMethod>

string type in hexadecimal character format.The v alue range for 1 byte format and for
8 bytes expanded format is defined in RFC 3748 [68].

<EAP packet data>

string type in hexadecimal character format.

<DFeap>

string type in hexadecimal character format.

<EAPsessionid>

integer type. This is the identifier of the EAP session to be used in order to retrieve the EAP parameters with EAP Retreive Parameters +CERP command. Value range is from 1 to 4294967295.

<EAP packet response>

string type in hexadecimal character format.

6.14 EAP Retrieve Parameters +CERP

This command allows a TE to retrieve EAP session parameters / derived keys after a run of the +CEAP command. If the EAP session is handled by

the UICC then the MT shall return the content of the elementary file corresponding to the indicated <EAPparameter>.

6.14.1 Syntax of the Command

Command syntax :
AT+CERP=<EAPsessionid>,<EAPparameter>

Command	Possible Response(s)
AT+CERP=<EAPsessionid>,<EAPparameter>	+CERP: <EAP parameter response> or +CME ERROR: <err>

6.14.2 Defined values

<EAPparameter>

integer type.

1 Keys

2 Status

3 Identity

4 Pseudonym

<EAPsessionid>

integer type; this is the identifier of the EAP session to be used in order to retrieve the EAP parameters corresponding to an active EAP session. Value range is from 1 to 4294967295.

<EAP parameter response>

string type in hexadecimal character format

6.15 Customer Service Profile +XCSP

This command reads the customer service profile (CSP) from the SIM.

The CSP indicates the services that are user accessible.

- Set Command reads the customer service profile (CSP) from the SIM.
- Test command returns the list of supported service groups.

6.15.1 Syntax of the Command

Command syntax: AT+XCSP[=<service_group>]

Command	Possible Response(s)
AT+XCSP[=<service_group>] or AT+XCSP	+XCSP: <service_group>,<services> <CR><LF> +XCSP: 06,10000000 e.g. +XCSP: <service_group>,<services> OK or CME ERROR: <error> or +XCSP: <service_group>,<services> OK
AT+XCSP=?	+XCSP: (1-9,c0,d5) i.e. (list of supported <service group>s) OK

6.15.2 Defined values

<service group>

service group (1-9, c0, d5)

<services>

services of one service group in bit-format beginning with the most significant bit of the service byte.

6.16 Set Voice Mail Number +CSVM

The number to the voice mail server is set with this command. The parameters

<number> and <type> can be left out if the parameter <mode> is set to 0.

- Set Command is used to set the number to the voice mail server.
- Read command returns the currently selected voice mail number and the status.
- Test command returns supported <mode>s and <type>s

6.16.1 Syntax of the Command

Command syntax: AT+CSVM=<mode>[,<number>[,<type>]]

Command	Possible Response(s)
AT+CSVM=<mode>[,<number>[,<type>]]	OK Or +CME ERROR: <err>
AT+CSVM?	+CSVM: <mode>,<number>,<type> OK or +CME ERROR: <err>
AT+CSVM=?	+CSVM: (list of supported <mode>s), (list of supported <type>s) OK Or +CME ERROR: <err>

6.16.2 Defined values

<mode>

0 Disable the voice mail number. (default)

1 Enable the voice mail number.

<number>

string type; Character string <0..9,+>

<type>

type of address octet in integer format (refer TS 24.008 [8] subclause 10.5.4.7); default

145 when dialing string includes international access code character "+", otherwise 129

6.17 Set Voice Mail Number +XSVM

This command allows to set the voice mail server number.

- Set Command is used to set the number to the voice mail server.
- Read command returns the currently selected voice mail number and the status.
- Test command returns supported <line>s, <index>s, <mode>s and <type>s.

6.17.1 Syntax of the Command

Command syntax: AT+XSVM= <line>,<index>,<mode>[,<number[,<type>]]

Command	Possible Response(s)
AT+XSVM= <line>,<index>,<mode>[,<number[,<type>]]	OK Or +CME ERROR: <err>
AT+XSVM?	+XSVM: <line1>,<index1>,<mode1>,<number1>,<type1>,<mailbox_type> <CR><LF> +XSVM: <line1>,<index2>,<mode2>,<number2>,<type2>,<mailbox_type> <CR><LF> +XSVM: <line2>,<index1>,<mode3>,<number3>,<type3>,<mailbox_type> <CR><LF> +XSVM: <line2>,<index2>,<mode4>,<number4>,<type4>,<mailbox_type> OK
AT+XSVM=?	+XSVM: (list of supported <line>s),(list of supported <mode>s),<nlength>,(list of supported <type>s) OK

6.17.2 Defined values

<line>

1 line 1

2 line 2

<index>

1 home network voice mail number

2 roaming voice mail number

<mode>

0 disable the voice mail number

1 enable the voice mail number

<number>

string type (0...9,+) containing the phone number.

<nlength>

maximum length of the <number> phone string, normally 44.

<type>

integer type indicating the type of address octet as follows:
may be: 128-255

meaningful values:

129 ISDN / telephony numbering plan, national / international unknown

145 ISDN / telephony numbering plan, international number

<mailbox_type>

string type indicating the mailbox_type as contained in the corresponding alpha_tag field of the CPHS-file from the SIM-card.

6.18 UICC Application Discovery +CUAD

This command asks the MT to discover what applications are available for selection on the UICC. According to TS, the ME shall access and read the EFDIR file in the UICC and return the values that are stored in its records.

6.18.1 Syntax of the Command

Command syntax : AT+CUAD

Command	Possible Response(s)
AT+CUAD	<response> OK Or +CME ERROR: <err>
AT+CUAD=?	OK

6.18.2 Defined values

<response>

string type in hexadecimal character format. The response is the content of the EFDIR.

6.19 Display SIM and Phonelock Status +XSIMSTATE

This command enables or disables sending of the unsolicited result codes +XSIM and
+XLOCK. The result codes are sent out whenever one of the states is
changed or lock verification has been performed.

- Set Command enables or disables sending of the unsolicited result codes +XSIM and
  +XLOCK.
- Read command returns the status of the mode selected.
- Test command returns the list of supported<mode>s.

6.19.1 Syntax of the Command

Command syntax:

AT+XSIMSTATE=<mode>

Unsolicited Response syntax:

+XSIM: <SIM state>

+XLOCK: [<fac>,<Lock state>,<Lock result>,...,<fac>,<Lock state>,<Lock result>]

Command	Possible Response(s)
Set Command: AT+XSIMSTATE=1	OK or CME ERROR: <error>
Read command: AT+XSIMSTATE?	+XSIMSTATE: <mode>,<SIM state>,<PB Ready>, <SMS Ready> +XLOCK:[...] OK
Test Command AT+XSIMSTATE=?	+XSIMSTATE:(0,1) i.e.(list of supported <mode>'s) OK

6.19.2 Defined values

<mode>

parameter sets the result code presentation in the TA:

0 disable (default)

1 enable

<SIM state>

parameter shows the current SIM state and may be:

0 SIM not present

1 PIN verification needed

2 PIN verification not needed - Ready

3 PIN verified - Ready

4 PUK verification needed

5 SIM permanently blocked

6 SIM Error

7 ready for attach (+COPS)

8 SIM Technical Problem

9 SIM Removed

10 SIM Reactivating

11 SIM Reactivated

12 SIM SMS Caching Completed. (Sent only when SMS caching enabled)

14 SIM is powered off by modem

Note: State 12 will not be reflected in <SIM state> param but in <SMS Ready> param in +XSIMSTATE?

99 SIM State Unknown

The state 8 reflects a potentially temporary technical problem in access the SIM (return code 6F xx in SIM low level access) , action could either be to retry current operation or in case of SIM startup this may be a stable condition, then restarting the phone either automatically or manual should be considered. Because of the temporary meaning of this state, it does not get reflected by a following at+xsimstate? Command. Instead the previous state will get reported.

<PB Ready>

1 +PBREADY URC Received.

0 +PBREADY URC Not Received.

<SMS Ready>

1 SIM SMS Caching completed URC Received.

0 SIM SMS Caching completed URC Not Received.

<fac>

facility values (see AT+CLCK):

"PS" PH-SIM (lock Phone to SIM card)

"PN" Network Personalisation (refer GSM 02.22 [33])

"PU" network sUbset Personalisation (refer GSM 02.22 [33])

"PP" service Provider Personalisation (refer GSM 02.22 [33]) "PC" Corporate Personalisation (refer GSM 02.22 [33])

<Lock state>

parameter shows the state of the lock for <fac>

0 the lock is ARMED

1 the lock is ACTIVE

2 the lock is PERMANENT_ACTIVE

3 the lock is BLOCKED

4 the lock is DEACTIVE

5 the lock is DISABLED

6 the lock has just been AUTOACTIVATED

< Lock result >

parameter shows the result of the lock verification for <fac>

0 continue operation

1 verification needed

2 no further operation possible

3 lock error

4 unknown

Note: +XSIM notifications are designed to give only the initial state of the SIM/SIM-PIN at the startup(based on SI_INFO_IND) or on restart. Update indications resulting +XSIM : 3 (or 4 or 5) is not given after SIM-PIN verification, AP shall rely on AT+CPIN responses for this. Apart from this, "+XSIM: 7" indication is given to indicate the completion of (U)SIMAP initializations (based on SI_INIT_IND).

6.20 Checks for UICC Card +XUICC

This command is used to check whether the current SIM is a 2G or 3G sim.

6.20.1 Syntax of the Command

Command syntax: AT+XUICC?

Command	Possible Response(s)
AT+XUICC?	+ XUICC: <state> OK or +CME ERROR

6.20.2 Defined values

0 2G SIM

1 3G SIM

6.21 Extended error report +XEER

This command causes the TA to return one line extended error report on the last error happened. This error report is addition to +CEER, +XCEER and +NEER which are for call and networking related errors. So this will not cover the errors related to call (PS and CS) and networking module:

6.21.1 Syntax of the Command

Command syntax:
AT+XEER

Command	Possible Response(s)
AT+XEER	+XEER:<category>,<cause>,<cause_description> OR +XEER: <category>,203,<sw1>,<sw2>,<cause_description> OK
AT+XEER=?	OK

6.21.2 Defined values

<category>:

is a string describing the module. Please refer the appendix G for more details.

<cause> :

contains a digit representing the error cause sent by Sim PhoneBook and SIM Access. Please refer the appendix G for more details

<cause_description>:

is a verbose string containing the textual representation of the <cause>. Please refer the appendix G for more details

<sw1>,<sw2>:

is status word 1 and status word 2 and will be displayed in decimal format

6.22 Get remaining SIM PIN attempts +XPINCNT

This command reads the remaining attempts for SIM PIN, SIM PIN2, SIM PUK and SIM PUK2.

- Set command allows reading the remaining attempts for SIM PIN, SIM PIN2, SIM PUK and SIM PUK2.
- Read command is not supported.
- Test command returns "OK".

6.22.1 Syntax of the Command

Command syntax: AT+XPINCNT

Command	Possible Response(s)
AT+XPINCNT	+XPINCNT: <PIN attempts>,<PIN2 attempts>,<PUK attempts>,<PUK2 attempts> OK or CME ERROR: <error>
AT+XPINCNT=?	OK

6.22.2 Defined values

The result parameters are integer values.

<PIN attempts>

number of remaining attempts to enter PIN (default 3)

<PIN2 attempts>

number of remaining attempts to enter PIN2 (default 3)

<PUK attempts>

number of remaining attempts to enter PUK (default 10)

<PUK2 attempts>

number of remaining attempts to enter PUK2 (default 10)

7 Mobile Station Control and Status Commands

7.1 Switch off MS +CPWROFF

This command allows to switches off the MS.

- Execution command switches off the MS (shutdown the system).
- Test command returns "OK" string.

7.1.1 Syntax of the Command

Command syntax : AT+CPWROFF

Command	Possible Response(s)
AT+CPWROFF	OK Or CME ERROR: <error>
AT+CPWROFF=?	OK

Note: some times OK won't be seen at Terminal if SIO if switched of bfore OK sent out.

7.2 Request product serial number identification +CGSN

This command gets the product serial number, known as IMEI (International Mobile
Station Identity) of the MS.

- Execution command shows the product serial number if present otherwise error.
- Test command returns "OK" string.

7.2.1 Syntax of the Command

Command syntax : AT+CGSN

Command	Possible Response(s)
AT+CGSN	<IMEI> OK Or CME ERROR: <error>
AT+CGSN=?	OK

7.3 System Change Indication +XSYSCHANGEIND

This command is used to enable/disable the display of +XSYSCHANGEIND unsolicited response.

- Set command enable or disable the disclosure of the state change indication
- Read command reads the value of subscription of URC
- Test command returns the list of all supported <subscribe> values.

7.3.1 Syntax of the Command

Command syntax: AT+XSYSCHANGEIND=<subscribe>

URC syntax: +XSYSCHANGEIND: <fun>

Command	Possible Response(s)
AT+XSYSCHANGEIND=<subscribe>	OK or CME ERROR: <error>

AT+XSYSCHANGEIND?	+XSYSCHANGEIND: <subscribe> OK
AT+XSYSCHANGEIND =?	+XSYSCHANGEIND: (0,1) OK

7.3.2 Defined values

<subscribe>

0 disclosure of the state change indication is disabled(default)

1 disclosure of the state change indication is enabled

<fun>

Please refer AT+CFUN command

7.4 set and Read real time Clock +CCLK

This set command sets the real-time clock of the ME.

7.4.1 Syntax of the Command

Command syntax : AT+CCLK=<time>

Command	Possible Response(s)
AT+CCLK=<time>	OK Or CME ERROR: <error>
AT+CCLK?	+CCLK: <time> +CME ERROR: <err>
AT+CCLK=?	OK

7.4.2 Defined values

<time>

string type value; format is "yy/MM/dd,hh:mm:ss+TZ", wherein characters indicates year, month,day ,hour, minutes, seconds.

TZ: Time zone information represented by two digits. The time zone information is optional;

if it was entered it is always accepted, but the display of TZ for query contains this information (in updated form) only if the network supports the time zone information.

7.5 Automatic Time Zone Update +CTZU

This command enables/disables (on/off) the automatic update of the time zone via NITZ.

- Execution command enables/disables the automatic update of the time zone.
- Read command returns the state of the automatic update (enable/disable) (on/off).
- Test command returns list of the supported (on/off)s.

7.5.1 Syntax of the Command

Command syntax: AT+CTZU=<on off>

Command	Possible Response(s)
AT+ CTZU=<on off>	OK Or CME ERROR: <error>
AT+CTZU?	+CTZU: <on off> OK
AT+CTZU=?	+CTZU: (list of supported <on off>s) OK

7.5.2 Defined values

<on off>

integer type value indicating:

0 Disable automatic time zone update via NITZ (default)

1 Enable automatic time zone update via NITZ.

7.6 Time Zone Reporting +CTZR

This command enables/disables the time zone change event and Daylight saving time reporting.

- Execution command enables/disables the time zone change event and daylight saving timereporting.
- Read command returns the status of the time zone change event reporting (enable/dis- able) (on/off).
- Test command returns list of the supported (on/off)s. If the reporting is enabled, the MT returns the URC whenever the time zone is changed.

7.6.1 Syntax of the Command

Command syntax: AT+CTZR= <on/off>

7.6.2 Syntax of the URC

+CTZV: <tz>,<time>

XNITZINFO: <timzone_variance>,<time>

+CTZDST: <dst>

Command	Possible Response(s)
AT+ CTZR = <on/off>	OK Or CME ERROR: <error>
AT+CTZR?	+CTZR: <on/off> OK
AT+CTZR=?	+CTZR: (list of supported <onoff>s) OK

7.6.3 Defined values

<onoff>

integer type value indicating:

0 disable time zone change event reporting and URC +XNITZINFO, +CTZDST (default)

1 enable time zone change event reporting and URC +XNITZINFO, +CTZDST.

<tz>

integer value indicating the time zone.

<time>

string type value; format is "Yy/MM/dd,hh:mms" ,wherein characters indicates year, month, day, hour, minutes, seconds.

<dst>

daylight savings time value:

0 No adjustment for Daylight Saving Time

1 +1 hour adjustment for Daylight Saving Time

2 +2 hours adjustment for Daylight Saving Time

<timzone_variance>

is a string "GMT+HH:MM" or "GMT-HH:MM" e.g. "GMT+5:30"

7.7 Select TE Character Set +CSCS

This command informs TA which character set < vail>is used by the TE.

- Set command informs TA which character set < vail>is used by the TE. TA is then able to convert character strings correctly between TE and MT character sets.
- Read command shows current setting.
- Test command displays conversion schemes implemented in the TA.

7.7.1 Syntax of the Command

Command syntax: AT+CSCS= [< vail>]

Command	Possible Response(s)
AT+CSCS= [< vail>]	OK Or CME ERROR: <error>
AT+CSCS?	+CSCS: < vail>or +CME ERROR: <err>
AT+CSCS=?	+CSCS: (list of supported < vail>s)

7.7.2 Defined values

< vail>

"GSM" GSM 7 bit default alphabet (3GPP TS 23.038 [25]); this setting causes easily software flow control (XON/XOFF) problems.

"HEX" Character strings consist only of hexadecimal numbers from 00 to FF; e.g. "032F E6" equals three 8-bit characters with decimal values 3, 47 and 230; no conversions to the original MT character set shall be done. "IRA" International reference alphabet (ITU-T T.50 [13]). (default)

"UCS2" 16-bit universal multiple-octet coded character set (ISO/IEC10646 [32]); UCS2 character strings are to hexadecimal numbers from 0000 to FFFF; e.g. "004100620063" equals three 16-bit characters with decimal values 65, 98 and 99.

7.8 Configuration Trace and Modem (AT) interfaces +XSIO

This command allows the configuration of the modem-interface (AT), trace-interface, IrDA interface and MUXinterface by setting the variant number.

- Set command allows the configuration of the modem-interface (AT), trace-interface, Ir DA interface and MUX-interface by setting the variant number. The set variant number becomes active only after a reset
- Read command allows seeing which is the current variant and which is the requested variant. A star marks the active variant. -Test command returns the possible and customizable variants.

7.8.1 Syntax of the Command

Command syntax:AT+XSIO= <requested>

Command	Possible Response(s)
AT+XSIO=<requested>	OK Or CME ERROR: <error>
AT+XSIO?	+XSIO: <requested>, <active> OK
AT+XSIO=?	+XSIO: Variant=<requested>: [AT=<AT-interface>;] [Trace=<Trace-interface> ;] [MUX=<MUX-interface> ;] [IrDA=<IrDA-interface>] <CR><LF>+XSIO: Variant=<requested>: [AT=<AT-interface>;] [Trace=<Trace-interface> ;] [MUX=<MUX-interface> ;] [IrDA=<IrDA-interface>] ..... (more display rows are possible) OK

7.8.2 Defined values

<requested>

requested variant, which may be in range 0-255

<active>

currently active variant, which may be in range 0-255

<AT-interface>

NULL, UART0,..., UARTn

<Trace>

NULL, UART0,..., UARTn

<MUX>

1-x

<IrDA>

NULL, UART0,..., UARTn

7.9 Switch Trace ON1OFF +TRACE

This command controls the trace; it allows selecting the trace mode, method and the trace data transfer rate.

- Set command switches the trace on or off. It allows the trace mode, method and the trace data transfer rate.
- Read command allows seeing the current set mode value along with the speed, i.e. data transfer rate. It also allows knowing which traceable unit is on or off.
- Test command returns all the possible values of mode, data transfer rate, traceable unit, their mode and power saving countdown

7.9.1 Syntax of the Command

Command syntax:
AT+TRACE=[<mode>],[<speed>],["<unit>=<umode>]",["<method>"],[PowerSavingCountdown]

Command	Possible Response(s)
+TRACE=[<mode>],[<speed>],["<unit>=<umode>]",["<method>"],[PowerSavingCountdown]	OK Or CME ERROR: <error>
+TRACE?	+TRACE: <mode>,<speed>, <unit>=<umode>;..;"<unit>=<umode>","<method>",<PowerSaving Countdown> OK
AT+TRACE=?	+TRACE: [list of supported <mode>s],[list of supported <speed>s],[list of supported "<unit>=<umode>s]",[list of supported "<method>"s],list of supported [PowerSavingCountdown] values.

7.9.2 Defined values

<mode> may be

0 switch trace off (all kinds of traces are switched off) (default)

1 switch trace on (all kinds of traces are switched on)

128 This value can not be entered, it is only displayed via read syntax if trace configu- ration is done by unitdefinitions

the last time. See <umode> & <unit> for trace configuration;

<speed>

trace data transfer rate which may be

115200 bps (trace)

230400 bps

460800 bps

921600 bps

1843200 bps

3250000 bps

6000000 bps

Maybe not all listed rates are available because they depend on the target.

<unit>=<umode>
<unit>

indicates a traceable

unit as follows: St

stack

Pr printf

Bt Bluetooth

Ap apoxi

Db debug

Lt LLT (Low Level Trace)

Li LwIP (Lightweight TCP/IP Stack)

Ga GATE (3rd Party Software Decoding with a

Windows DLL) Ae AENEAS-trace

<umode>

defines whether the unit related trace is on or off and can have the values:

0 unit-trace off

1 unit-trace on

<method>

sting type indicating the trace method with

possible values: "BTM" byte stuffing trace

method

"EBTM" extended byte stuffing trace method

"DTM" direct trace method

"EDTM" extended direct trace method (16bits)

"DTMGTS" extended direct trace method (16bits) with global time stamp

<PowerSavingCountdown>

integer value indicating the power saving countdown value in units of milliseconds. The maximum valid value is 30000.

7.10 Display Generation and SW Version +XGENDATA

This command requests the software version and generation data.

7.10.1 Syntax of the Command

Command syntax:AT+XGENDATA

Command	Possible Response(s)
+XGENDATA	+XGENDATA: "<Short> ∗<Customer>∗<Driver>" <CR><LF>"<Stack>∗<L1>" OK or CME ERROR: <error>

7.10.2 Defined values

<Short>

Includes the short software version with date and time

<Customer>

Customer software version

<Driver>

Driver software version

<Stack>

Full Stack version

<L1>

L1-FW Software Version

7.11 DCE Response Format +V

This command allows to control the contents of the header and trailer transmitted with result codes and information responses. It also determines whether result codes are transmitted in a numeric form or a alphabetic (or verbose) form. The text portion of information responses is not affected by this setting.

The effect of V setting on response formats is

described below in case of information

responses the format is:

- for V0: <text><CR><LF>
- for V1: <CR><LF><text><CR><LF>

in case of result codes the format is:

- for V0: <numeric code><CR>
- for V1: <CR><LF><verbose code><CR><LF>

7.11.1 Syntax of the Command

Command syntax:
ATV[value]

Command	Possible Response(s)
ATV0	OK 4
ATV1	OK or CME ERROR: <error>

7.11.2 Defined values

<value> may be

0 DCE transmits limited headers and trailers and numeric text

1 DCE transmits full headers and trailers and verbose response text(default)

7.12 Command Echo E

This command controls whether or not the C-AT echoes characters received from the DTE during command state.

7.12.1 Syntax of the Command

Command syntax: ATE[<value>]

Command	Possible Response(s)
ATE1[<value>]	OK or CME ERROR: <error>

7.12.2 Defined values

<value> may be

0 echo off

1 echo on (default)

7.13 Result Code Selection and Call Progress Monitoring Control X

7.13.1 Description

This command determines whether or not the DCE transmits particular result codes to the DTE. It also controls whether or not the DCE verifies the presence of dial tone when it first goes off-hook to begin vailab and whether or not engaged tone (busy signal) detection is enabled.

7.13.2 Syntax of the Command

Command syntax:
ATX [< value>]

Command	Possible Response(s)
ATX[< value>]	OK Or CME ERROR: <error>

7.13.3 Defined values

< value> may be

0 CONNECT result code is given upon entering online data state; dial tone and busy detection are disabled.

1 CONNECT <text> result code is given upon entering online data state; dial tone and busy detection are disabled.

2 CONNECT <text> result code is given upon entering online data state; dial tone detection is enabled and busy detection is disabled.

3 CONNECT <text> result code is given upon entering online data state; dial tone detection is disabled and busy detection is enabled.

4 CONNECT <text> result code is given upon entering online data state; dial tone and busy detection are both enabled.

7.14 List All Available AT Commands +CLAC

This execution command causes the MS to return one or more lines of AT commands that are available for the DTE user. Each line contains one AT command. The presentation of commands respects the order in the ATmanual

7.14.1 Syntax of the Command

Command syntax:
AT+CLAC

Command	Possible Response(s)
+CLAC	<AT command 1> [<CR><LF><AT command 2>[..]] OK OR CME ERROR: <error>

7.14.2 Defined values

<AT command >

defines the AT command including the prefix AT.

7.15 Fixed DTE Rate +IPR

This command specifies the data rate at which the DCE will accept commands. The full range of data rate values may be reduced dependent on HW or other criteria.

- Execution command sets baud rate of i/o port
- Read command returns the current settings of the i/o baud rate
- Test command returns list of supported baud rates.

7.15.1 Syntax of the Command

Command syntax:AT+IPR= <baud_rate>

Command	Possible Response(s)
AT+IPR= <baud_rate>	OK Or CME ERROR: <error>
AT+IPR?	+IPR: <baud_rate> OK
AT+IPR=?	+IPR: (list of supported auto detectable<rate> values) [,(list of fixed only <rate> values)] OK

7.15.2 Defined values

<baud_rate>

may be 0 meaning autobauding or 300, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 (default), 230400, 460800, 500000, 750000, 921600, 1843200, 3250000, 6000000 bps. Maybe not all listed rates are available because they depend on the target.

7.16 Read Exception Log +XLOG

This command allows displaying the exceptions stored in NVRAM on DTE. The MS-error LOG is contained in a response code formatted as" +XLOG : <num>,<code>,<file>, <line>,<count>" or an other appropriate format as specified below. If the MS-error LOG is only displayed on DTE, the corresponding data are also sent to the Mobile-Analyser. The Mobile-Analyser has also the possibility the delete the stored errors, using the corresponding syntax of this AT-command.

- Execution command display the exceptional logs on DTE
- Test command returns "OK" string with list of supported modes. Following modes are supporting by C-AT
- +XLOG: (0,2,4,5)[,"number"][,<urrc_error_type>]
- +XLOG=0 (default) : display exception

- +XLOG=2 : delete exception from NVRAM
- +XLOG=4 : invoke exception
- +XLOG=5, <urrc_error_type> : simulates an URRC error
- +XLOG=6, Reset Count

7.16.1 Syntax of the Command

Command syntax AT+XLOG [=<mode>,<phone_number>] Response syntax +XGENDA TA: customer and short sw version if provided

+XLOG: Exception
Number: <num>
Trap Class: <class>

Identification: <id> - "Identification" exists only in case of SW traps- System Stack: - exists only for class A-C (HW) <Syst> - display as one word in a line; 32-bit processor:
4 bytes, 16-bit processor: 2 bytes in a line Date: <date> Time: <time> File: <file> - exists only in case of SW traps - Line: <line> - exists only in case of SW traps - Logdata:
<log_data> - in case of for SW traps or exceptions - Register - in case of HW traps - <register_values>

Command	Possible Response(s)

+XLOG [=<mode>[,<phone_number>]]	+XGENDATA: 00*01*GFS19.03*2003-11-21*12:00 :00 +XLOG: Exception Number: 1 Trap Class: 0xEEEE Identification: 1000 Date: 01.01.2004 Time: 00:00 File: <file> Line: <line> Logdata: 54 45.. 00 OK OR +XLOG: <rstcnt> OR +CME ERROR: <err>
+XLOG=?	+XLOG: (list of supported modes) OK

7.16.1 Defined values

<mode> may be

0 (default) forces display of command response on DTE; the same data are also sent to the Mobile-Analyser;

4 invoke exception

2 delete all exceptions from NVRAM;

5 <urrc_error_type> : simulates an URRC error

6 display the reset count

<rstcnt>

Total reset count

<phone_number>

contains the address (phone_number) to which the SMS's with the exception log infor- mation are sent; this address shall be used if no usable entry in NVRAM containing a valid address exists; if <mode> equals to 3,<phone_number> parameter is mandatory

<num> exception number; (usual range: 1 -10);

the highest counter value always holds the latest occurred exception data; it is also the number of exception log entry in the RAM storage;

<class>

indicates the trap class type and may be:

0xAAAA Data abort

0xBBBB Prefetch abort

0xCCCC Undefined instruction

0xDDDD Software trap

0xEEEE Software exception

The traps A-C are of HW type and D-E of SW type.

<register_value>

register values; they depends on the hardware; the registers are R0, R1, R2, R3, R13, R14, SPSR, DFAR, DSFR (normal format);

the register in extended format are:

r0 (hw_dump.r0) r1 (hw_dump.r1) r2 (hw_dump.r2) r3 (hw_dump.r3) r4 (hw_dump.r4) r5 (hw_dump.r5) r6 (hw_dump.r6) r7 (hw_dump.r7) r8 (hw_dump.r8) r9 (hw_dump.r9) r10 (hw_dump.r10) r11 (hw_dump.r11)

r12 (hw_dump.r12) r13 (hw_dump.r13) r14 (hw_dump.r14) r15 (hw_dump.r15) SPSR (hw_dump.SPSR) DFAR (hw_dump.DFAR) DFSR (hw_dump.DFSR)

<id>

number in hexadecimal format identifying the exact source of a generated Trap or an exception; this

element is not used for hard Trap Classes A, B or C;

<syst>

system-stack containing all significant words of the system stack at the time where the
Trap/exception occurred

<time>
time where the Trap/exception occurred in format HH:Mmam|pm

<date>

date where the Trap/exception occurred in format JJ:MM:DD

<log_data>

in case of SW generated traps this array (only first 20 bytes) is used for debug purposes; the log_data are displayed in a special format: the left part contains the 20 bytes in hexadecimal format and the right part contains the readable characters of them - for each unreadable byte a dot is printed - in case of exception this array holds the exception log

<code>

error code (hexadecimal format)

<file>

file name containing the error line

<line>

line in <file> containing the error.

7.17 Phone Activity Status +CPAS

Execution command returns the activity status <pas> of the MT. Test command returns values supported by the MT as a compound value.

7.17.1 Syntax of the Command

Command syntax:AT+CPAS

Command	Possible Response(s)
+CPAS	+CPAS: <pas> OK Or CME ERROR: <error>
+CPAS?	+CPAS: (list of supported <pas>s) OK +CME ERROR: <err>

7.17.2 Defined values

<pas>

0 ready (MT allows commands from TA/TE)

1 unavailable (MT does not allow commands from TA/TE)

2 unknown (MT is not guaranteed to respond to instructions)

3 ringing (MT is ready for commands from TA/TE, but the ringer is active)

4 call in progress (MT is ready for commands from TA/TE, but a call is in progress)

5 asleep (MT is unable to process commands from TA/TE because it is in a low function- ality state)

7.18 configure LwIP trace module +SETLITRACE

This command allows to configure LwIP tracing module.

- Set command is used to configure LwIP tracing module.
- Test command returns command description list and list of configurations.

7.18.1 Syntax of the Command

Command syntax: AT+SETLITRACE=<trc_lvl>,<mod_trc_cfg>,<data_lvl>

Command	Possible Response(s)
AT+SETLITRACE==<trc_lvl>,<mod_trc_cfg>,<data_lvl>	<manufacturer> OK Or +CME ERROR: <err>
AT+SETLITRACE=?	OK

7.18.2 Defined values

<trc_level> Prioritization Level

0 All messages outputted

1 Warnings and serious messages outputted

2 Only serious messages outputted

<mod_trc_config>

Configuration to enable/disable LwIP sub-modules. Hexadecimal input. If more than one module is required to be enabled, then corresponding values should be hexa-Ored and given as input.

IPRAW messages 80000000

TCP messages 40000000

IP messages 20000000

UDP messages 10000000

Sockets messages 8000000

Memory pool messages 4000000

Memp pool messages 2000000

Pbuf messages 1000000

API lib Messages 800000

API msg messages 400000

PPP messages 200000 netif messages 100000

WLAN interface messages 80000

DNS messages 40000

TCPIP messages 20000

Etharp messages 10000

DHCP messages 8000

ICMP messages 4000

LL Raw messages 2000

LL Addr messages 1000

All messages FFFFFFFF

<data_level> Ethereal data tracing levels (0-2)

0 No ethereal header or data

1 Only IP+TCP/UDP Header in ethereal

2 Complete IP datagram in ethereal

Note: This command is available only if CAT_LWIP flag is enabled.

7.19 Manufacturer Identification +CGMI

This command gives the manufacturer identification.

- Execution Command displays the manufacturer identification.
- Test command returns "OK" string.

7.19.1 Syntax of the Command

Command syntax: AT+CGMI

Command	Possible Response(s)
AT+CGMI	<manufacturer> OK Or +CME ERROR: <err>
AT+CGMI=?	OK

7.20 Request Model Identification +CGMM

This command gives the model identification.

- Execution Command displays the model identification.
- Test command returns "OK" string.

7.20.1 Syntax of the Command

Command syntax: AT+CGMM

Command	Possible Response(s)
AT+CGMM	<model> OK Or +CME ERROR: <err>
AT+CGMM=?	OK

7.21 Request Revision Identification and Software +CGMR

This command gives the revised version and SV from IMEISV of the mobile station.

- Execution Command displays the manufacturer identification.
- Test command returns "OK" string.

7.21.1 Syntax of the Command

Command syntax : AT+CGMR

Command	Possible Response(s)
AT+CGMR	<revision_version> , <SV> OK Or +CME ERROR: <err>
AT+CGMR=?	OK

7.21.2 Defined values

<revision_version>

Revision Version of the mobile station.

<SV>

refer to SV portion of IMEISV. Usually 2 bytes in length.

7.22 Configure the Data Channel + XDATACHANNEL

This command configures the channel over which CSD or GPRS data shall be routed. The data is default routed on the channel where the connection is established.

- Set Command configures the channel over which CSD or GPRS data shall be routed.

- Test command returns the list of modes supported.

7.22.1 Syntax of the Command

Command syntax:
AT+XDATACHANNEL=<mode>,<csd_gprs_flag>,<ctrl_tid_path>,<tid_path>[,<connect_flag> [, <cid>]]

Command	Possible Response(s)
AT+XDATACHANNEL=<mode>,<csd_gprs_flag>,<ctrl_tid_path>,<tid_path>[,<connect_flag> [, <cid>]]	OK Or +CME ERROR: <err>
AT+XDATACHANNEL=?	+XDATACHANNEL: (list of <mode>s),(list of <csd_gprs_flag>'s), (list of<connect_flag>'s), (list of supported <cid>'s) OK

7.22.2 Defined values

<mode>

0 disable the routing

1 enable the routing

2 query current setting for the channel where the command is executed(other parameters will be ignored)

<csd_gprs_flag>

0 configure the channel for a CSD connection

1 configure the channel for a GRPS connection

<ctrl_tid_path>

terminal for which the data routing mechanism shall be enabled, string format. (eg: "/mux/5")

<tid_path>

terminal to which a data call shall be routed, string format.(eg: "/mux/2")

<connect_flag>

0 No Reporting on the data channel (neither CONNECT nor NO CARRIER)

1 Reporting on the data channel enabled (= CONNECT and NO CARRIER)

2 Reporting on the control channel enabled (= CONNECT and NO CARRIER)

<cid>

a numeric parameter which specifies a particular PDP context definition (see the +CGDC ONT and +CGDSCONT commands).

- The control channel must be in OPEN state when XDATACHANNEL command is sent
- XDATACHANNEL settings will only apply while control channel DLC is OPEN and will be reset as soon as DLC is closed
- When the XDATACHANNEL command is sent with <cid> parameter, then the data channel(<tid-path>) must be in OPEN state and the given <cid> should be already defined.
- If the <cid> is deleted/undefined, the XDATACHANNEL settings pertaining to the<cid>are not retained.
- Connection must be established(start and stop) through <ctrl-tid-path> for data to be properly routed
- XDATACHANNEL query(mode=2) does not return the <cid> associated with the control channel, as the data routing of a control channel can be configured for multiple <cid>s

7.23 Set CTM Working Mode +XCTMS

This command allows to set the TTY/CTM behavior. The selected setting is stored also in
NVRAM and remains valid also after switch off the mobile.

- Set Command is used to set the TTY/CTM behaviour.
- Read command returns the mode selected.
- Test command returns the list of supported <mode>s.

7.23.1 Syntax of the Command

Command syntax: AT+XCTMS= <mode>

Command	Possible Response(s)

AT+XCTMS= <mode>	OK Or +CME ERROR: <err>
AT+XCTMS?	+XCTMS: <mode> OK
AT+XCTMS=?	+XCTMS: (list of supported <mode>s) OK

7.23.2 Defined values

<mode>

Indicates the working mode in relation to TTY/CTM and may be:

0 CTM off (default)

1 CTM on

2 VCO mode

3 HCO mode

7.24 Configure the Mode of HSDPA1HSUPA +XHSDUPA

This command configures the mode of HSDPA and HSUPA (by changing the appropriate dynamic NVRAM parameter).

- Set Command is used to configure the mode of HSDPA and HSUPA.
- Read command returns the HSDPA mode and HSUPA mode.
- Test command returns (<list of supported HSDPA-mode's>),(<list of supported HSUP A-mode's).

7.24.1 Syntax of the Command

Command syntax: AT+XHSDUPA=<HSDPA-mode>,<HSDPA-cat>[,<HSUPA-mode>,<H SUPA-cat]

Command	Possible Response(s)

AT+XHSDUPA=<HSDPA-mode>,<HSDPA-cat>[,<HSUPA-mode>,<HSUPA-cat]	OK Or +CME ERROR: <err>

7.24.2 Defined values

<HSDPA-mode>

0 HSDPA OFF

1 HSDPA ON

<HSDPA-cat>

Possible values are 6, 8, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24

13-18 are only supported in RELEASE 7 and higher

19-24 are only supported in RELEASE 8 and higher

<HSUPA-mode>

0 HSUPA OFF

1 HSUPA ON

<HSUPA-cat>

Possible values are 1, 2, 4, 6, 7

is only supported in RELEASE 7 and higher, (Available with release DFS24.10.00). Note: <HSUPA-cat=4> is not supported for XMM6260 platform.

7.25 Reset to Default Configuration Z

This command resets the parameters of all AT-commands (also FAX-related). The values related to parameters contained in a user profile will be taken from the corresponding NVRAM-profile, indicated by the

. Execution command is used to resets the parameters of all AT-commands.

7.25.1 Syntax of the Command

Command syntax:
ATZ<value>

Command	Possible Response(s)
ATZ	OK Or +CME ERROR: <err>

7.25.2 Defined values

<values>

indicates NVRAM profile; possible values 0-1.

Note: Currently C-AT does not supports the NVRAM profiles, so for both(0&1) profile id's the common profile params will be reset to default values.

7.26 Restricted UICC Logical Channel Access +CPWD

This command is used to set a new password for the facility lock function defined by command +CLCK.

- Set Command sets a new password for the facility lock function defined by command
  +CLCK.
- Test command returns list of supported values and length of password.

7.26.1 Syntax of the Command

Command syntax : AT+CPWD= <fac>,<oldpwd>,<newpwd>

Command	Possible Response(s)
AT+CPWD= "SC","0933","0934"	OK Or +CME ERROR: <err>

AT+CPWD=?	+CPWD :("SC",8"),("P2",8),("PS",16),("PN",16),("PU",16),("PP",16),("PC",16),("AO",4),("OI",4),("OX",4),("AI",4),("IR",4),("AB",4),("AG",4),("AC",4) Note: list of supported(<fac>,<pwdlength>)s OK

7.26.2 Defined values

<fac>

"P2" and other values as defined for +CLCK

<oldpwd>

string type containing the old password.

<newpwd>

string type containing the new password

<pwdlength>

length of password (digits).

7.27 Circuit 10812 Behaviour &D

This command determines how the DCE responds when circuit 108/2 is changed from ON to OFF condition during on-line data state.

7.27.1 Syntax of the Command

Command syntax: AT&D[<value>]

Command	Possible Response(s)
ATD&1	Ok Or CME ERROR

7.27.2 Defined values

<value> may be:

0 the DCE ignores circuit 108/2

1 upon an ON-to-OFF transition of circuit 108/2, the DCE enters online command state and issues an OK result code

2 upon an ON-to-OFF transition of circuit 108/2, the DCE instructs the underlying DCE to perform an orderly cleardown of the call. Automatic answer is disabled while circuit 108/2 remains OFF.

7.28 Open Port +CONNECTPORT

This command is used to open the port. Currently, the command serves no functionality. It is kept for backward compatibility.

7.28.1 Syntax of the Command

Command syntax: AT+CONNECTPORT

Command	Possible Response(s)
AT+CONNECTPORT	OK

7.29 Reset to Default Configuration : I

This command is used to reset the default configuration. Currently, the command serves no functionality. It is kept for backward compatibility.

7.29.1 Syntax of the Command

Command syntax: ATI

Command	Possible Response(s)
ATI	OK

7.30 Reset to Default Configuration : M

This command is used to reset the default configuration. Currently, the command serves no functionality. It is kept for backward compatibility.

7.30.1 Syntax of the Command

Command syntax: ATM

Command	Possible Response(s)
ATM	OK

7.31 Result Code Suppression: Q

This command determines whether or not the DCE transmits result codes to the DTE. When result codes are being suppressed, no portion of any intermediate, final, or unsolicited result code - header, result text, line terminator, or trailer - is transmitted. Information text transmitted in response to commands is not affected by the setting of this parameter.

7.31.1 Syntax of the Command

Command syntax:
ATQ[<value>]

Command	Possible Response(s)
ATQ[<value>]	OK Or +CME ERROR: <err>

7.31.2 Defined Values

0 DCE transmits result codes. (default)

1 Result codes are suppressed and not transmitted.

7.32 Multiplexing Mode +CMUX

This command enables the multiplexing protocol control channel as defined in GSM07.10. The AT command sets parameters for the Control Channel. If parameters are left out the default values are used. If no autobauding is supported, a customer related interface speed is pre selected. The final response code OK or CME ERROR: <err> is returned using the old interface speed; the parameters become active only after sending OK.

- Set Command enables the multiplexing protocol control channel.
- Read Command returns the current mode and the settings.
- Test command returns the list of supported values for the parameters.

7.32.1 Syntax of the Command

Command syntax:

AT+CMUX=<mode>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>[,<k>]]]]]]]

Command	Possible Response(s)
AT+CMUX=0,0,,1500,50,3,90	OK Or CME ERROR: <error> or
AT+CMUX?	+CMUX : <mode>,[<subset>],, <N1>,<T1>,<N2>,<T2>,<T3>[,< k>] or +CME ERROR: <error>

AT+CMUX=?	+CMUX: (list of supported <mode>s),(list of supported subset>s), ,(list of supported <N1>s),(list of supported <T1>s), (list of supported <N2>s),(list of supported <T2>s),(list of supported <T3>s),(list of supported <k>s) OK

7.32.2 Defined values

<mode> (multiplexer Transparency Mechanism)

0 Basic option (default)

1 Advanced option (not supported)

<subset>

This parameter defines the way in which the multiplexer control channel is set up.

0 UIH frames used only

1 UI frames used only; value currently not supported

2 I frames used only; value currently not supported

Default value: 0

<port_speed>(transmission rate)

1 9 600 bit/s

2 19 200 bit/s

3 38 400 bit/s

4 57 600 bit/s

5 115 200 bit/s

6 230 400 bits/s

7 1 Mbit/s (default)

<N1> (maximum frame size)

32768; currently only the range 1-

1509 is supported default Value : 31

(64 if Advanced option is used)

<T1> (acknowledgement timer in units of ten milliseconds)

1-255, where 10 is default (100 ms)

<N2> (maximum number of re-transmissions)

0-100, where 3 is default; currently only the range 0 -5 is supported

<T2> (response timer for the multiplexer control channel in units of ten mil- liseconds)

2-255, where 30 is

default (300 ms)

Note: T2 must be

longer than T1.

<T3> (wake up response timer in seconds)

1-255, where 10 is default ; currently not supported, in case of read command 0 is returned;

<k> (window size, for Advanced operation with Error Recovery options)

1-7, where 2 is default; currently not supported, in case of read command 0 is returned.

7.33 Rx Diversity +XRXDIV

This command is used to allow external control of the 3G Rx Diversity feature during runtime. The feature can be enabled or disabled during operation. Read back of the feature enable is also provided. The command will also allow the <DARP> field, i.e. 2G DARP value to be set to one of these values:

- DARP_NOT_SUPPORTED
- DARP_PHASE_1
- DARP_PHASE_2_TRAFFIC_ONLY
- DARP_PHASE_2_ALWAYS_ON

Apart from the runtime AT command configuration, 2G DARP and 3G Rx diversity are also configurable in NVRAM independently from each other. The Default 3G RxDiv and 2G DARP configuration is stored in NVRAM and configured during build configuration or with PhoneTool. The static NVRAM parameter is read during start-up of the modem and cannot be

changed runtime.

- Set Command is used to allow external control of the 3G Rx Diversity feature during runtime.
- Read Command displays whether the 3G Rx Diversity is on or off as well as the current 2G Darp value.
- Test command returns the list of supported (<RxDiv3G>, <DARP>)

This command is available only if FEAT_STATIC_RXDIV is defined (build).

7.33.1 Syntax of the Command

Command syntax:AT+XRXDIV=<RxDiv3G>[,<DARP>]

Command	Possible Response(s)
Set command AT+XRXDIV= 0, 1	OK or ERROR
Read command AT+XRXDIV?	+XRXDIV: <RxDiv3GenblRd>, <DARPrd> OK
Test command AT+XRXDIV=?	+XRXDIV: (0-1)[,(0-3)] OK

7.33.2 Defined values

<RxDiv3G>

turn the 3G Rx Div ON and OFF

0 disable the 3G Rx Diversity feature (default)

1 enable the 3G Rx Diversity feature

The feature enable selected here is volatile, and will persist until a power cycle. Format: x

<DARP>

Optional parameter to set the 2G DARP field 0 DARP_NOT_SUPPORTED

1 DARP_PHASE_1

2 DARP_PHASE_2_TRAFFIC_ONLY

3 DARP_PHASE_2_ALWAYS_ON

This parameter will be used until the next power cycle. Format: x

<RxDivEnbl3GRd>

Readback of the 3G Rx Div feature enable in use At power up, the 3G Rx div feature enable stored in NVM is restored. During operation, the <RxDiv3Genbl> can be changed via this command, and this selection will persist until a power cycle or subsequent command update.

0 3G Rx Diversity is OFF

1 3G Rx Diversity is ON Format: x

<DARPrd>

Readback of the current 2G DARP field value At power up, the 2G DARP value stored in NVM is restored. During operation, the <DARP> can be changed via the XRXDIV set command, and this volatile update will be in effect until a power cycle or another command update. The value currently in use can be:

0 DARP_NOT_SUPPORTED

1 DARP_PHASE_1

2 DARP_PHASE_2_TRAFFIC_ONLY

3 DARP_PHASE_2_ALWAYS_ON

7.34 Battery Charge +CBC

This command returns battery status <bcs> and battery charge level <bcl> of MT.The charge level <bcl> will be also used to build and display the indicator "battchg" i.e. battery charge level in in the unsolicited result code +XCIEV.

Execution Command returns battery status <bcs> and battery charge level <bcl> of MT. Test command returns the (list of supported<bcs>'s),(list of supported <bcl>'s)

7.34.1 Syntax of the Command

Command syntax :
AT+CBC

Command	Possible Response(s)
AT+CBC	+CBC: <bcs>,<bcl> OK Or CME ERROR: <error> or
AT+CBC=?	+CBC: (list of supported <bcs>'s),(list of supported <bcl>'s) OK

7.34.2 Defined values

<bcs> may be

0 MT is powered by the battery (default)

1 MT has a battery connected, but is not powered by it

2 MT does not have a battery connected

3 Recognized power fault, calls inhibited

<bcl> may be

0 battery is exhausted or MT does not have a battery connected

1...100 battery has 1-100 percent remaining

7.35 Set powersaving mode +XPOW

This command sets the powersaving-mode.

- This Set Command sets the powersaving-mode.
- Read command diaplays the selected power saving mode.
- Test command returns list of supported <mode>, <timeout>, <num_sp>.

7.35.1 Syntax of the Command

Command syntax:AT+XPOW=<mode>,<timeout>,<num_sp>

Command	Possible Response(s)
AT+XPOW=1,500,100	OK or CME ERROR: <error>
AT+XPOW?	+XPOW: <mode>, <timeout>, <num_sp> OK +CME ERROR: <err>
AT+XPOW=?	+XPOW: (0-1),(0-65535),(0-255) OK

7.35.2 Defined values

<mode>

0: UART SWITCHED OFF (default)

1: UART SWITCHED ON

<timeout>

Minimum time in frames until the phone sleeps after the last received or sent character. [This parameter is ignored in the latest CAT release and kept only for backward compatibility. Read for this parameter will be a random value]

<num_sp>

Minimum suspend-pending time only required if the other side reacts slow on FCTL- in. [This parameter is ignored in the latest CAT release and kept only for backward compatibility. Read for this parameter will be a random value]

Note: at+xpow? Can also have different values than 0 and 1 as long as at+xpow= is not sent or in other words at+xpow? Has no meaning unless at+xpow is used beforehand.

7.36 Proprietary extended error report +XCEER

This command causes the TA to return one or more lines of information text <report>,<cause>,determined by the ME manufacturer, which offer an extended report of the reason for:

- the failure in the last unsuccessful call setup or in-call modification
- the last call release
- the last unsuccessful GPRS attach or unsuccessful PDP context activation
- the last GPRS detach or PDP context deactivation

The displayed <report> contains the numeric code (s. Annex C, D), while the <cause> indicates the error code displayed with the previously CME ERROR response.

- This Execution Command causes the TA to return one or more lines of information text <report>, <cause>, determined by the ME manufacturer, which offer an extended report.
- Test command returns "OK" string.

7.36.1 Syntax of the Command

Command syntax: AT+XCEER

Command	Possible Response(s)
AT+XCEER	+XCEER: <report>,<cause> OK
AT+XCEER=?	OK

7.36.2 Defined values

<report>

numeric error code as contained in the Annex C, D

<cause>

indicates the error code as previously displayed with the response CME ERROR on DTE corresponding to the <report>

7.37 Configuring Trace-Tools: +XTRACECONFIG

This command is used to configure Trace-Tools.

- Execution command allows configuring trace tool.
- Test command returns [list of supported kind of trace], [list of supported func], [max string length of dats].

7.37.1 Syntax of the Command

Command syntax: AT+XTRACECONFIG=<kind of trace>, <func>,<data/action>

Command	Possible Response(s)
AT+XTRACECONFIG=<kind of trace>, <func>, <data/action>	OK or CME ERROR: <error>
AT+XTRACECONFIG=?	+XTRACECONFIG: (list of supported kind of trace), (list of supported func), (max string length of dats) OK

7.37.2 Defined values

<kind of trace>

which trace to be configured

0: MA-trace

<func>

functionality to be triggered

4: select and forward predefined filter-file or specify trace-flags

<data1action>

<flags> flags as a string of hexadecimal values (must NOT include ".")

Usage Example

Specify trace-flags for MA-trace:
AT+XTRACECONFIG=0,4,"A57867E123BB68775FFF..."

7.38 GPRS cell environment description +CGED

This command returns a dump of the cell environment, either as a one shot dump or as a periodic refreshed dump (each 5 seconds), dependent on the command parameter <mode>. The displayed parameters are dependent on the fact whether the UMTS is supported (Note: define UMTS_SUPPORT exists) and if it is, dependent on the currently supported RAT (GSM, UMTS).

This command will work only if feature FEAT_UTA_EM is enabled.

7.38.1 Syntax of the Command

Command syntax: AT+CGED=[<mode>]

Response syntax if the UMTS is not supported:
+CGED :

Service-Cell:

<MCC>,<MNC>,<LAC>,<CI>,<BSIC>,<AcT>

Equivalent PLMNs :

<MCC>,<MNC>

<MCC>,<MNC>

<arfcn>,<RxLevServ>,<RfChannels>,<Arfcn_ded>,<RxLevFull>,<RxLevSub>,<RxQualFull>
,<RxQualSub>,GSM-<ciphering>,GPRS Ciphering
Algorithm :GEA<gprs_ciphering>,
<ms_txpwr>,<rx_acc_min>,<cbq>,<cba>,<c2_valid>,<cr_offset>,
<tmp_offset>,<penalty
_t>,<c1>,<c2>,<ch_type>,<ch_mode>, <txpwr>,<dtx_used>,< dtr_used
>,<t3212>
,<acc>,<t_adv>,<bs_pa_mfrms>, dsc>,<rll>,
<amr_acs>,<amr_cod_ul>,<amr_cod_ dl>,<amr_c_i>,BEP GMSK:
<mean_bep_gmsk>,<cv_bep_gmsk>,BEP 8PSK: <mean_
bep_8psk>,<cv_bep_8psk>,Neighbour Cell <n>:
<MCC>,<MNC>,<LAC>,<CI>,<BSIC>
,<arfcn>,<RxLev> <C1_nc>,<C2_nc>

Note : the neighbour cell content may be repeated up to 6 times. GPRS-Parameters :
<GPRS_sup>,<RAC>,<Split_Pg_Cycle>,<NCO>,<NOM>,<T3192>,<Acc_Burst_type>,<
DRX_Timer_Max>,<PBCCH>,<Ext_Measure_Order>

<PSI1_r_per>,<si13_location>,<packet_psi_status>,<packet_si_status>,<ext_upl_tbf_
supported>,<ccn_active>,<pfc_feat_supported>

Coding Scheme:

dl_sc: <dl_sc>,ul_sc: <ul_sc>

<Count_LR>,<Count_HR>,<C_R_Hyst>,<C31>,<C32>,<Prior_Acc_Thr>

Response syntaxes if the UMTS is supported follow.
Response syntax in case of UMTS radio access technology (RAT):

+CGED: RAT:<rat>,URR:<rrc_state>,DC:<urrcdc_state>, BP:<urrcbp_state>, M:<urrcm
_state>, ERR:<as_error_code>, RC:<release_cause>, OOS:<out_of_service>, BLER:
<meas_bler>,TSIR:<target_sir>,MSIR:<meas_sir>,DPUC:<dlpc_power_up_commands_
count>, DPDC:<dlpc_power_down_commands_count>, UPUC:
<ulpc_power_up_commands
_count>, UPDC:<ulpc_power_down_commands_count>, CMOD:
<compressed_mode>

TPCA:<tx_ul_pwr_ctrl_alg>, DCL:<drx_cycle_length>, UPCS:
<ul_pwr_ctrl_step_size>, BTRG:<bler_target>,NHSC:<num_hsscch_codes>

HSC:<hierarchical_cell_structure>, HMD:<high_mobility_detected>,
LM:<limited_mode>
,RJCZ: <urrc_con_rej_cause>

CMAX:<UMAC data CQI max value>, CMEAN:<UMAC data CQI mean value>,
CMIN:<U MAC data CQI min value>, AFTI:<AMR frame type id>, ATYP:<AMR
type>

CellId:<cell_identity>, DLF:<dl_frequency>, ULF:<ul_frequency>,
C:<ciphering>, D:
<ps_data_transfered>,PSM:< power_saving_mode>,Cell:<celltype=AS>,
SC:<scrambling
_code>, RSCP:<rscp>, ECN0:<ecn0>

Cell:<celltype=VAS>, SC:<scrambling_code>, RSCP:<rscp>, ECN0:<ecn0>,
DLF:<dl_
frequency>
Cell:<celltype=M>, SC:<scrambling_code>, RSCP:<rscp>, ECN0:<ecn0>
Cell:<celltype=D>, SC:<scrambling_code>, RSCP:<rscp>, ECN0:<ecn0>
Cell:<celltype=G>, B:<gsm_band>,Arfcn:<arfcn>, RxLev:<rxLev>,
Bsic:<bsic>, RV:
<ranking_value>

Cell:<celltype=U>, SC:<scrambling_code>, RSCP:<rscp>, ECN0:<ecn0>,
DLF:<dl_
frequency>, RV:<ranking_value>

Cell:<celltype=NU>, SC:<scrambling_code>, RSCP:<rscp>, ECN0:<ecn0>,
DLF:<dl_
frequency>, RS:<ranking_status>

Cell:<celltype=NG>, B:<gsm band>, Arfcn:<arfcn>, RxLev:<rxLev>,
Bsic:<bsic>, RS:
<ranking_status>

RR measurement evaluation :

MeasId :<meas_id>, EventId :<event_id>, <par 3>,<par 4>, <par 5>, <par
6>,...,
<par N>,MeasId :<meas_id>, EventId :,<par 3>,<par 4>,<par 5>,<par
6>,...,<par
M>,etc... MM:
Process:CO,
MMs:<mm_state>,MMSs:<mm_service_state>,MSC:<ms_class>,T:<active
_timer_bitmap>

Process:CS,
MMs:<mm_state>,MMSs:<mm_service_state>,LUS:<location_update_status>
,T:<active_timer_bitmap>,L:<limited_service>

Process:PS,
MMs:<mm_state>,MMSs:<mm_service_state>,LUS:<location_update_status> ,T:
<active_timer_bitmap>,L:<limited_service>,GS:<gprs_supported>,R:<ready_sta
te>

Cell change counters:
CRT:<cell_reselecetion_total>,IRCR:<ir_cell_reselecetion>,AIRCR:<attempted_ir_cell_reselecetion>
,IRHO:<ir_handover>, AIRHO:<attempted_ir_handover>

Equivalent PLMNs:

MCC:<mobile_country_code>, MNC:<mobile_network_code>

Serving PLMN:

MCC:<mobile_country_code>, MNC:<mobile_network_code>,
LAC:<location_area_code>
,RAC:<routing_area_code>

Note: the total number of cells can be max 24

Response syntax in case of GSM/GPRS radio access technology (RAT):

+CGED: RAT: <rat>,RR:<rr_state>

SFRLC:<signal_failure/radio_link_counter>, RSR:<reselection_reason>, RC:<release_
cause>, LM:<limited_mode>

B:<gsm_band>, Arfcn:<arfcn>,
Rxlev:<rxlev>,C1:<c1>,C2:<c2>,Bsic:<bsic>,MA:<nr_of_rf_in_ma>,MADed:<dedicated_arfcn>,GSM:
B:<gsm_band>,Arfcn:<arfcn>,RxLev:
<rxLev>,C1:<c1>,Bsic:<bsic>
UMTS: SC:<scrambling_code>,RSCP:<rscp>,ECN0:<ecn0>,DLF:<dl_frequency>
MM:
Process:CO,MMs:<mm_state>,MMSs:<mm_service_state>,MSC:<ms_class>,T:<active_
timer_bitmap>

Process:CS,MMs:<mm_state>,MMSs:<mm_service_state>,LUS:<location_update_status>
,T:<active_timer_bitmap>,L:<limited_service>

Process:PS,MMs:<mm_state>,MMSs:<mm_service_state>,LUS:<location_update_status>
,T:<active_timer_bitmap>,L:<limited_service>,GS:<gprs_supported>,R:<ready_state>

Cell change counters:
CRT:<cell_reselecetion_total>,IRCR:<ir_cell_reselection_counter>,AIRCR:<attempted_ir
_cell_reselection>,IRHO:<ir_handover>,AIRHO:<attempted_ir_handover>

Coding Scheme: dl_sc:<dl_sc>,ul_sc:<ul_sc> Equivalent PLMNs:
MCC:<mobile_country_code>,MNC:<mobile_network_code>

Serving PLMN:

MCC:<mobile_country_code>,MNC:<mobile_network_code>,LAC:<location_area_code>
,RAC:<routing_area_code>,AcT:<access technology>

Note: Up to 6 GSM + 24 UMTS cells may need to be displayed.

Command	Possible Response(s)
AT+CGED=0	+CGED: RAT:UMTS, RR:"CD" DC:000,BP:0000,M:000,ERR:00,RC:0,OOS:0,HSC:0, HMD:0,LM:0, CellId:0000000,DLF:00000,ULF:00000,C:0,D:0,PSM :0, Cell:AS, SC:000, RSCP:000, ECN0:00 (0..6 rows) Cell:VAS, SC:000, RSCP:000, ECN0:00, DLF:00000 (0..6 rows) Cell:M, SC:000, RSCP:000, ECN0:00 (0..6 rows) Cell:D, SC:000, RSCP:000, ECN0:00 (0..6 rows) Cell:G, B:D/P/G,Arfcn:0000, RxLev:00, Bsic:00, RV :000 (0..6 rows) Cell:U, SC:000, RSCP:000, ECN0:00, DLF:00000, RV:000 (0..6 rows) Cell:NU, SC:000, RSCP:000, ECN0:00, DLF:00000, RS:000 (0..6 rows) Cell:NG, B:D/P/G, Arfcn:0000, RxLev:00, Bsic:00, RS:000 (0..6 rows) RR measurement evaluation: MeasID:1,EventID0,2,3,3,1,0 MeasID:2,EventID:2,1,3,0,9,2 MM: Process:CO, MMs:00, MMSs:00, MSC:A/B/C, T:0000 Process :CS, MMs :00, MMSs :00, LUS :0, T :0000, L :0 Process :PS, MMs :00, MMSs :00, LUS :0, T :0000, L :0, GS :0, R :0 Cell change counters : CRT :0, IRCR :0, AIRCR:0, IRHO:0, AIRHO:0, Serving PLMN: MCC:252,MNC:02,LAC:23,RAC:12 Equivalent PLMNs: MCC:252,MNC:01 OK or CME ERROR: <error>
Read command AT+CGED?	+CGED: <mode> OK

Test command AT+CGED=?	+CGED: (0-2) i.e. (list of supported <mode>s) OK

7.38.2 Defined values

<mode> may be:

- 0: one shot dump
- 1: periodic refreshed dump
- 2: stop periodic dump (default)

Parameter definitions, if UMTS is not supported, follow. Service-Cell:

<MCC>:

Mobile country code, range 0-999 (3 digits)

<MNC>:

Mobile network code, range 0-99 (2 digits)

<LAC>:

Location area code, range 0h-FFFFh (2 octets)

<CI>:

Cell Identity, range 0h-FFFFh (2 octets)

<BSIC>:

Base Station Identify Code, range 0h-3Fh (6bits)

<AcT>:

Access Technology, range 0…8,GSM=0, GPRS=1, EGPRS=2, EGPRS_PCR=3, EGPRS_EP CR=4,UMTS=5 (unused), DTM=6, EGPRS_DTM=7, undefined=8

<arfcn>:

absolute radio frequency chanel number, range 0-1023

<RfChannels>:

number of frequencies in MA, no_of_rf_chans : 0x01 if single RF and 0 if n.a.

<Arfcn_ded>:

single ARFCN of dedicated channel of first ARFCN of MA

<RxLevFull>:

Received signal strength on serving cell, measured on all slots;0h-3Fh;10.5.2.20 GS M04.08

<RxLevSub>:

Received signal strength on serving cell, measured on all slots;0h-3Fh;10.5.2.20 GS M04.08

<RxQualFull>:

Received signal quality on serving cell, measured on all slots;range 0-7;10.5.2.20 GS M04.08

<RxQualSub>:

Received signal qual.onserving cell, measured on a subset of slots, range 0-7;10.5.2.20
GSM04.08

<ms_txpwr>:

Maximum TX power level an MS may use when accessing the system until otherwise commanded, range 0-31;10.5.2.4 GSM08.08

<rx_acc_min>:

RXLEV-ACCESS-MIN, range 0-63;10.5.2.4 GSM04.08

<cbq>:

CELL_BAR_QUALIFY, range 0-1;10.5.2.34 GSM04.08

<cba>:

CELL_BAR_ACCESS, range 0-1; 10.5.2.29 GSM04.08

<cs_valid>:

True if all parameter for calculation of c2 are available; vailab

<cr_offset>:

CELL_RESELECT_OFFSET, range 0-63 (6 bit); 10.5.2.34 GSM04.08

<tmp_offset>:

TEMPORARY_OFFSET, range 0-7 mapped to 0-70; 10.5.2.34 GSM04.08

<penalty_t>:

Penalty time, range 0-31; 10.5.2.34 GSM04.08

<c1>:

Value of c1; 6.4 GSM04.08

<c2>:

Value of c2; 6.4 GSM04.08

<ch_type>:

Channel type of the current connection as follows (10.5.2.5 GSM04.08)

see type T_CHANNEL_MODE :

- 0: INVALID_CHN_TYPE
- 1: TCH_F
- 2: TCH_F
- 3: SDCCH_4
- 4: SDCCH_8
- 5: TCH_H_H
- 6: TCH_F_M

<ch_mode>:

Channel mode of current connection (10.5.2.6 GSM04.08), range 0-255 mapped to an internal value:

- 0: MODE_SIG_ONLY
- 1: MODE_SPEECH_F
- 2: MODE_SPEECH_H
- 3: MODE_DATA_96_F
- 4: MODE_DATA_48_F
- 5: MODE_DATA_48_H
- 6: MODE_DATA_24_F
- 7: MODE_DATA_24_H
- 8: MODE_SPEECH_F_V2

- 9: MODE_SPEECH_F_V3
- 10: MODE_SPEECH_H_V2
- 11: MODE_SPEECH_H_V3
- 12: MODE_DATA_144_F

<txpwr>:

Transmit power level of the current connection, range 0-31 (5 bits); 10.5.2.4 GSM04.08

<dtx_used>:

DTX used, range 0-1; 10.5.2.4 GSM04.08

<dtr_used>:

DTX used, range 0-1;

<t3212>:

T3212. The T3212 timeout value field is coded as the binary representation of the timeout value for periodic updating in decihours; range 0-255 (8 bits);10.5.2.11 GSM04.08

<acc>:

Access control class (RACH Control Parameters), range 0-65535 (2 octets);10.5.2.29
GSM04.08

<t_adv>:

Timing Advance, not used, always FFh

<bs_pa_mfrms>:

BS_PA_MFRMS (multiframes period for transmission of PAGING REQUEST), range 0-7 mapped to 2-9; 10.5.2.11 GSM04.08

<amr_acs>:

AMR active codec

<amr_cod_dl>:

AMR codec used in DL

<amr_cod_ul>:

AMR codec used in UL

<amr_ci_i>:

AMR C/I in dB/2

<mean_bep_8psk>:

MEAN_BEP_8PSK[0...31]

<cv_bep_8psk>:

CV_BEP_8PSK[0...7]

<mean_bep_gmsk>:

MEAN_BEP_GMSK[0...31]

<cv_bep_gmsk>:

CV_BEP_GMSK[0...7]

GPRS-Parameters:
<GPRS_sup>:

GPRS supported (in serving cell); range 0-255 (8 bits);10.5.2.37b GSM04.08

<RAC>:

Routing Area Code, range 0-1 (i bit);10.5.2.37b GSM04.08

<Split_Pg_Cycle> :

SPGC_CCH_SUP split pg_cycle on ccch by network,range 0-1 (2 bits); 10.5.2.37b GS M04.08

<NCO>:

NETWORK_CONTROL_ORDER (GPRS_Cell_Options), range 0-3 (2 bits); 10.5.2.37b GS M04.08

<NOM>:

NETWORK OPERATION MODE (GPRS_Cell_Options), range 0-3 (2 bits); 10.5.2.37b GS M04.08

<T3192>:

T3192 (Wait for Release of the TBF after reception of the final block),range 0-7 mapped to 0-1500 msec (3 bits);12.24 GSM04.60:

- 500 msec
- 1000 msec
- 1500 msec

- 0 msec
- 80 msec
- 120 msec
- 200 msec

<Acc_Burst_type>:

ACCESS_BURST_TYPE (Literal AB_8 and AB_11),range 0-1 mapped to 8,11 (1 bit);
12.24 GSM04.60

<DRX_Timer_Max>:

DRX_TIMER_MAX, range 0-7 (3 bits); 12.24 GSM04.60

<PBCCH>:

PBCCH present, vailab; 11.2.25 GSM04.60

<Ext_Measure_Order>:

EXT_MEASUREMENT_ORDER, range 0-3 (2 bits);11.2.23 GSM04.60

<PSI1_r_per>:

PSI1_REPEAT_PERIOD, range 0-15 mapped to 1-16 (4 bits);11.2.18 GSM04.60

<si14_location>:

- "BCCH_NORM"
- "BCCH_EXT"
- "NO_BCCH_TYPE"

<packet_psi_status>:

may be 0-1

<packet_si_status>:

may be 0-1

<ext_upl_tbf_supported>:

may be 0-1

<ccn_active>:

may be 0-1

<pfc_feat_supported>:

may be 0-1

<dl_sc> and <ul_sc>:

current Modulation and Coding Scheme of downlink(<dl_sc>) or uplink(<ul_sc>) TBF
may be:

- NB_CS_1
- NB_CS_2
- NB_CS_3
- NB_CS_4
- NB_MCS_1
- NB_MCS_2
- NB_MCS_3
- NB_MCS_4
- NB_MCS_5
- NB_MCS_6
- NB_MCS_7
- NB_MCS_8
- NB_MCS_9
- NB_MCS_5_7
- NB_MCS_6_9
- AB_8
- AB_11
- AB_11_E

<Count_LR>:

PSI_COUNT_LR, range 0-63 (4 bits); 11.2.18 GSM04.60

<Count_HR>:

PSI_COUNT_HR, range 0-15 mapped to 1-16 (4 bits);11.2.18 GSM04.60

<C_R_Hyst>:

CELL-RESELECT-HYSTERESIS, range 0-7 (3 bits);10.5.2.4 GSM04.08

<C1>:

Value of c1, integer

<C2> Value of c2, integer <C31>:

Value of c31, integer

<C32>:

Value of c32, integer

<Prior_Acc_Thr>:

Prioriry_ACCESS_THR, range 0-7 (3 bits);10.5.2.37b GSM04.08

Parameter definitions, if UMTS is supported follow:
<rat>:

currently selected Radio Access Technologie (RAT) and may be:

- "UMTS",
- "GSM"

UMTS RR PARAMETERS:
<rrc_state>:

may be "CD", "CF", "CP", "UP", "ID", "ST"- standing for CELL_DCH (0), CELL_FACH(1), CELL_PCH(2), URA_PCH(3), IDLE(4), START(5)

<urrcdc_state>:

indicated by three hex digits, (octet1,2:event, 3:state)

<urrcbp_state>:

indicated by four hex digits, (1,2:event, 3,4:state)

<urrcm_state>:

indicated by three hex digits (1:event, 2:state, 3:nr of sent measurements)

<as_error_code>:

indication about error in UAS; integer, range 0-99

<release_cause>:

integer, range 0-99

<out_of_service>:

may be 0-1

<meas_bler>:

block error rate, range 1.0 ∗10exp(-6)... 9.9∗10exp(-1); the value - is indicated if the parameter is not available or for all cells except DCH; the internal received value is divided by 2∧23 before display;

<target_sir>:

target SIR, range -10...+20 (3 digits are always displayed); the value '-' is displayed if the parameter is not available or for all cells except DCH; the internal received value is divided by 2∧24 before display;

<meas_sir>:

integer displayed in hexadecimal format, range -10...+20; the value '-' is displayed if the parameter is not available or for all cells except DCH; the internal received value is divided by 2∧24 before display;

<hierarchical_cell_structure>:

may be 0-1

<high_mobility_detected>:

may be 0-1

<limited_mode>:

may be 0-1

<dlpc_power_up_commands_count>:

L1 related data counter

<dlpc_power_down_commands_count>:

L1 related data counter

<ulpc_power_up_commands_count>:

L1 related data counter

<ulpc_power_down_commands_count>:

L1 related data counter

<compressed_mode>:

Flag indicating if Compressed Mode is Active or not

<tx_ul_pwr_ctrl_alg>:

Tx Uplink Power Control Algorithm

<drx_cycle_length>:
DRX Cycle Length value: 2∧k

<ciphering>:

the GSM Ciphering may be ON or OFF

<gprs_ciphering>:

It is the GPRS Ciphering Algorithm GEA1- GEA7

<ps_data_transfered>:

may be 0-1

<power_saving_mode>:

may be 0-1

<cell_ype>:

-"AS" - Active Set,

-"VAS" Virtual Active Set

- "M",- Monitored Cells
- "D", - Detected Cells
- "G", - GSM cells
- << U >>, - UMTS cells
- << NU >>,- Non Ranked UMTS cells
- "NG" - Non Ranked GSM cells

<scrambling_code>:

integer, range 0-511

<rscp>:

Received Signal Code Power, range 0-91, 255 for invalid/default value

<ecno>:

energy per chip/noice, range 0-24, 255 for invalid/default value

<gsm_band>:

- "D",- 1800 MHz
- "P"- 1900 MHz
- "G"- 900 MHz

<arfcn>:

absolute radio frequency channel number, range 0-1023

<rssi>:

radio signal strength -110... -48 (negative values)

<bsic>:

base station identify code, range 0-3Fh (6 bits)

<ranking_value>:

integer, range 0-999

<ranking_status>:

integer, range 0-9

MEASUREMENT PARAMETERS:
<meas_id>:

one hex digit, range 0-FH

<event_id>:

two hex digits 1AH-3DH

<par 3,4,5,...,M,...,N>:

integer, range 0-99

GSM RR PARAMETERS:
<signal_failure1radio_link_counter>:

integer, range 0-99

- in case of grr_state == GRR_IDLE (11) Downlink Signaling Counter will be printed
- in case of grr_state == GRR_RR_CONNECTION (28) Radio Link Loss Counter will be printed

<reselection_reason>: integer, range 0-99

- 0: RESEL_PLMN_CHANGE
- 1: RESEL_SERV_CELL_NOT_SUITABLE
- 2: RESEL_BETTER_C2_C32
- 3: RESEL_DOWNLINK_FAIL
- 4: RESEL_RA_FAILURE
- 5: RESEL_SI_RECEIPT_FAILURE
- 6: RESEL_C1_LESS_NULL
- 7: RESEL_CALL_REEST_TIMEOUT

- 8: RESEL_ABNORMAL_RESEL
- 9: RESEL_CELL_CHANGE_ORDER
- 10: RESEL_NOT_OCCURRED

<c1>:

integer, range 0-99 (6.4 GSM04.08)

<c2>:

integer, range 0-99 (6.4 GSM04.08)

<nr_of_rf_in_ma>:

integer, range 0-99

<dedicated_arfcn>:

dedicated arfcn, range 0-1023

<dl_sc> and <ul_sc>:

current Modulation and Coding Scheme of downlink(<dl_sc>) or uplink(<ul_sc>) TBF
may be:

- NB_CS_1
- NB_CS_2
- NB_CS_3
- NB_CS_4
- NB_MCS_1
- NB_MCS_2
- NB_MCS_3
- NB_MCS_4
- NB_MCS_5
- NB_MCS_6
- NB_MCS_7
- NB_MCS_8
- NB_MCS_9

- NB_MCS_5_7
- NB_MCS_6_9
- AB_8
- AB_11
- AB_11_E

UMTS1GSM MM PARAMETERS:

<mm_state>:

integer, range 0-99

<mm_service_state>:

integer, range 0-99

<ms_class>:

the MS GPRS-class (previously stored in ATC either at reception of message MN_GCLAS S_IND or sending the message MN_GCLASS_REQ); it may be:

- class A
- class B
- class CG: class C in GPRS only mode
- classCC: class C in circuit switched only mode (lowest class)

<active_timer_bitmap>:

four hex coded digits

<location_update_status>:

integer, range 0-9

<limited_service>:

may be 0-1

<gprs_supported>:

may be 0-1

<ready_state>:

may be 0-1

<cell_reselecetion_total>:

integer, range 0-999

<ir_cell_reseelection_counter>:

integer, range 0-999

<attempted_ir_cell_reselection>:

integer, range 0-999 <ir_handover: integer, range 0-999
<attempted_ir_handover: integer, range 0-999

<mobile_country_code>:

MCC three hexcoded digits, range 0-999

<mobile_network_code>:

MNC two hexcoded digits, range 0-99

<location_area_code>:

LAC, two octets, range 0-65535

<routing_area_code>:

integer, range 0-255

<access technology>:

integer, range 0..8,GSM=0, GPRS=1, EGPRS=2, EGPRS_PCR=3, EGPRS_EPCR=4,UMTS=5 (unused), DTM=6, EGPRS_DTM=7, undefined=8

7.39 Provide Cell information +XCELLINFO

This command provides a periodic reporting of the serving cell and the neighbour cells for GSM, UMTS cells and LTE . This command will work only if feature FEAT_UTA_EM(for GSM and UMTS) or FEAT_ENG_MODE_METRICS(For LTE) is enabled.

7.39.1 Syntax of the Command

Command syntax : AT+XCELLINFO=<mode> If FEAT_UTA_EM is

enabled: For GSM cells:
URC: +XCELLINFO: <type>,<MCC>,<MNC>,<LAC>,<CI>,<RxLev>[,<t_advance>] For UMTS cells:
URC: +XCELLINFO: <type>,<MCC>,<MNC>,<LAC>,<CI>,<scrambling_code>, <dl_frequency>
,<rscp>,<ecn0>,<pathloss>

If FEAT_ENG_MODE_METRICS is enabled: For LTE cells:
URC for serving cell : +XCELLINFO:<type><MCC>,<MNC>,<CI>,<PhyCellInd>,<Tracking AreaCode>,<RSRRResult>,<RSRQResult>,<TA>

URC for neighbour cell:

+XCELLINFO: <type>,[[<Earfcn>,[<PhyCellID>,[< RSRPResult>,[<RSRQResult>]]]]]

Command	Possible responses
AT+XCELLINFO=1	OK or CME ERROR: <error>
AT+XCELLINFO?	+XCELLINFO: <mode>,<type>,<MCC>,<MNC>,<LAC>,<CI>,<RxLev> [,<t_advance>] OK or +XCELLINFO: <mode>,<type>,<MCC>,<MNC>,<LAC>,<CI>,<scrambling_code>,<dl_frequency>, <rscp>,<ecn0>,<pathloss> OK Or +XCELLINFO: <mode>,<MCC>,<MNC>,<CI>,<PhyCellInd>,<TrackingAreaCode>,<RSRRResult>,<RSRQResult>,<TA>,<NumMeasuredEUTRA> Or +XCELLINFO: <mode>,<type>,[[<Earfcn>,[<PhyCellID>,[< RSRPResult>,[<RSRQResult>]]]]] Or +XCELLINFO:<mode><type><MCC>,<MNC>,<CI>,<PhyCellInd>,<TrackingAreaCode>,<RSRRResult>,<RSRQResult>,<TA>

AT+XCELLINFO=?	+XCELLINFO: (range of <mode>s) OK

7.39.2 Defined values

<mode>

0: disable the periodic reporting

1: enable the reporting

2: currently not used (backward compatibility)

<type> is

0: GSM serving cell

1: GSM neighbour cell

2: UMTS serving cell

3: UMTS neighbour cell

4: UMTS detected cell

5: LTE serving cell

6: LTE neighbour cell

<MCC>,<MNC>,<LAC>,<CI>,<scrambling_code>,<rscp>,<ecn0>,<dl_frequency> ,<pathloss>

see +CGED

<RxLev>

signal strength

<t_advance>

only valid for the serving cell

<MCC>:

Integer type, Mobile Country Code, range: (0..999)

<MNC>:

Integer type, Mobile Network Code,

range: (0..999) (Ref: 3GPP TS

36.331, 6.3.4, PLMN-Identity IE)

<CI> :

Integer type , Cell Identity, length 28 bits. (Ref: 3GPP TS 36.331, 6.3.4, CellIdentity IE)

<PhysCellId> :

Integer type, Physical Cell ID, range: (0..503), (Ref: 3GPP TS 36.331, 6.3.4, PhysCellId IE)

<TrackingAreaCode> :

Integer type, Tracking Area Code, length 16 bits, (Ref: 3GPP TS 36.331, 6.3.4, Tracking AreaCode IE)

<RSRPResult> :

Integer type, Reference Signal Received Power, range: (0..97), (Ref: 3GPP TS 36.331, 6.3.5, RSRP-Range IE)

<RSRQPResult> :

Integer type, Reference Signal Received Quality, range: (0..34), (Ref: 3GPP TS 36.331, 6.3.5, RSRQ-Range IE)

<TA> :

Integer type, Timing Advance, range: (0.. 1282) (as per [3GPP 36.321]).

< Earfcn > :

The carrier frequency of the neighbor cell designated by the EUTRA Absolute Radio Frequency

Channel Number (EARFCN), valid range: 0 .. 0xFFFF. (Ref: 3GPP TS 36.101, 5.7.3)

< PhyCellID >:

Integer type,The physical cell ID of the neighbor cell, valid range : 0 ... 503 (Ref: 3GPP TS 36.331, 6.3.4, PhysCellId IE)

<RSRPResult>:

Integer type,average RSRP of the neighbor cell, the valid

range: 1 ... 97. (Ref: 3GPP TS 36.331, 6.3.5, RSRP-Range

IE

<RSRQResult>:
Integer type,average RSRQ of the neighbor cell, valid range: 0 ... 34. (Ref: 3GPP TS 36.331, 6.3.5, RSRQ-Range IE)

7.40 Debug screen command +XCGEDPAGE

This command returns a dump of the cell environment, either as a one shot dump or as a periodic refreshed dump (each 5 seconds), dependent on the command parameter
<mode>. The displayed parameters are dependent on the fact whether the UMTS is supported (Note: define UMTS_SUPPORT exists) and if it is, dependent on the currently supported RAT (GSM, UMTS). This command will work only if feature FEAT_UTA_EM is enabled.

7.40.1 Syntax of the Command

Command syntax:AT+XCGEDPAGE=<mode>[,<page_nr>]

Command	Possible Response(s)
AT+XCGEDPAGE= <mode>[,<page_nr>]	(see response syntax description below) CME ERROR: <error>
Read command AT+XCGEDPAGE?	+XCGEDPAGE: <mode>,<page_nr>
Test command AT+XCGEDPAGE=?	+XCGEDPAGE: (0-4), (1-12) i.e. (list of supported <mode>s), (list of supported <page_nr>s)

7.40.2 Defined values

<mode> may be:

- 0: one shot dump (default)
- 1: periodic refreshed dump (is not allowed for page_nr=6)
- 2: stop periodic dump (is not allowed for page_nr=6)
- 3: reset statistics of all pages (page_nr ignored)
- 4: STOP the EM (page_nr ignored)

<page_nr> may be:

- 1-12 number of response page (see response syntax description above), where 1 is used if this parameter is not stated (NA in case of mode 3 and 4, as they are ignored)

<Please note that if certain parameters are not available, then nothing will be printed>

Response syntax for page_nr 1

+XCGEDPAGE:
<rat>,<mobile_country_code>,<mobile_network_code>,<mm_state>
,<location_update_status>,<LAC>,<mm_service_state>,<active_timer_bitmap>,<band>
,

Only if RAT:"GSM"
<rr_state>,<arfcn>,<arfcn_ded>,<bsic>,<rssi>,<c1>,<RxQualFull>,<txpwr>,<rx_power
_level>,<amr_codec_set>,<amr_cod_ul>,<amr_cod_dl>

Only if RAT:"UMTS"

<rrc_state>,<dl_frequency>,<ul_frequency>,<scrambling_code>,<rscp>,<ecn0>,<rx
_power_level>,

<drx_cycle>,

<call_connect>

Response syntax for page_nr 2

+XCGEDPAGE:

<rat>,<mobile_country_code>,<mobile_network_code>,

Only if RAT:"GSM"

<reselection_reason>,<release_cause>, <ch_type>,<ch_mode>,<dsc>,<rll>,<t3212>
,<RxLevFull>,<RxLevSub>, <RxQualFull>,<RxQualSub>,<rx_acc_min>, <c1>,<c2>,
<txpwr>,<dtx_used>

Only if RAT:"UMTS"

<rrc_state>,
<power_saving_mode>,<ps_data_transfered>,<release_cause>,<ul_meas
_cnt>,<oos_cnt>,<tx_pwr>,<ciphering>

Response syntax for page_nr 3

+XCGEDPAGE:
<no_ncells>,<arfcn>,<bsic>,<rssi>,<c2>,<no_umts_ncells>,<dl_frequency>
,<scrambling_code>,<rscp>,<ecn0>

Response syntax for page_nr 4

+XCGEDPAGE: <access
technology>,mm_state>,<location_update_status>,<mm_service
_state>,<NOM>,<NCO>,<active_timer_bitmap>,<T3192>,<gprs_ciphering>,<PBCCH>

Response

syntax for

page_nr 5 if

<rat> = "GSM"

+XCGEDPAGE: <rat>,<mobile_country_code>,<mobile_network_code>,
<mm_state>,
<location_update_status>,<mm_service_state>,<ciphering>,<integr_prot>

if <rat> = "UMTS"

+XCGEDPAGE:
<rat>,<mobile_country_code>,<mobile_network_code>,<mm_state>,<location
_update_status>,<mm_service_state>,<rrc_state>,<urrcbp_state>,<urrcdc_state
>,<urrcm
_state>,<s_rxlev>,<s_qual>,<s_intrasearch>,
<s_intersearch>,<s_search_rat>,<ciphering>
,<integr_prot>

Response syntax for page_nr 6

+XCGEDPAGE:
<SIM_phase>,<2G_PB_supp>,<USIM_globPB_supp>,<USIM_applPB_supp>

Response syntax for page_nr 7

+XCGEDPAGE:
<total_time>,<2G_time>,<3G_time>,<cr_2g_2g_cnt_su>,<cr_2g_2g_
cnt_at>,<ir_cr_2g_3g_cnt_su>,<ir_cr_2g_3g_cnt_at>,<ir_hocc_2g_3g_cnt_su>,<
ir_hocc
_2g_3g_cnt_at>,<ho_2g_2g_cnt_su>,<ho_2g_2g_cnt_at>,<cr_3g_3g_cnt_su>,<c
r_3g
_3g_cnt_at>,<ir_cr_3g_2g_cnt_su>,<ir_cr_3g_2g_cnt_at>,<ir_hocc_3g_2g_cnt_s
u>,<ir
_hocc_3g_2g_cnt_at>,<ho_3g_3g_cnt_su>,<Ho3g3gCntAt>,<ho_3g_3g_cnt_su>,
<boReset
MmCnt>

Response syntax for page_nr 8

+XCGEDPAGE: <rssi>,<sc_rat>,<sc_band>,<therm_adc>,<batt_adc>

Response syntax for page_nr 9

+XCGEDPAGE:<num_alert_msgs>,num_call_confirmed_msgs>,<num_call_proceed
ing_msgs>,<num_connect_msgs>,<num_connect_ack_msgs>,<num_emergency
_setup_msgs>
,<num_progress_msgs>,<num_cc_establish_msgs>,<num_cc_establish_conf_msg
s>,<num
_start_cc_msgs>,<num_setup_msgs>,<num_modify_msgs>,<num_modify_compl

ete_msgs>
,<num_modify_reject_msgs>,<num_user_info_msgs>,<num_disconnect_msgs>,<num
_release_msgs>,<num_recall_msgs>,<num_release_comp_msgs>,<num_facility_msgs>
,<num_hold_msgs>,<num_hold_ack_msgs>,<num_hold_reject_msgs>,<num_retrieve
_msgs>,<num_retrieve_ack_msgs>,<num_retrieve_rej_msgs>,<num_congestion_ctrl_
msgs>,<num_notify_msgs>,<num_start_dtmf_msgs>,<num_stop_dtmf_ack_msgs>,<num
_start_dtmf_rej_msgs>,<num_status_msgs>,<num_status_enquiry_msgs>,<num_stop
_dtmf_msgs>,<num_stop_dtmf_ack_msgs>

Response syntax for page_nr 10

+XCGEDPAGE:
<last_mo_fail_cause>,<mo_gprs_sms_count>,<mo_gprs_sms_count_succ>
,<last_mt_fail_cause>,<mt_gprs_sms_count>,<mt_gprs_sms_count_succ>,<call_reject
_cause>,<call_failure_cause>,<pdp_act_state>

Only if RAT:"GSM"

<dl_blocks_total>,<ul_blocks_total>,<dl_blocks_retrans>,<ul_blocks_retrans>,<dl_throughput
_kbps>,<ul_throughput_kbps>,<total_dl_rx_frames>,<total_ul_tx_frames>,<total_dl_retx
_frames>,<total_ul_retx_frames>,<mac_timer_state>

Response syntax for page_nr 11

Only if RAT:"UMTS"

+XCGEDPAGE:
<dl_input_throughput_kbps>,<dl_output_throughput_kbps>,<dl_ReTxReq
PDU_Count>,<ul_input_throughput_kbps>,<ul_output_throughput_kbps>,<ul_ReTxPDU
_Count>,<dl_ack_cnt>,<dl_nack_cnt>,<ul_ack_cnt>,<ul_nack_cnt>,<dtx_cnt>,<cqi_max>
,<cqi_mean>,<cqi_min>,<amr_frame_type_idx>,<amr_type>

Only if RAT:"GSM"

+XCGEDPAGE:

Response syntax for page_nr 12

+XCGEDPAGE: <active_domains>,<rab_id_list>

Only if RAT:"UMTS"

<active_domains>,<rab_id_list>

Parameter definitions

<MCC>:

Mobile country code, range 0-999 (3 digits)

<MNC> :

Mobile network code, range 0-99 (2 digits)

<LAC>:

Location area code, range 0-65535 (5 digits)

<arfcn>:

absolute radio frequency chanel number, range 0-1023

<RxLevFull>:

Received signal strength on serving cell, measured on all slots; 0h-3Fh;10.5.2.20 GS M04.08

<RxLevSub>:

Received signal strength on serving cell, measured on all slots;0h-3Fh; 10.5.2.20 GS M04.08

<RxQualFull>:

Received signal quality on serving cell, measured on all slots;range 0-7; 10.5.2.20
GSM04.08

<RxQualSub>:

Received signal qual.onserving cell, measured on a subset of slots, range 0-7;10.5.2.20
GSM04.08

<rx_acc_min>:

RXLEV-ACCESS-MIN, range 0-63; 10.5.2.4 GSM04.08

<c1>:

Value of c1; 6.4 GSM04.08

<c2>:

Value of c2; 6.4 GSM04.08

<txpwr>:

Transmit power level of the current connection, range 0-31 (5 bits); 10.5.2.4 GSM04.08

<dtx_used>:

DTX used, range 0-1; 10.5.2.4 GSM04.08

<t3212>:

T3212. The T3212 timeout value field is coded as the binary representation of the timeout value for periodic updating in decihours; range 0-255 (8 bits);10.5.2.11 GSM04.08

<RAC>:

Routing Area Code, range 0-1 (i bit);10.5.2.37b GSM04.08

<NCO>:

NETWORK_CONTROL_ORDER (GPRS_Cell_Options), range 0-3 (2 bits); 10.5.2.37b GS M04.08

<NOM>:

NETWORK OPERATION MODE (GPRS_Cell_Options), range 0-3 (2 bits); 10.5.2.37b GS M04.08

<T3192>:

T3192 (Wait for Release of the TBF after reception of the final block), 12.24 GSM04.60 (range 0x0000 - 0xFFFF, 0xFFFF means invalid value)

<PBCCH>:

PBCCH present, vailab; 11.2.25 GSM04.60

<rat>:

currently selected Radio Access Technologie (RAT) and may be:

- "UMTS",
- "GSM"

<rrc_state>:

may be "CD", "CF", "CP", "UP", "ID", "ST"- standing for CELL_DCH (0), CELL_FACH(1), CELL_PCH(2), URA_PCH(3), IDLE(4), START(5)

<urrcdc_state>:

indicated by three hex digits, (octet1,2:event, 3:state)

<urrcbp_state>:

indicated by four hex digits, (1,2:event, 3,4:state)

<urrcm_state>:

indicated by three hex digits (1:event, 2:state, 3:nr of sent measurements)

<release_cause>:

integer, range 0-99

<dl_frequency>:

integer, range 0-16383

<ul_frequency>:

integer.

<ciphering>:

the GSM Ciphering may be 0-1

<gprs_ciphering>:

It is the GPRS Ciphering Algorithm GEA1 - GEA7

<ps_data_transfered>:

may be 0-1

<power_saving_mode>:

may be 0-1

<scrambling_code>:

integer, range 0-511

<rscp>:

Received Signal Code Power (dBm - absolute value), 255 for invalid/default value

<ecno>:

energy per chip/noice, range 0-24, 255 for invalid/default value

<band>:

- "D" - DCS 1800 MHz
- "P" - PCS 1900 MHz
- "G" - GSM bands: 900 MHz, 850 MHz, 450 MHz, 480 MHz, 750 MHz
- "U" - UMTS bands

<arfcn>:

absolute radio frequency channel number, range 0-1023

<rssi>:

radio signal strength in steps 0..63

<bsic>:

base station identify code, range 0-3Fh (6 bits)

<reselection_reason>:

integer, range 0-99

<c1>:

integer, range 0-99 (6.4 GSM04.08)

<c2>:

integer, range 0-99 (6.4 GSM04.08)

<mm_state>:

integer, range 0-99

<mm_service_state>:

integer, range 0-99

<active_timer_bitmap>:

four hex coded digits

<location_update_status>:

integer, range 0-9

<access technology>:

integer, range 0..9,GSM=0, GPRS=1, EGPRS=2, EGPRS_PCR=3, EGPRS_EPCR=4,UMT S=5 (unused), DTM=6, EGPRS_DTM=7, LTE=8, undefined=9

Note : LTE is supported only in R8.

<no_ncells>:

Number of GSM neighbour cells

<no_umts_ncells>:

Number of DETECTED UMTS cells (CELL_DCH) or Number of UMTS neighbour cells (all states but CELL_DCH)

<rr_state>:

values 1-35

- STATE GRR_START 1
- STATE GRR_WAIT_FOR_ACT 2
- STATE GRR_CELL_SELECTION 3
- STATE GRR_WAIT_CELL_SELECTION 4
- STATE GRR_DEACT_CELL_SELECTION 5
- STATE GRR_SELECT_ANY_CELL 6
- STATE GRR_WAIT_SELECT_ANY_CELL 7
- STATE GRR_DEACT_SELECT_ANY_CELL 8
- STATE GRR_WAIT_INACTIVE 9
- STATE GRR_INACTIVE 10
- STATE GRR_IDLE 11
- STATE GRR_PLMN_SEARCH 12
- STATE GRR_WAIT_PLMN_SEARCH 13
- STATE GRR_CELL_RESELECTION 14
- STATE GRR_WAIT_CELL_RESELECTION 15
- STATE GRR_ABORT_PLMN_SEARCH 16
- STATE GRR_DEACT_PLMN_SEARCH 17
- STATE GRR_CELL_CHANGE 18
- STATE GRR_CS_CELL_CHANGE 19
- STATE GRR_WAIT_CELL_CHANGE 20
- STATE GRR_SINGLE_BLOCK_ASSIGN 21
- STATE GRR_DOWNL_TBF_EST 22
- STATE GRR_UPL_TBF_EST 23
- STATE GRR_WAIT_TBF 24
- STATE GRR_TRANSFER 25
- STATE GRR_MO_CON_EST 26

- STATE GRR_MT_CON_EST 27
- STATE GRR_RR_CONNECTION 28
- STATE GRR_CALL_REESTABLISH 29
- STATE GRR_NORMAL_CHN_REL 30
- STATE GRR_LOCAL_CHN_REL 31
- STATE GRR_WAIT_IDLE 32
- STATE GRR_DEACTIVATION 33
- STATE GRR_IR_CELL_RESEL_TO_UTRAN 34
- STATE RR_INACTIVE 35

<ecn0>:

ECN0 (dB - positive value presented positive) of cell, 255 for invalid/default value

<dsc>:

Downlink Signaling Counter

<rll>:

Radio Link Loss Counter

<ul_meas_cnt>:

Number of measurements sent during the last reporting period

<oos_cnt>:

Number of times UE went out of service

<tx_pwr>:

Tx output power

<ch_type>:

Channel type of the current connection as follows

(10.5.2.5 GSM04.08) (range 0x00 - 0xFF, 0xFF means

invalid value):

- 00: INVALID_CHN_TYPE
- 01: TCH_F
- 02: TCH_H
- 03: SDCCH_4

- 04: SDCCH_8
- 05: TCH_H_H
- 06: TCH_F_M

<ch_mode>:

Channel mode of current connection (10.5.2.6 GSM04.08),

(range 0x00 - 0xFF, 0xFF means invalid value) mapped to an internal value:

- 00: MODE_SIG_ONLY
- 01: MODE_SPEECH_F
- 02: MODE_SPEECH_H
- 03: MODE_DATA_96_F
- 04: MODE_DATA_48_F
- 05: MODE_DATA_48_H
- 06: MODE_DATA_24_F
- 07: MODE_DATA_24_H
- 08: MODE_SPEECH_F_V2
- 09: MODE_SPEECH_F_V3
- 0A: MODE_SPEECH_H_V2
- 0B: MODE_SPEECH_H_V3
- 0C: MODE_DATA_144_F

<rx_power_level> :

signal strength dBm (negative values)

<SIM_phase>:

0: 3G

2: 2G

<2G_PB_supp>:

0: supported

1: not supported

<USIM_globPB_supp>:

0: supported

1: not supported

<USIM_applPB_supp>:

0: supported

1: not supported

<drx_cycle> :

DRX cycle frame length

<call_connect> :

0 : If no call is active or hold.

1 : If at least 1 call is active or hold.

<rssi_1>:

radio signal strength 0-31,99

<sc_rat>:

currently selected Radio Access Technologie (RAT) and may be:

- "WCDMA",
- "GSM"

<sc_band>:

-"D" - DCS 1800 MHz

-"P" - PCS 1900 MHz

-"G" - GSM bands: 900 MHz, 850 MHz, 450 MHz, 480 MHz, 750 MHz

-"U" - UMTS bands

<therm_adc>:

Thermal ADC value (Temperature)

<batt_adc>:

Battery ADC value (Voltage)

<total_time>:

total time connected to Network

<2G_time>:

time connected to 2G Network

<3G_time>: time connected to 3G Network

<cr_2g_2g_cnt_su>:

number of successful intra GSM cell reselections or cell changes

<cr_2g_2g_cnt_at>:

number of attempted intra GSM cell reselections or cell changes

<ir_cr_2g_3g_cnt_su>:

number of successful GSM to UMTS cell reselections or cell changes

<ir_cr_2g_3g_cnt_at>:

number of attempted GSM to UMTS cell reselections or cell changes

<ir_hocc_2g_3g_cnt_su>:

number of successful GSM to UMTS HO

<ir_hocc_2g_3g_cnt_at>:

number of attempted GSM to UMTS HO

<ho_2g_2g_cnt_su>:

number of successful INTRA GAS handovers

<ho_2g_2g_cnt_at>:

number of attempted INTRA GAS handovers

<cr_3g_3g_cnt_su>:

number of successful intra UMTS cell reselections

<cr_3g_3g_cnt_at>:

number of attempted intra UMTS cell reselections

<ir_cr_3g_2g_cnt_su>:

number of successful UMTS to GSM cell reselections

<ir_cr_3g_2g_cnt_at>:

number of attempted UMTS to GSM cell

<ir_hocc_3g_2g_cnt_su>:

number of successful UMTS to GSM HO or cell changes

<ir_hocc_3g_2g_cnt_at>:

number of attempted UMTS to GSM HO or cell changes

<ho_3g_3g_cnt_su>:

number of successful INTRA UAS handovers

<ho_3g_3g_cnt_su>:

number of attempted INTRA UAS handovers

<ciphering>:

ciphering dis-/enabled (0/1) (can only be changed via Phonetool)

<integr_prot>:

integrity protection dis-/enabled (0/1) (can only be changed via Phonetool)

<s_rxlev>:

serving cell s_rxlev

<s_qual>:

serving cell q_qual

<s_intrasearch>:

serving cell intrasearch

<s_intrasearch>:

serving cell inter search

<s_search_rat>:

serving cell search rat

<num_alert_msgs>:

number of Alerting messages

<num_call_confirmed_msgs>:

number of call confirmed messages

<num_call_proceeding_msgs>:

number of call proceeding messages

<num_connect_msgs>:

number of connect messages

<num_connect_ack_msgs>:

number of connect ack messages

<num_emergency_setup_msgs>:

number of emergency set up messages

<num_progress_msgs>:

number of progress messages

<num_cc_establish_msgs>:

number of cc establishment messages

<num_cc_establish_conf_msgs>:

number of cc establishment confirmed messages

<num_start_cc_msgs>:

number of start ccmessages

<num_setup_msgs>:

number of setup messages

<num_modify_msgs>:

number of modify messages

<num_modify_complete_msgs>:

number of modify complete messages

<num_modify_reject_msgs>:

number of modify reject messages

<num_user_info_msgs>:

number of user info messages

<num_disconnect_msgs>:

number of disconnect messages

<num_release_msgs>:

number of release messages

<num_recall_msgs>:

number of recall messages

<num_release_comp_msgs>:

number of release complete messages

<num_facility_msgs>:

number of facility messages

<num_hold_msgs>:

number of hold messages

<num_hold_ack_msgs>:

number of hold ack messages

<num_hold_reject_msgs>:

number of hold reject messages

<num_retrieve_msgs>:

number of retrieve messages

<num_retrieve_ack_msgs>:

number of retrieve ack messages

<num_retrieve_rej_msgs>:

number of retrieve reject messages

<num_congestion_ctrl_msgs>:

number of congestion control messages

<num_notify_msgs>:

number of notify messages

<num_start_dtmf_msgs>:

number of start dtmf messages

<num_start_dtmf_ack_msgs>:

number of start dtmf ack messages

<num_start_dtmf_rej_msgs>:

number of start dtmf reject messages

<num_status_msgs>:

number of status messages

<num_status_enquiry_msgs>:

number of status enquiry messages

<num_stop_dtmf_msgs>:

number of stop dtmf messages

<num_stop_dtmf_ack_msgs>:

number of stop dtmf ack messages

<last_mo_fail_cause>:

last MO SMS over GPRS failure cause

<mo_gprs_sms_count>:

Count of MO SMS attempts over GPRS

<mo_gprs_sms_count_succ>:

Count of MO SMS attempts over GPRS successful

<last_mt_fail_cause>:

last MT SMS over GPRS failure cause

<mt_gprs_sms_count>:

Count of MT SMS attempts over GPRS

<mt_gprs_sms_count_succ>:

Count of MT SMS attempts over GPRS successful

<call_reject_cause>:

Call reject cause

<call_failure_cause>:

Call failure cause

<pdp_act_state>:

PDP activation state (TRUE/FALSE)

<dl_blocks_total>:

Total number of RLC data blocks for downlink direction received within the last test- param report-period

<ul_blocks_total>:

Total number of RLC data blocks for uplink direction transmitted within the last test- param report-period

<dl_blocks_retrans>:

Total number of DL RLC data block retrans

<ul_blocks_retrans>:

Total number of UL RLC data block retrains

<dl_throughput_kbps>:

DL Data throughput in kbit/s

<ul_throughput_kbps>:

UL Data throughput in kbit/s

<total_dl_rx_frames>:

Sum of downlink frames received within the last test-param report period

<total_ul_tx_frames>:

Sum of uplink frames transmitted within the last test-param report period

<total_dl_retx_frames>:

Sum of retransmission requests for downlink frames

<total_ul_retx_frames>:

Sum of uplink frames retransmitted within the last test-param report period

<mac_timer_state>:

Eng mode Mac Timer State

<dl_ack_cnt>:

positive acknowledgement (ACK) block count downlink

<dl_nack_cnt>:

negative acknowledgement (NACK) block count downlink

<ul_ack_cnt>:

positive acknowledgement (ACK) block count uplink

<ul_nack_cnt>:

negative acknowledgement (NACK) block count uplink

<dtx_cnt>:

DTX count when no ACK or NACK is sent

<cqi_max>:

Umac data CQI max value

<cqi_mean>:

Umac data CQI mean value

<cqi_min>:

Umac data CQI min value

<amr_frame_type_idx>:

AMR Frame type index = UBYTE : 0-15. Value is valid only during a call.

<amr_type>:

AMR Type: UBYTE: 0=NB_AMR, 1=WB_AMR. Value is valid only during a call.

7.41 Multiplexing mode +XMUX

This command configures the GSM07.10 multiplexing protocol.

- This Set Command configures the GSM07.10 multiplexing protocol.
- Read command displays the selected multiplexing protocol.
- Test command returns list of supported list of supported <actions>),(list of supported<p1's>), (list of supported <p2's>),list of supported <p3's>),(list of supported <p4's>), (list of supported <p5's>),(list of supported <p6's>),(list of supported <p7's>),(list of supported <p8's>),(list of supported <p9's>),(list of supported <p10's>).

7.41.1 Syntax of the Command

Command syntax:
AT+XMUX=<action>[,[<p1>][,[<p2>][,[<p3>][,[<p4>][,[<p5>][,[<p6>][,[<p7>] [,[<p8>][,[<p9>][,[<p10>]]]]]]]]]]

Command	Possible Response(s)
AT+XMUX=1,5,3,2	OK or CME ERROR: <error>

AT+XMUX?	+XMUX : <action>,<p1>,<p2>,<p3>,<p4>,<p5>, <p6>,<p7>,<p8>,<p9>,<p10> OK or +CME ERROR: <err>
AT+XMUX=?	+XMUX: (list of supported <actions>), (list of supported <p1's>), (list of supported <p2's>), (list of supported <p3's>), (list of supported <p4's>), (list of supported <p5's>), (list of supported <p6's>), (list of supported <p7's>), (list of supported <p8's>), (list of supported <p9's>), (list of supported <p10's>) OK

7.41.2 Defined values

<action>

Action

<p1>...<p10>

Parameter Details not provided as it is mainly user for internal test purpose. Wrong value may damage HW. for debug purpose If need, contact support engineer.

7.42 PLMN Info List +XNVMPLMN

This command is added with the PLMN Search and Cell Selection (PSSI) improvements. The command allows access to the PLMN tables via the AT interface. These tables are also accessible via phonetool. There is a GSM/2G table, a UMTS/3G table and a LTE table. Note: The LTE specific functionality and parameters are supported only if 'CAT_7060_SUPPORT' is defined in the build.

- A set command will overwrite the entry if it has already been entered. When an entry is cleared, all bytes in the entry fields are set to 0xFF.

The PLMN info lists are stored in NVM. Each list is first stored in the volatile NVM mirror, and the NVM copy is then updated in the background. It is recommended that the lists be entered, and then power is cycled on the handset to force the update to NVM, prior to test. When writing the entry, the number of frequencies is limited to: 2G: 1-32 ARFCN 3G: 1-10 UARFCN LTE: 1-10 EARFCN

Note: The commands in this section are available only if the FEAT_PSSI_XNVM is defined (build).

7.42.1 Syntax of the Command

Command syntax: AT+XNVMPLMN=<mode>,<rat>[,<idx>[,<mcc>,<mnc>,<bands>[,<f1>[,<f2> .....[,<fn>].....]],<lte_bands_tdd>, <channel_bw>]]

Note: For 2G and 3G RATs, unused frequencies and comma separators should be omitted from the command.

For LTE RAT, the unused frequencies should be supplied with commas, then <lte_bands _tdd>,<channel_bw> parameters should be given. Also <bands> parameter will be interpreted as <lte_bands_fdd> for LTE RAT. i.e, if only 3 frequencies to be set then the syntax would be, at+xnvmplmn=<mode>,<rat>,<idx>,<mcc>, <mnc>, <lte_bands_fdd>,f1,f2,f3,,,,,,,<lte_bands_tdd>,<channel_bw>

Command	Possible responses
AT+XNVMPLMN=<mode>,<rat>[,<idx> [,<mcc>, <mnc>,<bands> [,<f1>[,<f2> … [,<fn>] …]],<lte_bands_tdd>, <channel_bw>]] n=32 maximum	OK or (for read one entry) +XNVMPLMN: <rat>,<idx>,{entry info} OK or (for read entire list) +XNVMPLMN: <rat>,1,{entry info} …. +XNVMPLMN: <rat>,50,{entry info} OK or +CME ERROR: <error> where {entry info} is: For 2G / 3G: <mcc>,<mnc>,<bands>,<f1>[,<f2> … [,<fn>] …] n=32 maximum For LTE: <mcc>,<mnc>,<lte_bands_fdd>,<lte_bands_tdd>, <channel_bw><f1>[,<f2> …[,<fn>] …] n=10 maximum

AT+ XNVMPLMN=?	For 2G / 3G: +XNVMPLMN: (0-2),(0,1),(1-50),[(0-999),(0-999),(0-65535) [,(0-65535)[,(0-65535) ....[,(0-65535)] ....]]] For LTE: +XNVMPLMN: (0-2),(0,1,2),(1-50),[(0-999),(0-999),(0-4294967293)[,(0-65535)[,(0-65535)....[,(0-65535)]....]],(0-4294967293),(0-63)] OK

7.42.1 Defined values

<mode>:

Enumeration that defines the command 0 clear one or all entries in a list: (default)

- select the list with <rat>
- select the idx of an entry to clear with <idx>
- if <idx> is omitted, all entries will be cleared
- when an entry is cleared, all bytes in the entry are set to 0xFF

1 write one entry

- most of the optional information must be provided in the command: AT+XNVMPLM N=<mode>,<rat>,<idx>,<mcc>,<mnc>,<bands>,<f1>[,<f2> ... [,<fn>] ...],<lte_ bands_tdd>,<channel_bw>
- at least one frequency must be provided
- the maximum amount of frequencies per entry, n = 32

2 read one or all entries in a list:

- select the list with <rat>
- select the idx of an entry to clear with <idx>
- if <idx> is omitted, all entries will be read

An unused entry will be read back as:

+XNVMPLMN: <rat>,<idx>,0xFF

<rat>: Enumeration used to select the PLMN info lists

0: GSM/2G list (PLMN2G)

1: UMTS/3G list (PLMN3G)

2: LTE list (PLMN LTE)

<idx>:

Index of the entries in one of the two PLMN info lists 1-50 range of valid indices

<mcc>:

Mobile Country Code

0-999, decimal

<mnc>:

Mobile Network Code

0-999, decimal

<bands>:

Band selection. For 2G and 3G RATs, this parameter is a bit mask, 16-bits in length.

For LTE RAT this parameter is a interpreted as <lte_bands_fdd>, a 32-bit bitmap, each bit representing one LTE FDD band (LTE bands 1 to 32), as specified in 3GPP Spec 36.101 Section 5.5. The band is selected with an integer. Only the integers listed below are accepted. RAT

<bands> BIT MASK SELECTION

1 b0 = 0x0001 PGSM 900

2 b1 = 0x0002 EGSM 900

4 b2 = 0x0004 RGSM 900

8 b3 = 0x0008 DCS 1800

16 b4 = 0x0010 PCS 1900

32 b5 = 0x0020 GSM 450

128 b6 = 0x0040 GSM 480

<rat>=0 (GSM/2G):
256 b7 = 0x0080 GSM 850

1 b0 = 0x0001 band I

2 b1 = 0x0002 band II

<rat>=1 (UMTS/3G):
4 b2 = 0x0004 band III

1,2,4,8,16,32,128,256 integer bit selection

<rat>=2

(LTE): <lte_bands_fdd> as specified in 3GPP Spec 36.102 Section 5.5

1 b0 = 0x0001 support for E-UTRA Operating Band 1

2 b1 = 0x0002 support for E-UTRA Operating Band 2

4 b2 = 0x0004 support for E-UTRA Operating Band 3

8 b3 = 0x0008 support for E-UTRA Operating Band 4

16 b4 = 0x0010 support for E-UTRA Operating Band 5

..... 2147483648 b31 = 0x80000000 support for E-UTRA Operating Band 32

For multiple band selection, the corresponding bits should be OR'ed and accordingly the bitmap value should be given.

<fn>: Frequency (n)

RAT	n	<fn>
<rat> = 0 (GSM/2G):	1 - 32	ARFCN
<rat> = 1 (UMTS/3G):	1 - 10	UARFCN
<rat> = 2 (LTE):	1 - 10	EARFCN

One or more frequencies can be set for the cell. Depending on the rat selected, a frequency is specified by:

2G: ARFCN (Absolute Radio Frequency Channel Number)

3G: UARFCN (UTRA Absolute Radio Frequency Channel Number) LTE: EARFCN (E-UTRA Absolute Radio Frequency Channel Number)
0-65535

<lte_bands_tdd>:

This parameter is applicable only for LTE RAT and it is a 32-bit bitmap, each bit representing one LTE TDD band (LTE bands 33 to 64), as specified in 3GPP Spec 36.101
Section 5.5. The bitmap value can be formed as below. <lte_bands_tdd> as specified in
3GPP Spec 36.102 Section 5.5 1 b0 = 0x0001 support for E-UTRA Operating Band 33

2 b1 = 0x0002 support for E-UTRA Operating Band 34

4 b2 = 0x0004 support for E-UTRA Operating Band 35

8 b3 = 0x0008 support for E-UTRA Operating Band 36

..... 2147483648 b31 = 0x80000000 support for E-UTRA Operating Band 64

For multiple band selection, the corresponding bits should be OR'ed and

accordingly the bitmap value should be given.

Note: LTE FDD and TDD band bitmaps are validated only for the minimum and maximum possible values and not validated for any 'Reserved' bands (or) undefined bands as mentioned in the spec 3GPP TS 36.101 section 5.5

<channel_bw>:

This parameter is applicable only for LTE RAT. It is a 8-bit bitmap representing up to six possible LTE channel bandwidth as specified in 3GPP Spec 36.101 Section 5.6. The bitmap value can be formed as below. 1 b0 = 0x0001 support for LTE channel bandwidth
1.4 MHz

2 b1 = 0x0002 support for LTE channel bandwidth 3 MHz

4 b2 = 0x0004 support for LTE channel bandwidth 5 MHz

8 b3 = 0x0008 support for LTE channel bandwidth 10 MHz

16 b4 = 0x0010 support for LTE channel bandwidth 15 MHz

32 b5 = 0x0020 support for LTE channel bandwidth 20 MHz bits 6,7 are unused, shall be set to 0
For multiple band selection, the corresponding bits should be OR'ed and accordingly the bitmap value should be given.

7.43 MCC Update Table +XNVMMCC

This command is added with the PLMN Search and Cell Selection (PSSI) improvements. The command allows access to the MCC Update List. This list is a writeable extension to the MCC Netttype List.

- A set command will overwrite the entry if it has already been entered. The MCC Update list is stored in NVM.The list is first stored in the volatile NVM mirror, and the NVM copy is then updated in the background.It is recommended that the list be entered, and then power is cycled on the handset to force the update to NVM, prior to test.

- Baseband notes: Note: The commands in this section are available only if FEAT_PSSI_ XNVM is defined (build).

7.43.1 Syntax of the Command

Command syntax:
AT+XNVMMCC=<mode>[,<idx>[,<mcc>,<gsmbands>,<umtsbands>

,<lte_bands_tdd>,<lte
_bands_fdd>]]

Note: The LTE TDD and FDD bands should be provided incase of LTE RAT only and the LTE specific parameters are supported only if 'CAT_7060_SUPPORT' is defined in the build.

Command	Possible responses
AT+XNVMMCC=<mode>[,<idx>[,<mcc>, <gsmbands>,<umtsbands>,<lte_bands_tdd>,<lte _bands_fdd>]]	OK or +CME ERROR: <error>
AT+XNVMMCC? All entries will be returned	20 entries will be returned (<idx> = 1-20) +XNVMMCC: <idx>,<mcc>,<gsmbands>, <umtsbands>,<lte_bands_tdd>,<lte_bands_fdd> followed by: OK
AT+ XNVMMCC=?	+XNVMMCC: (0-1)[,(1-20)[,(0-999),(0-65535),(0-65535),(0-4294967293) ,(0-4294967293)]] OK

7.43.1 Defined values

<mode>:

Enumeration that defines the command (default)

0: clear one or all entries in the list

- select the idx of an entry to clear with <idx>
- if <idx> is omitted, all entries will be cleared
- when an entry is cleared, all bytes in the entry are set to 0xFF 1: write one entry
- the optional information must be provided in the command:

AT+XNVMMCC=<mode>,<idx>,<mcc>,<gsmbands>,<umtsbands>,<lte_bands_td d>,<lte
_bands_fdd>

<idx>:

Index of the entries in the MCC Update List

1-20 range of valid indices

<mcc>:

Mobile Country Code

0-999, decimal

<gsmbands>:

2G Band selection. The parameter is a bit mask, 16-bits in length. The band is selected with an integer. Only the integers listed below are accepted.

<bands>

BIT MASK SELECTION 1 b0 = 0x0001 PGSM 900

2 b1 = 0x0002 EGSM 900

4 b2 = 0x0004 RGSM 900

8 b3 = 0x0008 DCS 1800

16 b4 = 0x0010 PCS 1900

32 b5 = 0x0020 GSM 450

128 b6 = 0x0040 GSM 480

256 b7 = 0x0080 GSM 850

1,2,4,8,16,32,128,256 integer bit selection

<umtsbands>:

3G Band selection. The parameter is a bit mask, 16-bits in length. The band is selected with an integer. Only the integers listed below are accepted.

<bands>

BIT MASK SELECTION 1 b0 = 0x0001 band I

2 b1 = 0x0002 band II

4 b2 = 0x0004 band III

1,2,4 integer bit selection

<lte_bands_fdd>:

As defined in section 4.1(+XNVMPLMN)

<lte_bands_tdd>:

As defined in section 4.1(+XNVMPLMN)

7.44 Configuration of DLCs +XCONFIG

This command allows the configuration of DLCs (Data Logical Channels).

- Set command allows configuration of Data logical Channels.
- Read command give the corresponding channel dlc/tid.
- Test command returns rangeof maximum supported DLCs.

7.44.1 Syntax of the Command

Command syntax: AT+XCONFIG=<config_item>,<switch>[,<dlc/tid>]

Command	Possible Response(s)
Set command AT+XCONFIG=<config_item>,<switch>[,<dlc/tid>]	OK or CME ERROR: <error>
Read command AT+XCONFIG?	+XCONFIG: 0 Or +XCONFIG: <dlc/tid>
Test command AT+XCONFIG=?	+XCONFIG: (0-4),0|1,(0-max supported DLCs) e.g. +XCONFIG: (0-4),0|1,(0-9) OK

7.44.2 Defined values

<config_item>

0 -> configure voice channel for auto answering (default)

1 -> configure CSD channel for auto answering

2 -> configure GPRS channel for auto answering

3 -> configure unsolicited call results(RING,+XREDIAL)

4 -> configure unsolicited GPRS results(RING)

5 -> configure GPS NMEA reporting

Note: The enabling of auto answering with ATS0 is a prerequisite for the configuration of channels.

Note: With ATS0 auto answering is enabled for voice, CSD and GPRS on the DLC

where it had been latest requested. With AT+XCONFIG it is possible to configure separate channels for voice, CSD and GPRS.

Note: <config_item=5> is supported only if the feature FEAT_LCS is enabled

<switch>

if <config_item> value 0, 1, 2:

0: disable selection (default)

1: enable selection for <dlc/tid>

if <config_item> value 3, 4, 5:

0: disable on all channels or channel specific with optional parameter <dlc/tid>

1: enable on all channels (default) or channel specific with optional parameter <dlc/tid>

<dlc1tid>

integer type value indicating the DLC in the range of 1 - 9 (the maximum number of DLC
is customizable).In MUX mode DLC 0 is reserved for GSM 07.10 usage.

7.45 DLC(MUX) Test Mode +XDLCTEST

This command allows the testing of DLC operation and performance. After the "OK" response modem goes to a multiplexer test mode. Modem will return to normal mode of operation after test will be completed or after multiplexer control channel will be closed from TE side. 3 type of operation is supported: loopback, incoming and outgoing.

- Set command allows setting Data logical Channels in test mode.
- Test command returns rangeof maximum supported parameters.

7.45.1 Syntax of the Command

Command syntax:
AT+XDLCTEST=<operation>,<N1>,<N2>,<N3>,<N4>

Command	Possible Response(s)

Set command AT+XDLCTEST=<operation>,<N1>,<N2>,<N3>,<N4>	OK or CME ERROR: <error>
Test command AT+XDLCTEST=?	+XDLCTEST:(1-3),(0-63),(0-65535),(0-2047),(0-255) OK

7.45.2 Defined values

<operation>:

1 Loopback mode. Any data, is sent by TE to DLCn will be sent by modem back to TE.

<N1> The DLC number. If N1 is equal 0, data will be sent by modem to the same DLC where this data is coming. If the N1 is a valid number of DLC, modem will send data to specified DLC only. If N1 is not valid DLC number, the CME ERROR will be returned.

<N2> The amount of data to test in bytes. Range 0-65535. Test will be completed after N2 bytes will be sent. If N2=0 specified, test will be performed infinitely. It will be in DLC test mode till ME is reset.

<N3> Not used. Cannot be omitted. Must be 0.

<N4> Not used. Cannot be omitted. Must be 0.

2 Incoming mode. Modem will send the data to the TE

<N1> The DLC number. If N1 is equal 0, data will be sent to all the DLCs sequentially. If N1 is a valid number of DLC, modem will send data to specified DLC only. If N1 is not valid DLC number, the CME ERROR will be returned.

<N2> The amount of data to test in bytes. Range 0-65535. Test will be completed after
N2 bytes will be sent. If N2=0 specified, test will be performed infinitely.

<N3> Data block size. Range 0-2047. The data will be vailab to the DLC by blocks with N3 bytes length. If N3=0 specified, block size will be equal maximal DLC frame size. N2 must be multiple of N3.

<N4> Pattern. Range 0-255. Defines the fill pattern in decimal. If value entered is 49, the pattern is filled with '1'. 3 Outgoing mode. TE will send data to modem.

<N1> The submode of operation. Values supported -0, 1.If N1 = 0 specified, TE will send the data to modem. Modem should compare incoming data bytes with a pattern, specified by N4 parameter(see below) and count amount of errors and amount of received bytes. If N1 = 1 specified, modem will send to TE results of previous execution of test immediately.

<N2> The amount of data to test in bytes. Range 0-65535. Test will be completed after N2 bytes will be vailabl. If N2=0 specified, test will be performed

until first error happens.

<N3> Not used. Cannot be omitted. Should be 0.

<N4> Pattern, Range 0-255. Defines the fill pattern.

7.46 Trigger Fast Dormancy +XFDOR

This command triggers fast dormancy; if all conditions are passed successful SCRI will be send towards the network. SCRI will be sent as a one shot or for every delay timer expiry, depending on the mode specified. There will be no confirmation if the request was executed or not as in the last extend the full execution belongs to the network.

- Set Command is used to trigger either one shot Dormancy or to switch ON/OFF the autonomous fast dormancy. When command is accepted, "OK"string is returned.
- Read command returns "OK" string along with last accepted mode and timer values.
- Test command returns "OK"string along with supported modes and timer values.

7.46.1 Syntax of the Command

Command syntax: AT+XFDOR=<mode>[,< FDDelay-Timer>][,< SCRI-Timer>]

Command	Possible Response(s)
AT+XFDOR=<mode>[,< FDDelay-Timer>][,< SCRI-Timer>]	OK or CME ERROR: <error>
AT+XFDOR?	+XFDOR: <mode>,< FDDelay-Timer >,< SCRI-Timer> OK
AT+XFDOR=?	+XFDOR: (1-3)[,(1-60)] [,(1-120)] OK

7.46.2 Defined values

<mode> is

1 indicate application driven (1 shot) Fast Dormancy to modem (default)

2 switch ON autonomous Fast Dormancy (AFD)

3 switch OFF autonomous Fast Dormancy (AFD)

<FDDelay-Timer> is an integer value in the range of 1 to 60 seconds.(Default 5 Seconds)

<SCRI-Timer> is an integer value in the range of 1 to 120

seconds.(Default 5 Seconds) Note:

1: <mode> 2 and 3 will be available from REL.7 .

2: Default timer value will be 5 sec until NVM location <cps_nvm_dyn. fast_dormancy. xxxx_timer> is updated through any means

3: This command is available only if fast dormancy is supported.

7.47 Set Fast Dormancy Timer +XFDORT

This command sets the timer used for fast dormancy inhibit timer in NAS/UAS to adapt to network operator requirements. The timer is used to avoid repeated transmission of SCRI requests towards the network.

- Set Command is used to set timer used for fast dormancy inhibit timer in NAS/UAS to adapt to network

  operator requirements.

- Read command returns the timer value.

- Test command returns the range of <timer_value>s.

7.47.1 Syntax of the Command

Command syntax:
AT+XFDORT=<timer_value>

Command	Possible Response(s)
AT+XFDORT=<timer_value>	OK Or CME ERROR

AT+XFDORT?	+ XFDORT: <timer-value> OK
AT+XFDORT=?	+XFDORT:(0-120) OK

7.47.2 Defined values

<timer-value>

is an integer value in the range of 0-120 seconds (default:5).

0 the timer is not used (e.g.timer runtime is 0)

>0 means the timer is used to inhibit fast dormancy

Note: This command is available only if fast dormancy is supported.

7.48 Read call forwarding status +XCFC

This command reads the call forwarding flags related to voice calls from the SIM.

- Execution Command is used to reads the call forwarding flags related to voice calls from the SIM.
- Test command returns "OK" string.

7.48.1 Syntax of the Command

Command syntax: AT+XCFC Response syntax: +XCFC: <msp>,<IndicatorStatus>[,
<number[,<type>]], <forwardline>

Command	Possible Response(s)
AT+XCFC	+XCFC: <msp>,<IndicatorStatus>[,<number[, <type>]], <forwardline> OK or CME ERROR: <error>
AT+XCFC=?	OK

7.48.2 Defined values

<msp>

is MSP number containing the Profile Identity of the subscriber profile and may be:

1-4, if valid

255, if invalid

<IndicatorStatus>

is a sum of integers each representing a service type and may be:

1 voice (voice line 1)

2 FAX

4 Data

128 voice (voice line 2)

<number>

string type (0-9, +) containing the phone number

<type>

integer type indicating the type of address octet as follows: may be: 128-255

<forwardline>

forwarded line for voice and may be:

0: forwarded on line 1

1: forwarded on line 2

2: forwarded on both lines

3: no calls forwarded

7.49 Request revision identification +FMR

This command gives the revised version of the mobile station.

- Execution Command gives the revised version of the mobile station.

7.49.1 Syntax of the Command

Command syntax: AT+FMR

Command	Possible Response(s)
AT+FMR	OK or CME ERROR: <error>
AT+FMR=?	OK

7.50 Change Trace-port +XTDEV

This command allows to select the trace port. If an empty string is used as argument - at+xtdev="" - the current trace device is converted to an AT device and no trace port is available.

- This Set Command allows to select the trace port.
- Read command reads the current trace-device.
- Test command returns list of "<possible tracedev.1>", "<possible tracedev.2>","").

7.50.1 Syntax of the Command

Command syntax: AT+XTDEV ="<trace-device>"

Command	Possible Response(s)
AT+XTDEV="<trace-device>"	OK or CME ERROR: <error>
AT+XTDEV?	+XTDEV : "<current trace-device>" OK
AT+XTDEV=?	+XTDEV: ("<possible tracedev.1>", "<possible tracedev.2>","") i.e. +XTDEV: ("/tyCo/0","/mm_call/0", "/mux/1", "/mux/2","/mux/3","") OK

7.50.2 Defined values

<trace-device>

string type indicating the name of the trace-device. The possible trace-device-names should be read out with at+xtdev=?

7.51 Configure System Trace +XSYSTRACE

This command allows to configure system trace port, mode.

This command is available only when feature FEAT_TRACE_DEBUG is available and feature FEAT_TRACE_DEBUG_MON_DBG_ONLY is not available.

- Execution command allows to configure system trace port, mode.
- Test command returns list of supported <mode>s],[list of supported "<master>
  =<port>"s],[list of supported "<master>=<config>s]",[list of supported oct=<oct_
  mode>],[;pti1=<pti1_mode>],[;pti2=<pti2_mode>"s].

  Note: The old AT+TRACE command for legacy BB and 3G core tracing configuration remains untouched.

7.51.1 Syntax of the Command

Command syntax:
AT+XSYSTRACE=<mode>,["<master>=<port>[;<master>=<port>[;]]"],["<master>=<config>[;<master>=<config>[;]]"],["[oct=<oct_mode>][;pti1=<pti1_mode>][;pti2=<pti2_mode>]"]

Command	Possible Response(s)
AT+XSYSTRACE=<mode>,["<master>=<port>[;<master>=<port>[;]]"],["<master>=<config>[;<master>=<config>[;]]"],["[oct=<oct_mode>][;pti1=<pti1_mode>][;pti2=<pti2_mode>]"]	OK or CME ERROR: <error>
AT+ XSYSTRACE =?	+XSYSTRACE:[list of supported <mode>s],[list of supported "<master>=<port>"s],[list of supported "<master>=<config>s]",[list of supported oct=<oct_mode>][;pti1=<pti1_mode>][;pti2=<pti2_mode>"s] , OK

7.51.2 Limitation

The total length of parameters in set command cannot exceed 400 characters due to C-AT parser limitation. For set command with total parameter length exceeding 400 characters, multiple set commands by splitting the parameters can be issued.

7.51.3 Defined values

For supported values refer to the WIKI link
https://sdwiki.imu.intel.com/Diagnostics/Tracing/SystemTrace/Configuration#System_Trace_Concept_Document

If not accessible get this document form respective Customer Technical Support(CTS) team.

7.52 Configure the Debug configuration +XDBGCONF

This command allows configuring debug configuration in trace

debug module. This command is for internal test purpose only.

This command is available only when feature FEAT_TRACE_DEBUG is available and feature FEAT_TRACE_DEBUG_MON_DBG_ONLY is not available.

7.52.1 Syntax of the Command

Command syntax: AT+XDBGCONF=<str>

Command	Possible Response(s)
AT+XDBGCONF="xdbgconf"	OK or CME ERROR: <error>

7.52.2 Defined values

<str>

For supported values refer to the WIKI link
https://sdwiki.imu.intel.com/Diagnostics/Tracing/SystemTrace/Configur

ation#System_Trace_Concept_Document

If not accessible get this document form respective Customer Technical Support(CTS) team.

7.53 Configure the BB trace configuration +XABBTRACE

This command allows to configure BB trace configuration in trace debug module. This command is for internal test purpose only.

This command is available only when feature FEAT_TRACE_DEBUG is available and feature FEAT_TRACE_DEBUG_MON_DBG_ONLY is not available.

7.53.1 Syntax of the Command

Command syntax: AT+XABBTRACE=<str>

Command	Possible Response(s)
AT+XABBTRACE="xabbtrace"	OK or CME ERROR: <error>

7.53.2 Defined values

<str>

For supported values refer to the WIKI link https://sdwiki.imu.intel.com/Diagnostics/Tracing/SystemTrace/Configuration#System_Trace_Concept_Document

If not accessible get this document form respective Customer Technical Support(CTS) team.

7.54 Generic start of a server socket application +XAPP

The execution command allows to start a data transfer between a DTE-user and the corresponding internal MMI-application. After starting the data transfer, the C-AT has no longer the possibility to control this interface. The data-transfer can be terminated only from the DTE-application, so that the serial driver receives the escape sequence "+++". When the data-transfer is started, the intermediate result code "CONNECT" is displayed and switches to the online mode.

- Execution command allows to start a data transfer between a DTE-user and the corresponding internal MMI-application.
- Test command returns list of supported <socket_addr>'s

7.54.1 Syntax of the Command

Command syntax:
AT+XAPP=<socket_addr>

Command	Possible Response(s)
AT+XAPP= "apSV.01"	CONNECT or CME ERROR: <error>
AT+XAPP=?	[+XAPP: "apSV.01"<CR><LF> [+XAPP: "apSV.02"<CR><LF> [[+XAPP: "apSV.n"]]]] i.e, +XAPP lines building the list of supported <socket_addr>'s OK

7.54.2 Defined values

<socket-addr>

string type indicating the socket address of the corresponding application

Note: For SIO data loop test, the <socket_addr> should be given as "siotest". If the "CONNECT" is returned to terminal after setting up the "siotest" then the loop is working. Further data entered shall be echoed back. The loop can be stopped

by pressing "+" "+" "+". Make a short pause after entering every "+".

7.55 Emergency Numbers List +XLEMA

This command Provide list of emergency numbers with their associated emergency categories. When the list changes, the modem provides the updated list with an AT Unsollicited Result Code +XLEMA

- Set Command sets +XLEMA mode.
- Read command returns the emergency list based on the current mode.
- Test command returns the list of supported<mode>s.

7.55.1 Syntax of the Command

Command syntax: AT+XLEMA=<mode> Unsolicited Response Code

- XLEMA: <1>,<total cnt>,<ecc num>[, <cat>[, <simpre> [,<MCC>]]]
- XLEMA: <index>,<total cnt>,<ecc num>[, <cat>[, <simpre> [,<MCC>]]]

Command	Possible Response(s)
AT+XLEMA=<mode>	OK or CME ERROR: <error>
AT+ XLEMA?	+ XLEMA: <1>,<total cnt>,<ecc num>[, <cat>[, <simpre> [,<MCC>]]] + XLEMA: <index>,<total cnt>,<ecc num>[,<cat>[, <simpre> [,<MCC>]]] OK
AT+XLEMA=?	+XLEMA: (list of supported <mode>'s) OK

7.55.2 Defined values

< index> index of Emergency number

< total cnt > Total no.of Emergency numbers

< ecc num > Emergency number in string format

< cat > category (optional). Coding according to TS 24.008

< vaila > Is Emergency number valid with sim presence(1) or not(0) (optional)

< mcc > Mobile Country Code (optional)

<mode>

parameter sets the result code presentation in the TA:

0 - Disable URC display (default)

1 - Enable URC display when there is a update in Emergency number list
The list will be always identical to mode 6.

2 - Read command will list All the Emergency number in the NVM

3 - Read command will list All the Emergency number received from the Network

4 - Read command will list All the Emergency number in the SIM

5 - Read command will list All the Hard Coded Emergency number

6 - Read command will list the Current Valid list of Emergency number

based on MCC Notes:

1. By default XLEMA read command will be in mode 6.

2. Changing of modes(2-6) will not affect the URC enable/disable status.

3. Optional parameter MCC is applicable only to NVM and Network bases Emergency numbers

7.56 Write Emergency Number to NVM AT@NVM

This command writes a emergency number along with its associated values to NVM.

- Set Command writes a emergency number to NVM

7.56.1 Syntax of the Command

Command syntax: AT@NVM:cust.emergency[<index>]={P1, P2, P3, P4, P5, P6, P7, P8}

Command	Possible Response(s)
AT@NVM:cust.emergency[<index>]={<P1>,<P2>,<P3>,<P4>,<P5>,<P6>,<P7>,<P8>}	OK or CME ERROR: <error>
AT@NVM:cust.emergency[<index1>,<index2>]?	{{<P1>,<P2>,<P3>,<P4>,<P5>,<P6>,<P7>,<P8>}...{<P1>,<P2>,<P3>,<P4>,<P5>,<P6>,<P7>,<P8>}}

7.56.2 Defined values

< index>, <index1>, <index2>

index of Emergency number to be stored

<P1>,<P2>,<P3>

BCD encoded ECC in decimal values

For example: P1=18, P2=52, P3=86 corresponds to ECC number "123456"(ie 18=>0x12,
52=>0x34,86=>0x56).

A '*' can be represented with value 0x0A and '#' by 0x0B. So, an ECC

number "*291"can be given

as P1=0xA2, P2=0x91, P3=FF.

<P4>

denotes whether ECC is valid when sim present or not

0 - ECC is not valid when SIM present

1 - ECC is valid when SIM is present

<P5>

denotes ECC Category

<P6>, <P7>

MCC 2 bytes same as 3GPP PLMN format

<P8> reserved . give 0xff

Note: The command is owned by GTI, C-AT will only get the values of parameters.

The input format is proprietary and is owned by GTI. This command will be available only if

"FEAT_NVM_EMN_LIST" feature flag is enabled.

Examples:

AT@NVM:cust.emergency[0,5]?

{{1,2,3,4,5,6,7,255},{7,6,5,4,3,2,1,255},{255,255,255,255,255,255,255,255},{255,255,
255,255,255,255,255,255}, {255,255,255,255,255,255,255,255},
{255,255,255,255,255,
255,255,255}} OK

AT@NVM:cust.emergency[3,5]=
{{1,2,3,4,5,6,7},{7,6,5,4,3,2,1},{71,61,51,41,31,21,
11}} OK

AT@NVM:cust.e

mergency[0,5]?

{{1,2,3,4,5,6,7,255},{7,6,5,4,3,2,1,255},{255,255,255,255,255,255,255,255},{1,2,3,
4,5,6,7,255},{7,6,5,4,3,2,1,255},{71,61,51,41,31,21,11,255}}

OK

7.57 Keypad control +CKPD

This execution command emulates MT keypad by giving each keystroke as a character in a string <keys>. <time>x0.1 seconds is the time to stroke each key and <pause>x0.1 seconds is the length of pause between two strokes.

7.57.1 Syntax of the Command

Command
syntax:
AT+CKPD

Command	Possible Response(s)
AT+CKPD= "*#21#"	OK or CME ERROR: <error>
AT+ CKPD=?	OK

7.57.2 Defined values

<keys> is a string of characters representing keys or conventions as listed in chapter
8.7 of the GSM07.07.

<time>, <pause> integer values 0 ... 255 defining a time interval of 0 ...

25.5 seconds.

NOTE: This command is supported only if the system defines

CAT_CKPD_MEX_FLAG in the configuration.

7.58 Call the L1-specific function +XL1SET

This command allows to call L1-specific test and configuration functions.
This command is for internal test purpose only.

7.58.1 Syntax of the Command

Command syntax: AT+XL1SET=<str>

Command	Possible Response(s)
AT+XL1SET="xxx"	OK or CME ERROR: <error>

7.58.2 Defined values

<str>

values are specified from L1 Group and available via Intranet

7.59 ETWS configuration +XETWCFG

This command is used to configure the Earthquake and Tsunami warning System (ETWS).

- Set command configures the different parameters of ETWS.
- Read command returns current ETWS configuration.
- Test command returns values supported by ETWS

configuration parameters. This command will work only if

feature FEAT_ETWS is enabled.

7.59.1 Syntax of the Command

Command syntax: AT+XETWCFG= <pri_noti>,<sec_noti>,<sec_cfg>,<dup_det>

Command	Possible Response(s)
AT+XETWCFG = <pri_noti>, <sec_noti>, <sec_cfg>, <dup_det>	OK or +CME ERROR: <err>
AT+XETWCFG?	+XETWCFG: <pri_noti>, <sec_noti>, <sec_cfg>, <dup_det> OK
AT+XETWCFG =?	+XETWCFG: (0,1),(0,1),(0,1),(0,1) OK

7.59.2 Defined values

<pri_noti>

0: FALSE means reception of Primary Notification is OFF (default)

1: TRUE means reception of Primary

Notification is ON (see Fspec_PS-NAS-

MN_etws.doc)

<sec_noti>

It sets if the Secondary Notification is received, independent of the reception of the corresponding Primary Notification (default)

0: FALSE means immediate reception of Secondary Notification is OFF

1: TRUE means immediate reception of Secondary

Notification is ON (see Fspec_PS-NAS-MN_etws.doc)

<sec_cfg>

checks Security Configuration

0: FALSE means Security Check is OFF (default)

1: TRUE means

Security Check is ON

(see Fspec_PS-NAS-

MN_etws.doc)

<dup_det>

Contains setting for ignoring duplicate notifications. If set to

0 : Ignore all duplicate Notifications

1 : Ignore duplicate Secondary Notifications

(see 3GPP TS 22.168, sec. 5.8.1)

7.60 Start ETWS warning notifications +XETWNTFYSTART

This command is used to start the different ETWS warning notifications.

- Set command starts the different ETWS warning notifications.
- Test command returns different ETWS warning notifications that can be started.

Primary Notification is the information which is used specifically in ETWS in order to notify users about the most urgent event in seconds rather than minutes, such as imminent occurrence of Earthquake. Secondary Notification is the information which is used specifically in ETWS in order to notify users supplementary information that is of lesser urgency such as instructions on what to do / where to get help,for example, map to refuge facilities, time table of food distribution .These information, in general, would be issued by local government. The coding scheme decides the format in which this URC is displayed. See <cb_data> description below for more details. This command will work only if feature FEAT_ETWS is enabled.

7.60.1 Syntax of the Command

Command syntax: AT+ XETWNTFYSTART= <warning_type> Primary notification : UR C : +XETWPRIWARN : <serial_number>, <mid>, <warning_type>, <security_status> Secondary Notification : URC : The next line is repeated by the no_pages parameter (in case of text format) : +XETWSECWARN : <serial_number>, <mid>, <coding_scheme>
, <current_page>, <no_pages> <cb_data> URC : The next line is repeated by the no_pages parameter (in case of PDU format) :

- XETWSECWARN: <length><CR><LF><pdu>

Command	Possible Response(s)
AT+XETWNTFYSTART= <warning_type>	OK or +CME ERROR: <err>
AT+XETWNTFYSTART?	+XETWNTFYSTART: <warning_type> OK
AT+XETWNTFYSTART=?	+ XETWNTFYSTART: (0-4) OK

7.60.2 Defined values

<warning_type>

This parameter is set when ETWS is used. The warning type value field indicates the following 5 warning types as its values; (see 3GPP TS 23.041)

0: only earthquake

1: only tsunami

2: both earthquake and tsunami

3: test mode will be activated

4: others

<coding_scheme>

This parameter identifies the alphabet or coding employed for the message characters and message handling at the MS/UE and is passed transparently from the CBC to the MS/UE. The CBS Data Coding Scheme indicates the intended handling of the message at the MS, the character set/coding, and the language (when applicable).

Any reserved codings shall be assumed to be the GSM 7 bit default alphabet (the same as codepoint 00001111) by a receiving entity. This parameter is defined in 3GPP TS
23.038

<serial_number>

This parameter is a 16-bit integer which identifies a particular CBS message (which may be one to fifteen pages in length) from the source and type indicated by the Message Identifier and is altered every time the CBS message with a given Message Identifier is changed. The two octets of the Serial Number field are divided into a 2-bit Geographical Scope (GS) indicator, a 10-bit Message Code and a 4-bit Update Number. This parameter is defined in 3GPP TS 23.041

<mid>

The message identifier parameter identifies the source and type of the CBS message. For example,

"Automotive Association"(= source), "Traffic Reports" (= type) could correspond to one value. A number of CBS messages may originate from the same source and/or be of the same type. These will be distinguished by the Serial Number. The Message Identifier is coded in binary. This parameter is defined in 3GPP TS 23.041

<no_pages>

Total number of pages within the message

<current_page>

The current page number being displayed

<cb_data>

The raw data of CBS will be unpacked and displayed in text format, in case the coding scheme is decoded as English language (see 3GPP TS 23.041). If not, the PDU format of the data(each page) is output as below:

+XETWSECWARN: <length><CR><LF><pdu>

<security_status>

This parameter indicates brief ETWS Security Status. The various values that it can take are:

0: Default, no security check done;

1: Security Check passed;

2: No Security parameters have been received;

3: Security Check failed;

This parameter is defined in 3GPP TS 23.041

7.61 Stop ETWS warning notifications +XETWNTFYSTOP

This command is used to stop the different ETWS warning notifications.

- Set command stops the different ETWS warning notifications.
- Test command returns different ETWS warning notifications that

can be stopped. This command will work only if feature

FEAT_ETWS is enabled.

7.61.1 Syntax of the Command

Command syntax: AT+XETWNTFYSTOP= <warning_type>

Command	Possible Response(s)
AT+XETWNTFYSTOP= <warning_type>	OK or +CME ERROR: <err>
AT+XETWNTFYSTOP=?	+XETWNTFYSTOP: ((0-4), 255) OK

7.61.2 Defined values

<warning_type>

This parameter is set when ETWS is used. The warning type value

field indicates the following 5 warning types as its values; (see 3GPP TS 23.041)

0: only earthquake

1: only tsunami

2: both earthquake and tsunami

3: test mode

4: others

255: stops ETWS warning reception for all warning type values

7.62 Configure the UE capabilities +XCAP

This command is used to configure few of the UE capabilities for C-AT.

- Set command is used to enable/disable the different UE capabilities.
- Read command returns the current UE capabilities.
- Test command returns supported values of different capabilities.

7.62.1 Syntax of the Command

Command syntax: AT+XCAP=[<cat_support>]

Command	Possible Response(s)
AT+XCAP=1	OK or CME ERROR: <error>
AT+XCAP?	+XCAP: <cat_support> OK
AT+XCAP=?	+XCAP: (0-1) Note: i.e. list of the supported <cat_support>s OK

7.62.2 Defined values

specifies whether the CAT (customized alerting tones) capability is

enabled or not. This setting is considered for a video call when the R8_SUPPORT flag is defined.

0 disable CAT (customized alerting tones) (default)

1 enable CAT (customized alerting tones)

7.63 Read out unique key of file "trace.dec.zip": +XMAG ETKEY

7.63.1 Description

This command reads out the unique key of the file "trace.dec.zip". It is related to the command AT+XMAGETBLOCK. This command will work only if feature FEAT_INSERT_TR ACE_DEC is enabled.

7.63.2 Syntax of the Command

Command syntax:
AT+XMAGETKEY=<filename>

Command	Possible Response(s)
AT+XMAGETKEY="trace.dec.zip"	+XMAGETKEY:... (->see example) OK or +CME ERROR: <error>
AT+XMAGETKEY=?	+XMAGETKEY: ("<filename>") OK

7.63.3 Defined values

<filename>: "trace.dec.zip"

Examples

AT+XMAGETKEY="trace.dec.zip"

+XMAGETKEY:01001E001C4F37E5679A465743265764389756

OK

01001E001C4F37E5679A465743265764389756

||||||||||||||||||||||||||||||||||||||

VVNNNNLLLLKKKKKKKKKKKKKKKKKKKKKKKKKK

#

V: Version of format (Hex)

N: number of blocks (Hex) = number of blocks to be received with:

[AT+XMAGETBLOCK=0,"trace.dec.zip"]

based on the current blocklength

L: number of coming characters (Hex)

K: key (Hex)

7.64 Read out file "trace.dec.zip": +XMAGETBLOCK

This command reads out the file "trace.dec.zip" in several responses/blocks (in HEX- representation). This will be requested by MobileAnalyser to transfer the trace-decoding- file from MS to MobileAnalyzer. This command will work only if feature FEAT_INSERT_TRACE_DEC is enabled.

7.64.1 Syntax of the Command

Command syntax:
AT+XMAGETBLOCK=[<blocknumber>],["<filename>"][,<blocklength>]

Command	Possible Response(s)
AT+XMAGETBLOCK=5,"trace.dec.zip" AT+XMAGETBLOCK=0,"trace.dec.zip",1000	+XMAGETBLOCK:...(->see example) OK or +CME ERROR: <error>
AT+XMAGETBLOCK?	"<filename>",<blocklength>, <number of blocks with blocklength>, <filelength=number of chars to be transmitted>

AT+XMAGETBLOCK=?	(<range of possible blocknumbers>),("<filename>"),(<range of possible blocklength's>) OK

7.64.2 Defined values

<blocknumber>

one block of the file will be read out. This blocknumber is based on the current blocklength-setting.

If block 0 will be requested not only one block but the whole file in several blocks will be listed automatically.

"<filename>": "trace.dec.zip"

<blocklength>

- number of characters to be transmitted in one response (not including the header- information "+XMAGETBLOCK:VVBBBBLLLL" -> see example)

  The default blocklength after startup is 128.

  After change of blocklength the updated number of blocks can be read out with the read- and test-command.

Examples

/* get (<range of possible blocknumbers>),("<filename>"),(<range of possible blocklength's>)
*/

AT+XMAGETBLOCK =?

+XMAGETBLOCK: (0-

3),("trace.dec.zip"),(1-990) OK

/* get "<filename>",<blocklength>,<number of blocks with blocklength>,<length of
file=number of chars>

*/

AT+X
MAG
ETBL
OCK?

+XMAGETBLOCK: "trace.dec.zip",128,13,1540

OK

/* set

only
blocklengt

h */

AT+XMAG
ETBLOCK
=,,99

OK

/* read block# 14 (based on

blocklength 50) */

AT+XMAGETBLOCK=14,"trace.d
ec.zip",50

OK

/* req. all blocks (with current

blocklength) */

AT+XMAGETBLOCK=0,"trace.
dec.zip"

+XMAGETBLOCK:010001040037E589679A2345C34657432657643...

+XMAGETBLOCK:01000204003779A2345C346574326576437779A...

+XMAGETBLOCK:0100030400679A2345C34657432657644437954...

+XMAGETBLOCK:01000404005C3465743265764379A2995554545...

+XMAGETBLOCK:.....

+XMAGETBLOCK:01001E035F5C3465743265764379

A2995554545... OK

/* req. block# 14 (based on current blocklength) */

AT+XMAGETBLOCK=14,"trace.dec.zip"

+XMAGETBLOCK:01000E0032679A2345C3465743

26576437954... OK

010001003237E589679A2345C34657432657643...

||||||||||||||||||||||||||||||||||||||||

VVBBBBLLLLDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

#

V: version of format (Hex)

B: block-number (Hex)

L: number of coming characters (Hex)

D: data (Hex)

7.65 Report Mobile Termination Error +CMEE

This command disables or enables the use of result code +CME ERROR: <err> as an indication of an error relating to the functionality of the MT.

- Set command disables or enables the use of result code +CME ERROR: <err> as an indication of an error relating to the functionality of the MT.
- Read command returns the status of the result code values, whether enabled or disabled.
- Test command returns values supported as a compound value.

7.65.1 Syntax of the Command

Command syntax: AT+CMEE=[<n>]

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

7.65.2 Defined values

<n>

0 disable +CME ERROR: <err> result code and use ERROR instead (default)

1 enable +CME ERROR: <err> result code and use numeric

<err> values (refer APPENDIX A)

2 enable +CME ERROR: <err> result code and use verbose

<err> values (refer APPENDIX A)

Mobile Termination Error Result Code +CME ERROR

The operation of +CME ERROR: <err> result code is similar to the regular ERROR result code: if +CME ERROR: <err> is the result code for any of the commands in a command line, none of the following commands in the same command line is executed (neither ERROR nor OK result code shall be returned as a result of a completed command line execution). The format of <err> can be either numeric or verbose. This is set with command +CMEE (refer previous subclause). <err> values (numeric format followed by verbose format)

General Errors

Refer APPENDIX-A for general errors.

GPRS-Related Errors
Errors Related to a Failure to Perform an Attach

Numeric Text

103 Illegal MS

106 Illegal ME

107 GPRS services not allowed

111 PLMN Not allowed

112 Location area not allowed

113 Roaming not allowed in this location area

Errors Related to a Failure to Activate a Context

Numeric Text

132 Service option not supported

133 Requested service option not subscribed

134 Service option temporarily out of order

149 PDP authentication failure

Other GPRS Errors

Numeric Text

150 Invalid Mobile Class

148 Unspecified GPRS error

Other values in the range 101-150 are reserved for use by GPRS

7.66 Rx Diversity specific for 3G RAB +XRXDIV3GRAB

This command is used to configure the 3G RAB specific Rx Diversity settings. The rx div settings can be enabled or disabled during the operation. Read back of the settings is also provided. The Rx Diversity settings for the following 3G RABs can be set: DPCH signaling, DPCH CS, DPCH PS, HSDPA signaling, HSDPA CS and HSDPA PS.

- Set Command is used configure the 3G RAB specific Rx Diversity settings during runtime.
- Read Command displays the current 3G RAB specific settings.
- Test command returns the list of supported Rx Diversity values for the different RABs. This command is available only if FEAT_STATIC_RXDIV is defined (build).

7.66.1 Syntax of the Command

Command syntax: AT+XRXDIV3GRAB= <DPCH signaling>,<DPCH CS>,<DPCH PS>,<H SDPA signaling>,<HSDPA CS>,<HSDPA PS>

Command	Possible Response(s)
AT+XRXDIV3GRAB= 2, 2, 1, 2, 2, 1	OK or ERROR
AT+XRXDIV3GRAB?	+XRXDIV3GRAB: <DPCH signaling>,<DPCH CS>,<DPCH PS>,<HSDPA signaling>,<HSDPA CS>,<HSDPA PS> OK

AT+XRXDIV3GRAB=?	+XRXDIV3GRAB: (0-2), (0-2), (0-2), (0-2), (0-2), (0-2) OK

7.66.2 Defined values

<DPCH signaling>

The RxDiversity settings to be used if the current RAB is DPCH Signaling

0 Rx Diversity is disabled (default)

1 Rx Diversity is enabled

2 Dynamic Rx Diversity is enabled, in which case the stack would run an internal algorithm and switch on/off the Rx div based on the need.

<DPCH CS>

the RxDiversity settings to be used if the current RAB is DPCH CS

0 Rx Diversity is disabled (default)

1 Rx Diversity is enabled

2 Dynamic Rx Diversity is enabled

<DPCH PS>

the RxDiversity settings to be used if the current RAB is DPCH PS

0 Rx Diversity is disabled (default)

1 Rx Diversity is enabled

2 Dynamic Rx Diversity is enabled

<HSDPA signaling>

The RxDiversity settings to be used if the current RAB is HSDPA Signaling

0 Rx Diversity is disabled (default)

1 Rx Diversity is enabled

2 Dynamic Rx Diversity is enabled

<HSDPA CS>

the RxDiversity settings to be used if the current RAB is HSDPA CS

0 Rx Diversity is disabled (default)

1 Rx Diversity is enabled

2 Dynamic Rx Diversity is enabled

<HSDPA PS>

the RxDiversity settings to be used if the current RAB is HSDPA PS

0 Rx Diversity is disabled (default)

1 Rx Diversity is enabled

2 Dynamic Rx Diversity is enabled

7.67 Set Phone Functionality +CFUN

This command selects the level of functionality <fun> in the MS. Only some values of<fun> are allowed (see Defined values).

7.67.1 Syntax

Command syntax: AT+CFUN= <fun> [, <rst>]

Command	Possible Response(s)
+CFUN=<fun>[,<rst>]	OK or +CME ERROR: <err>
+CFUN?	+CFUN : <power_mode> ,<STK_mode> +CME ERROR: <err>
+CFUN=?	+CFUN: (list of supported <fun>s), (list of supported <rst>s) OK +CME ERROR: <err>

7.67.2 Defined values

<fun>

is used to select functionality level of ME and its values can be:

0 Minimum Functionality

1 Full functionality (default)

4 Mode to disable phone both transmit and receive RF circuits. Airplane mode.

5 Mode for fast detach

6 Mode to enable SIMTK and Fetching of proactive Commands.

7 Mode to disable SIMTK and enable Fetching of proactive Commands.

8 Mode to disable Fetching of proactive Commands.

15 Mode to perform hidden reset (this will reset MS without resetting SIM).

16 Mode to simulate reset (this will reset MS including SIM).

26 Mode to enable Over the Air subscription. <rst> value must be 1.

31 Mode to Disable Single Stack.

32 Mode to Disable all Stacks.

33 Mode to Enable Single Stack with an option to reset (U)SIM card.

34 Mode to Enable All Stacks with an option to reset (U)SIM cards.

35 Mode to Power-Off/Power-On Single (U)SIM card.

36 Mode to Power-Off/Power-On All (U)SIM cards.

37 Mode to Reset Single Stack.

38 Mode to Reset All Stacks.

<rst>

is reset value and its values can be:

Following values applies only for <fun> values 1 and 4.

0 Do not reset MT before resetting it to <fun> power level. (default)

1 Reset MT before setting it to <fun> power level

Following values applies only for <cfun> values 33 and 34.

0 Sim reset not needed.

1 Sim reset is needed.

Following values applies only for <cfun> values 35 and 36.

0 Sim is switched OFF.

1 Sim is switched ON.

< power_mode >

1 MS is switched on.

2 Invalid Mode.

4 Airplane Mode.

< STK_mode >

0: Inactive state (default).

6: Enable the SIM-toolkit interface and fetching of proactive commands by SIM-APPL
from the SIM-card

7: Disable the SIM-toolkit interface and enables fetching of proactive commands by
SIM-APPL from the SIM-card

8: Disable fetching of proactive commands by SIM-APPL from the SIM-card

Note: The above CFUN command is applicable only if feature FEAT_BOOT_AND_MODE_ MANAGER is enabled. Otherwise refer to [Ref 1].

7.68 Change system mode to deep sleep +XFDSLEEP

This command changes the system mode to forced deep sleep.

7.68.1 Syntax

Command syntax: AT+XFDSLEEP

Command	Possible Response(s)
+XFDSLEEP	OK or +CME ERROR: <err>
+XFDSLEEP=?	OK

7.68.2 Defined values

This is an action command. No input parameters are expected.

Note: This command is available only if feature FEAT_BOOT_AND_MODE_MANAGER is enabled.

7.69 Device diagnostic metrics +XMETRIC

This command is used to configure the URC for a specific device diagnostic metric.

- Set command enables/disables the URC for a specific device diagnostic metric.
- Test command returns values supported for the diagnostic metric URC configuration.

This command will work only if feature FEAT_CIQ_METRICS or FEAT_ENG_MODE_METR ICS is enabled.

7.69.1 syntax of the command

Command syntax : AT+XMETRIC = <mode>,<metricId>,<groupId>

FEAT_CIQ_METRICS define enables below 2 metrics

Network Information Metric URC for GERAN and UTRAN:

+XMETRIC :<metricId>,<groupId>,<fieldValidity>,<RAC>,<accessTech>,<freqBand>,
<MCC>,<MNC>,<LAC>,<cellId>, <RNCId>

Serving Cell Information URC for UTRAN :

+XMETRIC :<metricId>,<groupId>,<Uarfcn>,<ScellScramblingCode>,<ScellRssi>,<Scell
EcNo>,<ScellRscp>, <TxPower>

FEAT_ENG_MODE_METRICS define enables

below 6 metrics E-UTRA RRC ASN.1-encode-

message URC :

+XMETRIC :<metricId>,<groupId>,[<TimeStamp>],[<RRCMsgClass>],<TotalFragments>
, <CurrentFragment>,<RRCMsg>

Note : As Max size of E-UTRA RRC is not defined in 3GPP, and due to a limitaion in the transfer size between AP and CP, a single E-UTRA RRC message can be fragmented and sent in multiple URC's. Here <TotalFragments> indicates the number of fragments expected for single E-UTRA RRC message.

Scan_Cells & Measurements URC for LTE :

+XMETRIC :<metricId>,<groupId>,<noOfCells>,<CurrentCell>,<MCC>,<MNC>,<CI>,<
TAC>,<PHYCI>,<EARFCN>,[<DLBW>],[<ULBW>],<OperBand>,<DUPLEXMode>,<RSRP>
,<RSRQ>

Serving Cell Information URC for LTE :

+XMETRIC :<metricId>,<groupId>,<MCC>,<MNC>,<CI>,<TAC>,<PHYCI>,<ServCellCamp
Status>,<ERRCState>,<EARFCN>,[<DLBW>],[<ULBW>],<OperBand>,<DuplexMode>,<
AntennaMode>,[<RSRP_0>],[<RSRQ_0>],[<RSSNR_0>],[<RSRP_1>],[<RSRQ_1>],[<R
SSNR_1>],[<RSRP_2>],[<RSRQ_2>],[<RSSNR_2>],[<RSRP_3>],[<RSRQ_3>],[<RSSN
R_3>][,<Cid1>,<ApnAmbr_DL>,<ApnAmbr_UL>,<ApnAmbr_DL_ext>,<ApnAmbr_UL_ext>
,<ApnAmbr_DL_ext2>,<ApnAmbr_UL_ext2>[,<Cid2>,<ApnAmbr_DL>,<ApnAmbr_UL>,
<ApnAmbr_DL_ext>,<ApnAmbr_UL_ext>,<ApnAmbr_DL_ext2>,<ApnAmbr_UL_ext2>[,
<Cid3>,<ApnAmbr_DL>,<ApnAmbr_UL>,<ApnAmbr_DL_ext>,<ApnAmbr_UL_ext>,<Apn
Ambr_DL_ext2>,<ApnAmbr_UL_ext2>[,<Cid4>,<ApnAmbr_DL>,<ApnAmbr_UL>,<ApnAmbr
_DL_ext>,<ApnAmbr_UL_ext>,<ApnAmbr_DL_ext2>,<ApnAmbr_UL_ext2>[,
<Cid5>,<Apn
Ambr_DL>,<ucApnAmbr_UL>,<ApnAmbr_DL_ext>,<ApnAmbr_UL_ext>,<ApnAmbr_DL_
ext2>,<ApnAmbr_UL_ext2>[,<Cid6>,<ApnAmbr_DL>,<ApnAmbr_UL>,<ApnAmbr_DL_ext>
,<ApnAmbr_UL_ext>,<ApnAmbr_DL_ext2>,<ApnAmbr_UL_ext2>[,<Cid7>,<ApnAmbr_
DL>,<ApnAmbr_UL>,<ApnAmbr_DL_ext>,<ApnAmbr_UL_ext>,<ApnAmbr_DL_ext2>,<
ApnAmbr_UL_ext2>[,<Cid8>,<ApnAmbr_DL>,<ApnAmbr_UL>,<ApnAmbr_DL_ext>,<Apn
Ambr_UL_ext>,<ApnAmbr_DL_ext2>,<ApnAmbr_UL_ext2>[,<Cid9>,<ApnAmbr_DL>,<
ApnAmbr_UL>,<ApnAmbr_DL_ext>,<ApnAmbr_UL_ext>,<ApnAmbr_DL_ext2>,<ApnAmbr
_UL_ext2>[,<Cid10>,<ApnAmbr_DL>,<ApnAmbr_UL>,<ApnAmbr_DL_ext>,<ApnAmbr_
UL_ext>,<ApnAmbr_DL_ext2>,<ApnAmbr_UL_ext2>[,<Cid11>,<ApnAmbr_DL>,<ApnAmbr

_UL>,<ApnAmbr_DL_ext>,<ApnAmbr_UL_ext>,<ApnAmbr_DL_ext2>,<ApnAmbr_UL_ext2>

]]]]]]]]]]

Neighbour Cell(s) Measurements URC for LTE :

+XMETRIC :<metricId>,<groupId>,<noOfCells>,<CurrentCell>,<EARFCN>,<PHYCI>,<

RSRP>,<RSRQ>,<OperBand>,<DuplexMode>

Cell Uplink Channel Information providing PUSCH Tx Power Information URC :

+XMETRIC :<metricId>,<groupId>,<TotalPUSCHTxPower>

In-Device Coexistence E-UTRA Serving Cell Info URC :

+XMETRIC :<metricId>,<groupId>,<OperBand>,[<MCC>],[<MNC>],[<CI>],[<TAC>],

<PHYCI>,<DL_FREQ>,<DLBW>,[<UL_FREQ>],[<ULBW>],[<TDD_DLULConfig>],[<TDD

_SubFrameConfig>]

Uplink HARQ and MCS (Modulation and Coding scheme) statistic information URC for

LTE:

+XMETRIC:<metricId>,<groupId>,<noOfMCS>,<currentMCS>,<mcs_count>,<acks_count>

,<discard_count>,<nacks_count>,<bytes_count>

Downlink HARQ and MCS (Modulation and Coding scheme) statistic information URC for

LTE:

+XMETRIC:<metricId>,<groupId>,<noOfMCS>,<currentMCS>,<mcs_count>,<crc_error

_count>,<bytes_count>

Command	Possible responses
AT+ XMETRIC = 1, 7, 0	OK or +CME ERROR: <err>
AT+XMETRIC =?	[+XMETRIC: (list of supported modes),(list of supported <metricId>s for a particular group),<groupId>][....] OK Example: +XMETRIC: (0,1),(7,22),0 +XMETRIC: (0,1),(0,1,2,3,4,6,7,8),2 OK

7.69.2 Defined values

<mode>

0: Disables the URC for a specific diagnostic metric

1: Enables the URC for a specific diagnostic metric

<metricId>

The metric ID of a specific diagnostic metric. The following are supported under a specific
<groupId> as of now.

DEVICE_DIAGNOSTIC_METRI

C_GROUP_ID :

7: Metric ID for Network Information

22: Metric ID for Serving Cell information

DEVICE_DIAGNOSTIC_METRIC_EM_LTE_GROUP_ID :

0 : Metric ID for Scan_Cells & Measurements

1 : Metric ID for Serving Cell Information

2 : Metric ID for Neighbor Cells Measurements

3 : Metric ID for Total Tx power for PUSCH(dBm)

4 : Metric ID for E-UTRA RRC ASN.1-encode-message

6 : Metric ID for In-Device Coexistence LTE Serving Cell Metric

7 : Metric ID for Uplink HARQ and MCS (Modulation and Coding scheme)

8 : Metric ID for Downlink HARQ and MCS (Modulation and Coding scheme)

<groupId>

The group to which the device diagnostic metrics belong to.

0 DEVICE_DIAGNOSTIC_METRIC_GROUP_ID

2

DEVICE_DIAGNOSTIC_METRIC_EM_LT

E_GROUP_ID Network information

parameters :

<fieldvalidity> :

This field provides information

regarding the validity of some of the other fields within this metric, plus an indication of roaming.

0 bit (LSB): MCC is valid (=1), MCC is invalid (=0)

1 bit: MNC is valid (=1), MNC is invalid (=0)

2 bit: LAC is valid (=1), LAC is invalid (=0)

3 bit: CellID is valid (=1), CellID is invalid (=0)

4 bit: RAC is valid (=1), RAC is invalid (=0)

5 bit: RNC ID is valid (=1), RNC ID is invalid (=0)

6 bit: Reserved. Shall be set to 0

7 bit (MSB): Home network (=0), Foreign network (=1) (An indication of whether the UE has selected a home or foreign PLMN)

<RAC> :

The Routing Area Code is a fixed length code (of 1 octets) identifying a routing area within a location area.

<accessTech>:

The radio access network (GERAN or UTRAN) which the device is currently using or camped on. Shall be set to IQ_ACCESS_TECH_NONE when not camped on any cell.

ACCESS_TECH_UNKNOWN = 0 Serving RAN type is unknown. This value may be used when a device just started searching for a cell while coming out from "power off" state or when entering "flight mode" state.

ACCESS_TECH_GERAN = 1 Serving RAN is GERAN. ACCESS_TECH_UTRAN = 2 Serving RAN is UTRAN. ACCESS_TECH_NONE = 255 There is no serving RAN. This value may be used when a device is performing cell selection and cannot find a cell.

<freqBand> :

The frequency band that the cell uses

These bands are derived from 3GPP TS 45.005 section 2. Frequency bands and channel arrangement and 3GPP TS 25.101 section 5.4 Frequency bands.

BAND_INFO_T_GSM_380 TETRA-GSM 380 Band BAND_INFO_T_GSM_410 TETRA-GSM 410 Band
BAND_INFO_GSM_450 GSM 450 Band
BAND_INFO_GSM_480 GSM 480 Band
BAND_INFO_GSM_710 GSM 710 Band
BAND_INFO_GSM_750 GSM 750 Band
BAND_INFO_T_GSM_810 TETRA-GSM 810
BAND_INFO_GSM_850 GSM 850
BAND_INFO_P_GSM_900 Primary GSM 900 Band
BAND_INFO_E_GSM_900 Extended GSM 900 (inc. Primary GSM 900) Band
BAND_INFO_R_GSM_900 Railways GSM 900 (inc. Primary GSM 900 & Extended GSM 900)

BAND_INFO_T_GSM_900 TETRA-GSM 900
BAND_INFO_DCS_1800 DCS 1800
BAND_INFO_PCS_1900 PCS 1900
BAND_INFO_UTRA_FDD_I UTRA FDD Operating Band I

BAND_INFO_UTRA_FDD_II UTRA FDD

Operating Band II

BAND_INFO_UTRA_FDD_III UTRA FDD

Operating Band III

BAND_INFO_UTRA_FDD_IV UTRA FDD

Operating Band IV

BAND_INFO_UTRA_FDD_V UTRA FDD

Operating Band V

BAND_INFO_UTRA_FDD_VI UTRA FDD

Operating Band VI

BAND_INFO_UTRA_FDD_VII UTRA

FDD Operating Band VII

BAND_INFO_UTRA_FDD_VIII UTRA

FDD Operating Band VIII

BAND_INFO_UTRA_FDD_IX UTRA FDD

Operating Band IX

BAND_INFO_UTRA_FDD_X UTRA FDD

Operating Band X

BAND_INFO_UTRA_FDD_XI UTRA FDD

Operating Band XI

BAND_INFO_NOT_AVAILABLE = 255

The operating frequency band is

unknown or not available

<MCC>:

The Mobile Country Code. The MCC is a three-digit number.

<MNC>:

The Mobile Network Code. The MNC is a two or three digit number.

<LAC> :

The Location Area Code is a fixed length code (of 2 octets) identifying a

group of base stations (BTS/Node Bs) within a PLMN.

<cellId>:

When ucAccessTech is ACCESS_TECH_UTRAN: The 16-bit cell identity as described in
3GPP TS 25.401/6.1.5

<RNCId>:

The 12-bit RNC identifier as described in 3GPP TS 25.401/6.1.3 and 6.1.5 or, equivalently, the most-significant 12 bits of the 28-bit UTRAN cell identity as described in 3GPP TS
25.331. Shall be set to 65535 when ucAccessTech is not equal to ACCESS_TECH_UTRAN.

Serving Cell Information parameters: The UMTA/HSPA RF Info metric contains a standard set of RF information for WCDMA (UMTS FDD).

<Uarfcn>:

The UTRA Absolute Radio Frequency Channel Number [UARFCN] identifies the radio channel of the active base station. Ref. 3GPP TS 25.101

<ScellScramblingCode>:

The scrambling code of the Primary CPICH.

<ScellRssi> :

UTRA Carrier Received Signal Strength Indication (RSSI) is the wide-band received power (including thermal noise and noise generated within the receiver) within the relevant channel bandwidth. This field shall be encoded per 3GPP TS 25.133/9.1.3. Range: 0 to
76 - Shall be set to 255 if not available.

<ScellEcNo>

CPICH Ec/No or Ec/Io is the received energy per chip of the pilot channel (CPICH) divided by the power density in the band. This parameter is generally used to estimate the interference from other cells. This field shall be encoded per 3GPP TS 25.133/9.1.2. Range: 0 to 49

<ScellRscp> :

Received Signal Code Power, the received power on one code measured on the Primary
CPICH. This field shall be encoded per 3GPP TS 25.113/9.1.1. Range: -5 to 91

<TxPower> :

The total UE transmitted power on one carrier. This field shall be encoded per 3GPP TS
25.133/9.1.6. Range: 21 to 104 or 255 - Shall be set to 255 if not applicable or not available.

<RRCMsg> :

this is a string parameter in hexadecimal format containing the E-UTRA RRC message encoded in ASN.1.

<TotalFragments> :

Is the total number of fragments for one such E-UTRA RRC message.

<CurrentFragment> :

Is the current fragment number in the RRC message.

<TimeStamp> :

is the time that this event was produced in milli seconds since UE bootup.

<RRCMsgClass> :

is the E-UTRA RRC message class type as defined in 3GPP 36.331, , section 6.2.1. Valid range 0..6

0 BCCH-BCH messages

1 BCCH-DL-SCH messages

2 PCCH messages

3 DL-CCCH messages

4 DL-DCCH messages

5 UL-CCCH messages

6 UL-DCCH messages

<noOfCells>

Is the Number of Cells being Reported

<CurrentCell>

Current cell for which the URC is generated

<CI>

Is the cell identity of the LTE cell, valid range: 0.... 0x0FFFFFFF. (Ref: 3GPP TS 36.331,
6.3.4, CellIdentity IE)

<TAC>

Is the tracking area code of the LTE cell within the scope of a PLMN, valid range: 0...
0xFFFF. (Ref: 3GPP TS 36.331, 6.3.4, TrackingAreaCode IE)

<PHYCI>

Is the physical cell ID of the LTE cell, valid range : 0 .. 503 (Ref: 3GPP TS 36.331, 6.3.4, PhysCellId IE)

<EARFCN>

Is the carrier frequency of the LTE cell designated by the EUTRA Absolute Radio Frequency
Channel Number (EARFCN), valid range: 0...0xFFFF. (Ref: 3GPP TS 36.101, 5.7.3)

<DLBW>

Is the Downlink bandwidth configuration of the LTE cell. valid range: 0..5. (Ref: 3GPP TS 36.331, dl-Bandwidth in MasterInformationBlock)

<ULBW>

Is the Uplink bandwidth configuration of the LTE cell. valid range: 0..5. (Ref: 3GPP TS
36.331, ul-Bandwidth in SystemInformationBlockType2)

<OperBand>

Is the operating band of the LTE cell. valid range: 1..64. (Ref: 3GPP TS 36.331, freqBandIndicator in SystemInformationBlockType1), for supported bands referring to
3GPP TS 36.101 Table 5.5-1 (Rel. 9)

<DUPLEXMode>

Is the duplexing mode of the measured cell, 0:FDD , 1:TDD

<RSRP>

Is the average RSRP of the LTE cell over last measurement period, only neighbor cell with valid measurement to be included, valid range: 1..97. (Ref: 3GPP TS 36.331, 6.3.5, RSRP-Range IE)

<RSRQ>

Is the average RSRQ of the LTE cell over last measurement period, only neighbor cell with valid measurement to be included, valid range: 0..34. (Ref: 3GPP TS 36.331, 6.3.5, RSRQ-Range IE)

<ServCellCampStatus>

Is the camping status of the LTE serving cel. valid range: 0..1.

0 not camped

1 camped on a cell

<ERRCState>

Is the E-UTRA RRC states of the LTE serving cell. valid range: 0 ..2. (Ref: 3GPP TS
36.331, 4.2.1)

0 ERRC_NULL (prior entering in ERRC_IDLE state)

1 ERRC_IDLE

2 ERRC_CONNECTED

<AntennaMode>

Is

0 - Antenna Mode SIMO for serving cell.

1 - Antenna Mode MIMO for serving cell.

2 - Antenna Mode tx diversity for serving cell

255 - Antenna Mode UNAVAILABLE when there is no DL traffic or in Idle state for serving cell.

<RSRP_0>,<RSRP_1>,<RSRP_2>,<RSRP_3>

Is the average RSRP of the LTE serving cell over last measurement period, valid range:
1..97. (Ref: 3GPP TS 36.331, 6.3.5, RSRP-Range IE). The index (0...3) correponds to each Antenna port as below

0 : TX antenna 0 as seen by RX antenna 0

1 : TX antenna 1 as seen by RX antenna 0

2 : TX antenna 0 as seen by RX antenna 1

3 : TX antenna 1 as seen by RX antenna 1

<RSRQ_0>,<RSRQ_1>,<RSRQ_2>,<RSRQ_3>

Is the average RSRQ of the LTE serving cell over last measurement period, valid range:
0..34. (Ref: 3GPP TS 36.331, 6.3.5, RSRQ-Range IE). The index (0...3) correponds to each Antenna port as below

0 : TX antenna 0 as seen by RX antenna 0

1 : TX antenna 1 as seen by RX antenna 0

2 : TX antenna 0 as seen by RX antenna 1

3 : TX antenna 1 as seen by RX antenna 1

<RSSNR_0>,<RSSNR_1>,<RSSNR_2>,<RSSNR_3>

Is the average RSSNR of the LTE serving cell over last measurement period. The index
(0...3) correponds to each Antenna port as below

0 : TX antenna 0 as seen by RX antenna 0

1 : TX antenna 1 as seen by RX antenna 0

2 : TX antenna 0 as seen by RX antenna 1

3 : TX antenna 1 as seen by RX antenna 1

<Cid1> ... <Cid11>

Is the context ID. For each Context ID<Cid>, the following APN Aggregate Maximum Bit
Rate(APN-AMBR) (as defined in TS 24.301 section 9.9.4.2) will be reported

<ApnAmbr_DL>

Is the APN-AMBR for downlink

<ApnAmbr_UL>

Is the APN-AMBR for uplink

<ApnAmbr_DL_ext>

Is the APN-AMBR for downlink (extended)

<ApnAmbr_UL_ext>

Is the APN-AMBR for uplink (extended)

<ApnAmbr_DL_ext2>

Is the APN-AMBR for downlink (extended-2)

<ApnAmbr_UL_ext2>

Is the APN-AMBR for uplink (extended-2)

< TotalPUSCHTxPower>

Is a numeric parameter. This is the total UE transmit power for PUSCH transmission (measured in dBm) averaged over 480 subframes during the reporting period.(Ref: 3GPP TS 36.213, 5.1.1) Valid range: -23..50

<DL_FREQ>

Is the DownLink carrier frequency of the cell designated by the EUTRA Absolute Radio Frequency Channel Number (EARFCN), valid range: 0... 0xFFFF. (Ref: 3GPP TS 36.101, 5.7.3)

<UL_FREQ>

Is the Uplink carrier frequency of the cell designated by the EUTRA Absolute Radio
Frequency Channel Number (EARFCN), valid range: 0 ... 0xFFFF. (Ref: 3GPP TS 36.101,
5.7.3)

<TDD_DLULConfig>

Is the Cell Downlink and Uplink Configuration operating in TDD mode

<TDD_SubFrameConfig>

Is the Special subframe configuration where 0 indicates Configuration 0,
1 to Configura- tion 1 etc. as specified in TS 36.211

<noOfMCS>

Is the number of MCS's being reported

<currentMCS>

Is the current MCS being reported.

<mcs_count>

Is the Count how many times this MCS was used by the UE for

transmission/reception of UL/DL TBs within the period

<acks_count>

Is the number of times ACKs received for TBs transmitted with MCS within the period

<discard_count>

Is the number of times HARQ retransmissions reach max on certain HARQ process while last TB sent was using this MCS.

<nacks_count>

Is the number of times NACKs received for TBs transmitted with MCS within the period.

<bytes_count>

Is the Sum of bytes that were transmitted/Received using this MCS within the period.

<crc_error_count>

Is the Counting CRC errors for TB received with MCS within the period.

7.70 Configure thermal sensors with the threshold break point +XTSM

This command is used to configure thermal sensors with the threshold break point.

- Set command enables and disables the alarm for particular sensor.
- Test command returns the possible values of temperature sensor monitoring option, alarm id range for trip point, hysteresis and sampling period.

  URC will be displayed if the threshold is reached and it gets enabled if user has set any alarm.

7.70.1 Syntax of the command

Command syntax:AT+XTSM=<temp_sensor_id>[,<AlarmID>,[<TripPointNumber>,<Hysteresis>
], [<sampling_period>]]

command	Possible response(s)
AT+XTSM = <temp_sensor_id> [,<AlarmID>,[<Trip PointNumber>, <Hysteresis>],[<sampling_period>]]	ok or ERROR
AT+XTSM =?	+ XTSM: (list of supported < temp_sensor_id >s), (list of supported < AlarmId >s) (list of supported <TripPointNumber>s) (list of supported < Hysteresis >s) (list of supported < Sampling period >s) Ok

7.70.2 Defined values

<Temp_sensor_id>

0 Currently only RF sensor is supported

<AlarmID>

Alarm id value, ranging from 1 to 10

<TripPointNumber>

valid range is -20000 to 99000 in MilliDegC (actual setting) (Which is -20 degC to
99degC)

But due to limitation in accepting negative value, user has to enter an adjusted positive value which is in the range of (Minimum value 0 and maximum value 119000 in MilliDeg C) Which is (actual value + 20000MilliDegC)

Examples:

If user wants to give -20degC. He should pass it as (-20000+20000) which is 0 millidegC
in <TripPointNumber>
If user wants to give -15degC. He should pass it as (-15000+20000) which is 5000 millidegC in <TripPointNumber>

If user wants to give +15degC. He should pass it as (+15000+20000) which is 35000 millidegC in <TripPointNumber>

If user wants to give +99degC. He should pass it as (+99000+20000)

which is 119000 millidegC in <TripPointNumber>

<Hysteresis>

Minimum value 100, maximum value 99000 in MiliDegC

<Sampling period>

polling interval in millisecond, Minimum value 1000

7.70.3 Unsolicited Response Command

+XTS: <temp_sensor_id>, <AlarmId>, <OnOff>, <Temp>

<OnOff>

1 when temperature is rising

and it crosses trip point

temperature

0 when it goes below (trip point temperature minus hysteresis)

<temp>

current temperature value in MiliDegC

7.71 Real time temperature measurement +XTAMR:

This AT command supports real time temperature measurement.

- Set command triggers temperature measurement for a specific sensor and returns the same when the measurement is completed.
- Read command is not supported.
- Test command returns the list of supported sensor IDs.

7.71.1 Syntax of the command

Command syntax: AT+XTAMR=<temp_sensor_id>

command	possible response(s)

AT+XTAMR=<temp_sensor_id>	+XTAMR: <temp_sensor_id>, <temp> OK or CME ERROR:<err>
AT+XTAMR?	CME ERROR:<err>
AT+XTAMR=?	+XTAMR: (list of supported <temp_sensor_id>'s) OK

7.71.2 Defined values

<temp_sensor_id>

0 Currently only RF sensor is supported

<temp>

Measured temperature, value in MilliDegC

7.72 Limit the Max Tx power +XLMTXPWR

This command is used to enable, disable and limit the Maximum Tx power by setting the appropriate Tx power values per band as per the respective 3GPP spec.

7.72.1 Syntax of the Command

Command	Possible Response(s)
AT+XLMTXPWR=[<mode>[,<band_1>,<modulation_type_1>,<tx_slot_no_1>,<cust_tx_pwr_1>[,... <band_n>,<modulation_type_n>,<tx_slot_no_n>, <cust_tx_pwr_n>]]]]] To limit 3G and 4G Tx pwr: AT+XLMTXPWR=[<mode>[,<band_1>,<cust_tx_pwr_1>[,... [,<band_n>,<cust_tx_pwr_n>]]]]]	OK or +CME ERROR: <error>

7.72.2 Defined values

<mode>

0 Disable all Tx power (Default)

1 Disable 2G Tx power limit only

2 Enable 2G Tx power limit only

3 Disable 3G Tx power limit only

4 Enable 3G Tx power limit only

5 Disable 4G Tx power limit only

6 Enable 4G Tx power limit only

<band_1>...<band_n>

For 2G: applicable bands are only 850, 900, 1800, 1900

For 3G: band numbers are defined by 3GPP specification 25.101,

chapter 5 (R9) For 4G: band numbers are defined by 3GPP

specification 36.101, chapter 5 (R9)

<modulation_type_1> to <modulation_type_n>

0 GMSK

1 8PSK

<cust_tx_pwr_1> to <cust_tx_pwr_n>

For 2G: values from 0...255 are allowed. The unit is dB/16. I.e. maximum possible reduction is 15.9375Db

For 3G: value varies from -800...384 corresponding to -50...24 dBm

For 4G: Allowed values are -640...416 corresponding to -40...26 dBm Note :
1) For 2G : <band_x>,<modulation_type_x>,<tx_slot_no_x>,<cust_tx_pwr_x> are op- tional parameter. However, if entered, all 4 would be mandatory

2) For 3G/4G : <band_x>,<cust_tx_pwr_x> are optional parameter. However, if entered, both would be mandatory

3) Default values will be used for not specified parameters

4) Default values for 2G are :

{{{80,104,128,152,112,112},{80,104,128,152,112,112}},

{{32,56,80,104,112,112},{32,56,80,104,112,112}},

{{32,72,96,112,96,96},{32,72,96,112,96,96}},

{{96,136,160,176,112,112},{96,136,160,176,112,112}}};

5) Default values for 3G/4G are : 0x7FFF

7.73 IDC APP info +XNRTAPP

Coexisting LTE and CWS (WLAN and BT) are likely to generate harmonics and spur issues in several bands, contiguous or not. The In-Device-Coexisting feature will allow simultaneous operation of LTE and CWS, while minimizing performance degradation on both sides.

This command is used to provide the application related service period and service duration about CWS and LTE applications.

- Set command configures the values
- Read command returns the configured values
- Test command returns the supported range.

7.73.1 Syntax of the Command

Command syntax: AT+XNRTAPP= [<period>][,<duration>]

Command	Possible Response(s)
AT+XNRTAPP=[< period >][,< duration>]	OK or +CME ERROR: <err>
AT+XNRTAPP?	+XNRTAPP: <period>,< duration > OK
AT+XNRTAPP=?	+XNRTAPP: (supported range for <period>), (supported range for <duration>) OK

7.73.2 Defined values

<period>

is the required application service period in ms. Supported range is 0-65535 ms

<duration>

is the required application service duration in ms. Supported range is 0-65535 ms

Note1: In read command value of -1 represents an invalid or unavailable value for any of the parameters.

Note2: This command will be available only if feature FEAT_IN_DEVICE_COEXISTENCE is defined in the build config.

7.74 IDC CWS info +xnrtcws

Coexisting LTE and CWS (WLAN and BT) are likely to generate harmonics and spur issues in several bands, contiguous or not. The In-Device-Coexisting feature will allow simultaneous operation of LTE and CWS, while minimizing performance degradation on both sides.

This command is used for CWS (Connectivity Wireless System) active and inactive information.

- Set command configures the values
- Read command returns the configured values
- Test command returns the supported range.

7.74.1 Syntax of the Command

Command syntax:
AT+XNRTCWS=<mode>[,[<wlan_active>[,<wlan_safe_rx>[,<wlan_

bandwidth>[,<bt_active>[,<bt_safe_rx>]]]]]]

URC Syntax: +XNRTCWSI:
<lte_active>,<wlan_safe_rx_min>,<wlan_safe_rx_max>,

<bt_safe_rx_min>,<bt_safe_rx_max>,<lte_sps_periodicity>,<lte_sps_duration>,<lte_sps

_initial_offset>

Command	Possible Response(s)
AT+XNRTCWS=<mode>[,[<wlan_active>[,<wlan_safe_rx>[,<wlan_bandwidth>[,<bt_active>[,<bt_safe_rx>]]]]]]	OK or +CME ERROR: <err>
AT+XNRTCWS?	+XNRTCWS = <mode>,<wlan_active>,<wlan_safe_rx>,<wlan_bandwidth>,<bt_active>,<bt_safe_rx> OK
AT+XNRTCWS=?	+XNRTCWS: (list of supported <mode>s), (list of supported <wlan_active>s), (list of supported <wlan_safe_rx>s), (list of supported <wlan_bandwidth>s), (list of supported <bt_active>s), (list of supported <bt_safe_rx>s) OK

7.74.2 Defined values

<mode>

0 disable the +XNRTCWS URC

1 enable the +XNRTCWS URC

2 set command and the other parameters will be sent to below layers

Note: if <mode> is either 0 or 1, then all other parameters should not be given

<wlan_active>

is WLAN is active or inactive

0 WLAN is inactive

1 WLAN is active

<wlan_safe_rx>

is WLAN stays within safe frequency range.

0 WLAN is not in safe frequency range

1 WLAN is in safe frequency range

<wlan_bandwidth>

is the WLAN bandwidth

0 WLAN bandwidth is 20MHz

1 WLAN bandwidth is 40MHz

2 WLAN bandwidth is 80MHz

<bt_active >

BT is active or inactive

0 BT is inactive

1 BT is active

<bt_safe_rx >

is BT stays within safe frequency range.

0 BT is not in safe frequency range

1 BT is in safe frequency range

<lte_active>

is indication to CWS that LTE is active/inactive

0 inactive

1 active

<wlan_safe_rx_min>

is the lower limit of freq range where WLAN can receive during LTE Tx [in MHz]. Supported range is 2400 to 2500.

<wlan_safe_rx_max>

is the upper limit of freq range where WLAN can receive during LTE Tx [in MHz]. Supported range is 2400 to 2500.

<bt_safe_rx_min>

is the lower limit of freq range where BT can receive during LTE Tx [in MHz]. Supported range is 2400 to 2500.

<bt_safe_rx_max>

is the upper limit of freq range where BT can receive during LTE Tx [in MHz]. Supported range is 2400 to 2500.

<lte_sps_periodicity>

is the SPS(Semi-Persistent Scheduling) periodicity. Range is 0 to 2047.

<lte_sps_duration>

is the SPS event duration. Range is 0 to 511.

<lte_sps_initial_offset>

is the SPS initial offset. Range is 0 to 15.

Note1: In read command or URC, value of -1 represents an invalid or unavailable value for any of the parameters.

Note2: This command will be available only if feature FEAT_IN_DEVICE_COEXISTENCE is defined in the build config.

8 SMS Commands

8.1 Parameter Definitions

The following parameters are used in the subsequent clauses which describe all commands. The formats of integer and string types referenced here are defined in V.25ter. The default values are for command parameters, not for result code parameters.

8.1.1 Message Storage Parameters

<index>

integer type; value in the range of location numbers supported by the associated memory

<mem1>

string type; memory from which messages are read and deleted (commands List Messages +CMGL, Read Message +CMGR and Delete Message +CMGD); defined values (others are manufacturer specific):

"BM" broadcast message storage

"ME" ME message storage

"MT" any of the storages associated with ME "SM" (U)SIM message storage
"TA" TA message storage

"SR" status report storage

<mem2>

string type; memory to which writing and sending operations are made (commands
Send Message from Storage +CMSS and Write Message to Memory +CMGW)); refer
<mem1> for defined values

<mem3>

string type; memory to which received SMs are preferred to be stored (unless forwarded directly to TE; refer command New Message Indications +CNMI); refer <mem1> for defined values; received CBMs are always stored in "BM" (or some

manufacturer specific storage) unless directly forwarded to TE; received status reports are always stored in "SR" (or some manufacturer specific storage) unless directly forwarded to TE .

<stat>

integer type in PDU mode (default 0), or string type in text mode (default "REC UNREA D"); 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)

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<total1> integer type; total number of message locations in <mem1>

<total2> integer type; total number of message locations in <mem2>

<total3> integer type; total number of message locations in <mem3>

<used1> integer type; number of messages currently in <mem1>

<used2> integer type; number of messages currently in <mem2>

<used3> integer type; number of messages currently in <mem3>

8.1.2 Message Data Parameters

<ackpdu>

3GPP TS 23.040 [3] RP-User-Data element of RP-ACK PDU; format is same as for <pdu> in case of SMS, but without 3GPP TS 24.011 [6] SC address field and parameter shall be bounded by double quote characters like a normal string type parameter

<alpha>

string type alphanumeric representation of <da> or <oa> corresponding to the entry found in MT phonebook; 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])

<cdata>

3GPP TS 23.040 [3] TP-Command-Data in text mode responses; 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))

<ct>

3GPP TS 23.040 [3] TP-Command-Type in integer format (default 0)

<da>

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>

<data>

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 II (GSM 7 bit default alphabet 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 ETSI 3GPP TS 27.005 version 6.0.1 Release 6 34 ETSI TS 127 005 V6.0.1 (2005-01)

- 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 <dcs> depending on the command or result code: 3GPP TS 23.038 [2] SMS Data Coding Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format

3GPP TS 23.040 [3] TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss-
/+zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08" <fo> depending on the command or result code: first octet of
3GPP TS 23.040 [3] SMS-DELIVER, SMSSUBMIT (default 17), SMS-STATUS-REPORT, or
SMS-COMMAND (default 2) in
integer format

<length>

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)

<mid>
3GPP TS 23.041 [4] CBM Message Identifier in
integer format

<mn>
3GPP TS 23.040 [3] TP-Message-Number in
integer format

<mr>
3GPP TS 23.040 [3] TP-Message-Reference in
integer format

<oa>

3GPP TS 23.040 [3] TP-Originating-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 TS 07.07); type of address given by <tooa>

<page>
3GPP TS 23.041 [4] CBM Page Parameter bits 4-7 in integer format

<pages>

3GPP TS 23.041 [4] CBM Page Parameter bits 0-3 in integer format

<pdu>

In the case of SMS: 3GPP TS 24.011 [6] SC address followed by 3GPP TS 23.040 [3] TPDU in hexadecimal format: ME/TA converts each octet of TP data unit 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] TPDU in hexadecimal format

<pid>

3GPP TS 23.040 [3] TP-Protocol-Identifier in integer format (default 0)

<ra>

3GPP TS 23.040 [3] TP-Recipient-Address Address-Value field in string format; BCD numbers (or GSM C 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 <tora>

<sca>
3GPP TS 24.011 [6] RP SC 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 <tosca>

<scts> 3GPP TS 23.040 [3] TP-Service-Centre-Time-Stamp in time-string format (refer)

<sn> 3GPP TS 23.041 [4] CBM Serial Number in integer format

<st> 3GPP TS 23.040 [3] TP-Status in integer format

<toda> 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)

<tooa> 3GPP TS 24.011 [6] TP-Originating-Address Type-of-Address octet in integer format (default refer <toda>)

<tora> 3GPP TS 24.011 [6] TP-Recipient-Address Type-of-Address octet in integer format (default refer <toda>)

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<tosca> 3GPP TS 24.011 [6] RP SC address Type-of-Address octet in integer format
(default refer <toda>)

<vp> depending on SMS-SUBMIT <fo> setting: 3GPP TS 23.040 [3] TP-Validity-Period either in integer format (default 167) or in time-string format (refer)

<vp> depending on SMS-SUBMIT <fo> setting: 3GPP TS 23.040 [3] TP-Validity-Period either in integer format (default 167), in time-string format (refer), or if EVPF is supported, in enhanced format (hexadecimal coded string with double quotes)

8.2 Set Message Format +CMGF

This command tells the TA which input and output format of messages to use.

- Set command selects message format <mode>, which is used by other SMS commands.
- Read command returns currently selected message format.
- Test command returns supported message formats as a compound value.

8.2.1 Syntax

Command syntax : AT+CMGF=[<mode>]

Command	Possible responses
+CMGF=[<mode>]	OK or +CMS ERROR: <err>

+CMGF?	+CMGF: <mode> OK
+CMGF=?	+CMGF: (list of supported <mode>s) OK

8.2.2 Defined values

Possible values of <mode>

is used to indicate the format of messages used with send, list, read and write commands and unsolicited result codes resulting from received messages. <mode>

0 PDU mode (default when implemented)

1 Text mode

8.3 Set Show Text Mode Parameters +CSDH

This command controls whether detailed header information is shown in text mode result codes or not.

- Set command indicates whether detailed header information is shown in text mode result codes or not.
- Read command returns currently selected mode value.
- Test command returns supported show modes as a compound value.

8.3.1 Syntax of Command

+CSDH=[<show>]

Command	Possible Response(s)
+CSDH=[<show>]	OK or +CME ERROR: <err>
+CSDH?	+CSDH: <show> OK
+CSDH=?	+CSDH: (list of supported <show>s) OK

8.3.2 Defined Values

Possible values of <show>

is used to indicate whether detailed header information is shown in text mode result codes and may have the following values:

0 (default) do not show header values defined in commands +CSCA, +CSMP (<sca>

, <tosca>, <fo>, <vp>, <pid>, <dcs>) nor <length>, <toda> or <tooa> in +CMT,

+CMGL, +CMGR result codes for SMS-DELIVERs and SMS-SUBMIT in text mode; for SM SCOMMAND in +CMGR result code, do not show <pid>, <mn>, <da>, <toda>, <length> or <cdata>

1 Show the values in result codes

8.4 SMS Commands Service Centre Address +CSCA

This command updates the service center address.

- Set command sets the service center address and type.
- Read command returns current service center address.
- Test command is not applicable.

8.4.1 Syntax of the Command

Command Syntax : AT+CSCA=<sca>[,<tosca>]

Command	Possible Responses(s)
+CSCA=<sca>[,<tosca>]	OK or +CMS ERROR: <err>
+CSCA?	+CSCA: <sca>,<tosca>
+CSCA=?	OK

8.4.2 Defined Values

Possible Values of <sca>

<**sca**> is a string indicating the service center address, as a GSM 04.11 RP SC address Address-Value field in string format (i.e., enclosed by quotes ""), BCD numbers (or GSM default alphabet characters) are converted to characters.

AT+CSCA="06
96741234", 129

Service center address will be read from SIM in +CSCA? And updated in +CSCA set command.

Possible Values of <tosca>

<**tosca**> GSM 04.11 RP SC address Type-of-Address octet in integer format. When first character of tosca is '+' (IRA 43) default is 145, otherwise default is 129).

8.5 Select Cell Broadcast Message Types +CSCB

This command selects which types of Cell Broadcast Messages are to be received by the
ME.

- Set command controls which CB messages are accepted and those that are rejected.
- Read command returns currently selected mode value, message IDs and the language codes.
- Test command returns supported modes.

8.5.1 Syntax of the Command

Command	Possible Responses(s)
+CSCB=[<mode>[,<mids>[,<dcss>]]]	OK or +CMS ERROR: <err>
+CSCB?	+CSCB : <mode>,<mids>,<dcss>
+CSCB=?	+CSCB: (list of supported <mode>s) OK

8.5.2 Defined Values

Possible Values of <mode>

Control whether message types that are specified are going to be accepted or rejected.

0 (default) message types specified in <mids> and <dcss> are accepted. With mode as
0 and no other parameters are provided it is equal to diabling the CBS.

1 message types specified in <mids> and <dcss> are not accepted. With mode as 1 and no other parameters are provided it is equal to enabling the CBS for all "mids" and "dcss".

Possible Values of <mids>

String type; all different possible combinations of CBM message identifiers (refer <mid>). Default is empty string.

e.g.
"0,1,5,320
-478,922".

Note: +CSCB command can be used to control CMAS (Commercial Mobile Alert System) alerts. In CMAS, three warning notifications can be supported: Presidential, Imminent threat and Child Abduction Emergency (e.g. AMBER) as per 3GPP 22.268 spec. The corresponding <mids> for

each of the three alerts is given in 3GPP 23.041 spec. CMAS CBS <mids>4370(in decimal) need to be enabled for CMAS Presidential Level Alerts. User should ensure that this <mid> is enabled to receive Presidential Level Alerts. CMAS CBS <mids>4371-4378 should be enabled/disabled for CMAS Imminent threat Level Alerts as required. CMAS CBS <mids>4379 should be enabled/disabled for CMAS Child abduction alert(or Amber alert) as required.

8.6 Send SMS Message +CMGS

This command sends a SMS.

- Set command lets user send SMS in text mode or PDU mode based on the message format +CMGF.
- Test command will result in "OK" response.

8.6.1 Syntax of the Command

Command	Possible Responses(s)

if text mode (+CMGF=1):
+CMGS=<da>[,<toda>]<CR>
text is entered<ctrl-Z/ESC>
	if text mode (+CMGF=1) and sending successful:
	+CMGS: <mr>[,<scts>]
	OK
	if sending fails:
	+CMS ERROR: <err>

if PDU mode (+CMGF=0):
+CMGS=<length><CR>
PDU is given<ctrl-Z/ESC>
	if PDU mode (+CMGF=0) and sending successful:
	+CMGS: <mr>
	OK
	if sending fails:
	+CMS ERROR: <err>

+CMGS=?	OK

8.6.2 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 for text mode. 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.

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.

<length> must indicate the number of octets coded in the TP layer data unit to be given
(i.e. SMSC address octets
are excluded).

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 fourcharacter 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 <**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: 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).

- the PDU shall be hexadecimal format (similarly as specified for <pdu>) and given in one line; ME/TA converts this coding into the

actual octets of PDU.

- when the length octet of the SMSC address (given in the PDU) equals zero, the SMSC address set with command Service Centre Address +CSCA is used; in this case the SMSC Type-of-Address octet shall not be present in the PDU, i.e. TPDU starts right after SMSC length octet.

- sending can be cancelled by giving <ESC> character (IRA 27).

- <ctrl-Z> (IRA 26) must be used to indicate the ending of PDU.

Note: concatenated SMS is not supported in C-AT

8.6.3 Defined Values

<da>

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 in3GPP TS 27.007 [9]); type of address given by <toda>.

<toda>

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).

<mr>

3GPP TS 23.040 [3] TP-Message-Reference in integer format.

<dt>

23.040 [3] TP-Discharge-Time in time-string format: "yy/MM/dd,hh:mm:ss?zz", where characters indicate year (two last digits), month, day, hour, minutes, seconds and time zone. E.g. 6th of May 1994, 22:10:00 GMT+2 hours equals to "94/05/06,22:10:00+08".

<length>

integer type value indicating 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).

Note: In text mode, the gmaximum length of an SMS depends on the used coding scheme: It is 160 characters if the 7 bit.

GSM coding scheme is used, and 140 characters according to the 8 bit GSM coding scheme.

<pdu>

For SMS: GSM 04.11 SC address followed by GSM 03.40 TPDU in hexadecimal format: ME/TA converts each octet of TP data unit into hexadecimal numbers containing two IRA characters (e.g. octet with integer value 42 is presented to TE as two characters 2A (IRA 50 and 65)). In the case of CBS: GSM 03.41 TPDU in hexadecimal format.

Note: 1. SIO consumes all SMS commands and also the text entered by user. So C-AT doesnot receive these SMS commands until SIO processes them completely.

2. For additional description of SMS commands, 3GPP 27.005 may be consulted

3. In CMGS, CMGW, CMGC & CNMA commands TA shall send a four character sequence < CR><LF><greater_than><space> (IRA 13, 10, 62, 32) after command line is terminated with <CR>(applicable during SMS text/data input); after that text/data can be entered from TE to ME/TA.

8.7 Send Message from Storage +CMSS

This command sends a SMS.

- Set command lets user send SMS from a memory location.
- Test command will result in "OK" response.

8.7.1 Syntax of the Command

Command	Possible Responses(s)

+CMSS=<index>[,<da>[,<toda>]]	if text mode (+CMGF=1) and sending successful:
	+CMSS: <mr>[,<scts>]
	if sending fails:
	+CMS ERROR: <err>

+CMSS=<index>[,<da>[,<toda>]]	if PDU mode (+CMGF=0) and sending successful:
	+CMSS: <mr>
	if sending fails:
	+CMS ERROR: <err>

+CMGS=?	OK

8.7.2 Description

Set command sends message with location value <index> from preferred message storage <mem2> to the network (SMS-SUBMIT or SMS-COMMAND). If new recipient address <da> is given given for SMS-SUBMIT, it shall be used instead of the one stored with the message. Reference value <mr> is returned to the TE on successful message delivery. Optionally (when +CSMS <service> value is 1 and network supports) <scts> is returned in text mode. 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. Parameters have the same meaning as in +CMGS.

Note: For defined values refer SMS Prameter Defination Section

8.8 More Messages to Send +CMMS

This set command controls the continuity of SMS relay protocol link. When enabled, multiple messages (SMS) can be sent much faster as link is kept open.

8.8.1 Syntax of the Command

Command	Possible Responses(s)
+CMMS=[<n>]	OK Or +CME ERROR <err>
+CMMS?	+CMMS: <n> OK
+CMGS=?	+CMMS: (list of supported <n>s) OK

8.8.2 Defined Values

<n>

0 Disable. (default)

1 Keep enabled until the time between the response of the latest message send command (+CMGS, +CMSS, etc.) and the next send command exceeds 1-5 seconds (the exact value is up to ME implementation), then ME shall close the link and TA switches <n> automatically back to 0.

2 Keep permanently enabled (ME closes only the link after each send sequence, <n> is not switched back to 0).

8.9 Delete Message +CMGD

This command deletes message from preferred message storage.

- Set command deletes message from memory.
- Read command is not supportable.
- Test command returns list of supported indexes and list of supported deletion flags.

8.9.1 Syntax of the Command

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

8.9.2 Defined Values

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>.

<delflag>

an integer indicating multiple message deletion request as follows:

0 (or omitted) 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.

8.10 Select Message Service +CSMS

This command selects messaging service.

- Set command sets the supported message service.
- Read command returns currently selected message service value and supported mes- sage types.
- Test command returns supported message services as a compound value.

8.10.1 Syntax of the Command

Command	Possible Responses(s)
+CSMS=<service>	+CSMS: <mt>,<mo>,<bm> OK or +CMS ERROR: <err>
+CSMS?	+CSMS: <service>,<mt>,<mo>,<bm> OK
+CSMS=?	+CSMS: (list of supported <service>s) OK

Execution command selects messaging service <service>. It returns the types of messages supported by the ME: <mt> for mobile terminated messages, <mo> for mobile originated messages and <bm> for broadcast type messages. If chosen service is not supported by the ME (but is supported by the TA), final result code +CMS ERROR: <err> shall be returned. See chapter Message Service Failure Result Code for a list of <err> values.

8.10.2 Defined Values

0 3GPP TS 23.040 [3] and 3GPP TS 23.041 [4] (default)

1 3GPP TS 23.040 [3] and 3GPP TS 23.041 [4] the requirement of <service> setting 1 is mentioned under corresponding command descriptions)

<mt>, <mo>, <bm>

0 type not supported (default)

1 type supported

8.11 Select Service for MO SMS Messages +CGSMS

This command selects messaging service.

- The set command is used to specify the service or service preference that the MT will use to send MO SMS messages.
- The read command returns the currently selected service or service preference.
- The test command is used for requesting information on the currently available services and service preferences.

8.11.1 Syntax of the Command

Command	Possible Responses(s)
+CGSMS= [<service>]	OK ERROR
+CGSMS?	+CGSMS: <service>
+CGSMS=?	+CGSMS: (list of currently available <service>s)

Command selects service <service> for MO sms messages.

8.11.2 Defined Values

<service>:

a numeric parameter which indicates the service or service preference to be used

0 Packet Domain (default)

1 circuit switched

2 Packet Domain preferred (use circuit switched if GPRS not available)

3 circuit switched preferred (use Packet Domain if circuit switched not available)

8.12 Write Message to Memory +CMGW

This command writes message to preferred message storage.

- Set command writes message to memory.
- Test command is returns OK.

8.12.1 Syntax of the Command

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

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 (ME/TA manufacturer may choose to use different default <stat> values for different message types). 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: For defined values refer SMS Prameter Definations Section

8.13 Preferred Message Storage +CPMS

This command selects messaging service.

- Set command selects memory storages that can be used as <mem1>, <mem2> and <mem3>.
- Read command returns current memory type, used memory and total memory for each of the memories <mem1>, <mem2> and <mem3>.
- Test command returns list of supported memory types for <mem1> through <mem3>.

8.13.1 Syntax of the Command

Command	Possible Responses(s)
+CPMS=<mem1>[, <mem2>[,<mem3>]]	+CPMS: <used1>,<total1>,<used2>, <total2>,<used3>,<total3> OK or +CMS ERROR: <err>
+CPMS?	+CPMS: <mem1>,<used1>,<total1>,<mem2>, <used2>,<total2>, <mem3>,<used3>,<total3> OK or +CMS ERROR: <err>
+CPMS=?	+CPMS: (list of supported <mem1>s),(list of sup-porten <mem2>s), (list of supported <mem3>s) OK

Set command selects memory storages <mem1>, <mem2> and <mem3> to be used for reading, writing, etc. If chosen storage is not appropriate for the ME (but is supported by the TA), final result code +CMS ERROR: <err> shall be returned. See chapter Message Service Failure Result Code for a list of possible <err> values.

8.13.2 Defined Values

<index>

integer type; value in the range of location numbers supported by the

associated memory

<mem1>

string type; memory from which messages are read and deleted (commands List Mes- sages +CMGL, Read Message +CMGR and Delete Message +CMGD); defined values (others are manufacturer specific): "BM" broadcast message storage "ME" ME message storage "SM" (U)SIM message storage (default) "SR" status report storage

Note: "MT" is not supported because of lack of FS support from lower layers

<mem2>

string type; memory to which writing and sending operations are made (commands
Send Message from Storage +CMSS and Write Message to Memory +CMGW)); refer
<mem1> for defined values

<mem3>

string type; memory to which received SMs are preferred to be stored (unless forwarded directly to TE; refer command New Message Indications +CNMI); refer <mem1> for defined values; received CBMs are always stored in "BM" (or some manufacturer specific storage) unless directly forwarded to TE; received status reports are always stored in "SR" (or some manufacturer specific storage) unless directly forwarded to TE

<used>

Number of units of memory in use

<total>

Total Number of units of memory supported

Note: In the context of multiple terminals, CPMS has global scope and is common to all terminals.

Default configuration of <mem1>,<mem2> and <mem3> will be "SM" unless changed.

8.14 New Message Indications to TE +CNMI

This command selects the procedure, how receiving of new SMS from network is indicated to the TE

- Set command selects the procedure, how receiving of new messages from the network is indicated to the TE when TE is active.
- Read command returns the current settings of new message indication parameters.
- Test command returns lists of supported values for new message indication parameters.

8.14.1 Syntax of Command

+CNMI Parameter Command Syntax

Command	Possible Response(s)
+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	OK +CMS ERROR: <err>
+CNMI?	+CNMI: <mode>,<mt>,<bm>,<ds>,<bfr>
+CNMI=?	+CNMI: (list of supported <mode>s),(list of supported<mt>s),(list of supported <bm>s),(list of supported<ds>s),(list of supported <bfr>s)

8.14.2 Description

Set command selects the procedure, how receiving of new messages from the network is indicated to the TE when TE is active, e.g. DTR signal is ON. If TE is inactive (e.g. DTR signal is OFF), message receiving should be done as specified in 3GPP TS 23.038 [2]. Note: When DTR signal is not available or the state of the signal is ignored (V.25ter command &D0), reliable message transfer can be assured by using +CNMA acknowledgement procedure.v

8.14.3 Defined Values

<mode>

controls the processing of unsolicited result codes specified within this command, <mt> sets the result code indication routing for SMS-

DELIVERs, <bm> for CBMs and <ds> for SMS-STATUS-REPORTs. <bfr> defines the handling method for buffered result codes when <mode> 1, 2 or 3 is enabled. If ME does not support requested item (although TA does), final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for a list of <err> values. Test command gives the settings supported by the TA as compound values. Note: Command Select Message Service
+CSMS should be used to detect ME support of mobile terminated SMs and CBMs, and

to define whether a message routed directly to TE should be acknowledged or not Note: The buffering mechanism may as well be located in the ME; the setting affects only to unsolicited result codes specified within this command):

0 (default) Buffer unsolicited result codes in the TA. If TA result code buffer is full, indications can be buffered in some other place or the oldest indications may be discarded and replaced with the new received indications.

1 Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved (e.g. in on-line data mode). Otherwise forward them directly to the TE.

2 Buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.

3 Forward unsolicited result codes directly to the TE. TA-TE link specific inband technique used to embed result codes and data when TA is in on-line data mode.

Note: <mode> Value 3 is not supported as platform does not support the same. Note: It is possible that ME/TA result code buffer is in volatile memory. In this case messages may get lost if the power of ME/TA is switched off before codes are sent to TE. Thus, it is not recommended to use direct message routing (<mt>=2 or 3, <bm>=2 or 3, or
<ds>=1) with
<mode> value 0 or 2.

<mt>

(the rules for storing received SMs depend on its data coding scheme (refer 3GPP TS
23.038 [2]), preferred memory storage (+CPMS) setting and this value; refer table 1; Note: If AT command interface is acting as the only display device, the ME must support storing of class 0 messages and messages in

the message waiting indication group (discard message); refer table 2): 0 (default) No SMS-DELIVER indications are routed to the TE. 1 If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CMTI: <mem>,<index> 6 SMS-DELIV ERs (except class 2 messages and messages in the message waiting indication group (store message)) are routed directly to the TE using unsolicited result code: +CMT: [
<alpha>],<length><CR><LF><pdu> (PDU mode enabled); or +CMT: <oa>, [<alpha>],
<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,
<length>]<CR><LF><data> (text mode enabled; about parameters in italics, refer command Show Text Mode Parameters
+CSDH) If ME has its own display device then class 0 messages and messages in the message waiting indication group (discard message) may be copied to both ME display and to TE. In this case, ME shall send the acknowledgement to the network (refer table
2). Class 2 messages and messages in the message waiting indication group (store message) result in indication as defined in <mt>=1. 7 Class 3 SMS-DELIVERs are routed directly to TE using unsolicited result codes defined in <mt>=2. Messages of other data coding schemes result in indication as defined in <mt>=1.

Table 1 <mt> parameter

<mt>	**Receiving procedure for different message data coding schemes (refer 3GPP TS 23.038 [2])**
0	no class: as in 3GPP TS 23.038 [2], but use <mem3> as preferred memory class 0: as in 3GPP TS 23.038 [2], but use <mem3> as preferred memory if message is tried to be stored class 1: as in 3GPP TS 23.038 [2], but use <mem3> as preferred memory class 2: as in 3GPP TS 23.038 [2] class 3: as in 3GPP TS 23.038 [2], but use <mem3> as preferred memory message waiting indication group (discard message): as in 3GPP TS 23.038 [2], but use <mem3> as preferred memory if message is tried to be stored message waiting indication group (store message): as in 3GPP TS 23.038 [2], but use <mem3> as preferred memory
1	as <mt>=0 but send indication if message stored successfully

2	2 no class: route message to TE 0: as in 3GPP TS 23.038 [2], but also route message to TE and do not try to store it in memory 1: route message to TE class 2: as <mt>=1 class 3: route message to TE message waiting indication group (discard message): as in 3GPP TS 23.038 [2], but also route message to TE and do not try to store it in memory message waiting indication group (store message): as <mt>=1
3	class 3: route message to TE : as <mt>=1

Table 2 SMS-DELIVER result code and acknowledgement summary

<mt>	no class or class 1	class 0 or message waiting indication group (discard)	class 2 or message waiting indication group (store)	class 3
1	+CMTI	[+CMTI1]]	+CMTI	+CMTI
2	+CMT & +CNMA3)	+CMT [& +CNMA2]]	+CMTI	+CMT & +CNMA3)
3	+CMTI	[+CMTI1]]	+CMTI	+CMT & +CNMA3

1 Result code is sent when ME does not have other display device than AT interface.

2 Acknowledgement command must be sent when +CSMS <service> value equals 1 and ME does not have other display device than AT interface.

3 Acknowledgement command must be sent when +CSMS <service> value equals 1.

<bm>

(the rules for storing received CBMs depend on its data coding scheme (refer 3GPP TS

23.038 [2]), the setting of Select CBM Types (+CSCB) and this value; refer table 3): 0

No CBM indications are routed to the TE.

1 If CBM is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code:

+CBMI: <mem>,<index> 2 New CBMs are routed directly to the TE using unsolicited result code:

+CBM: <length><CR><LF><pdu> (PDU mode enabled); or

+CBM: <sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> (text mode enabled)

If ME supports data coding groups which define special routing also for messages other than class 3 (e.g.(U)SIM specific messages), ME may choose not to route messages of such data coding schemes into TE (indication of a stored CBM may be given as defined in <bm>=1).

3 Class 3 CBMs are routed directly to TE using unsolicited result codes defined in <bm> =2. If CBM storage is supported, messages of other classes result in indication as defined in <bm>=1.

Note: When CBMs are routed directly to TE: Individual +CBM message pages will be displayed for both GSM as well as UMTS. In case of UMTS, each CBS page will be displayed seperatly instead of one unique SMS-CB UMTS PDU (around 90 to 1252 bytes). One +CBM URC will be displayed per CBS message page.

Table 3 <bm> parameter

<bm>	Receiving procedure for different message data coding schemes (refer 3GPP TS 23.038 [2])
0	all schemes: as in 3GPP TS 23.038 [2]; if CBM storage is supported, store message to BM (or some manufacturer or data coding scheme specific memory)
1	all schemes: as <bm>=0 but send indication if message stored successfully
2	all schemes: route message to TE unless ME has detected a special routing to somewhere else(e.g. to (U)SIM; an indication may be sent if message stored successfully)
3	class 3: route message to TE others: as <bm>=1 (if CBM memory storage is supported)

Table 3 <ds>:

0 No SMS-STATUS-REPORTs are routed to the TE. 1 SMS-STATUS-REPORTs are routed to the TE using unsolicited result code:

+CDS: <length><CR><LF><pdu> (PDU mode enabled); or

+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,

,<st> (text mode enabled) 4 If SMS-STATUS-REPORT is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code: +CDSI: <mem>,<index>

Table 4 Table 4 SMS-STATUS-REPORT result code and acknowledgement sum- mary

<ds>	Result codes and commands
1	+CDS & +CNMA1)
2	+CDSI

1) acknowledgement command must be sent when +CSMS <service> value equals 1 <bfr>: 0 TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1...3 is entered. 1 TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1...3 is entered.

Implementation
Mandatory when any of the new message indications implemented.

8.15 Send Command +CMGC

- Set sends a command message from a TE to the network.
- Test command returns OK string.

8.15.1 Syntax of Command

Command syntax in text mode

AT+CMGC=<fo>,<ct>[,<pid>[,<mn>[,<da>[,<toda>]]]]<CR><text><Ctrl-Z/ESC>

Command syntax in PDU mode

AT+CMGC=<length><CR><PDU><Ctrl-Z/ESC>

Command	Possible Response(s)

if text mode (+CMGF=1):
+CMGC=<fo>,<ct>[,<pid>[,<mn>[,<da>[,<toda>]]]]
<CR>text is entered<ctrl-Z/ESC>
if PDU mode (+CMGF=0):
+CMGC=<length><CR>PDU is given<ctrl-Z/ESC>
	if text mode (+CMGF=1) and sending successful:
	+CMGC: <mr>[,<scts>]
	OK
	if sending fails:
	+CMS ERROR: <err>
	if PDU mode (+CMGF=0) and sending successful:
	+CMGC: <mr>
	OK
	if sending fails:
	+CMS ERROR: <err>

+CMGC=?	OK

8.15.2 Defined Values

<fo>

Depending on the command or result code: first octet of 3GPP TS 23.040 [3] SMS-DELI VER, SMS-SUBMIT (default 17), SMS-STATUS-REPORT, or SMS-COMMAND(default 2) in integer format.

<pid>

3GPP TS 23.040 [3] TP-Protocol-Identifier in integer format (default 0)

<ct>

3GPP TS 23.040 [3] TP-Command-Type in integer format (default 0)

<mn>

3GPP TS 23.040 [3] TP-Message-Number in integer format

<da>

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 in3GPP TS 27.007 [9]); type of address given by <toda>

<toda>

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)

<length>

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)

8.16 Set Text Mode Parameters +CSMP

This command is used to select values for additional parameters needed when SM is sent to the network or placed in storage when text format message mode is

- Set command is used to select values for additional parameters needed when SM is sent to the network or placed in a storage when text format message mode is selected.
- Read command will display the current set parameters.
- Test command returns OK string.

8.16.1 Syntax of Command

Command syntax in text mode

Command syntax: AT+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]

Command	Possible Response(s)
+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]	OK
+CSMP?	+CSMP: <fo>,<vp>,<pid>,<dcs> OK
+CSMP=?	OK

8.16.2 Defined Values

<fo>

Depending on the command or result code: first octet of 3GPP TS 23.040 [3] SMS-DELI VER, SMS-SUBMIT(default 17), SMS-STATUS-REPORT, or SMS-COMMAND(default 2) in integer format.

<vp>

Depending on SMS-SUBMIT <fo> setting: 3GPP TS 23.040 [3] TP-Validity-Period either in integer format(default 167) or in time-string format (refer <d_t>) or if EVPF is supported, in enhanced format (hexadecimalcoded string with double quotes)

<pid>

3GPP TS 23.040 [3] TP-Protocol-Identifier in integer format (default 0)

<dcs>

Depending on the command or result code: 3GPP TS 23.038 [2] SMS Data Coding
Scheme (default 0), or Cell Broadcast Data Coding Scheme in integer format

8.17 New Message Acknowledgement to ME1TA +CNMA

This command is used to send an acknowledgement to the network when messages of type SMS-DELIVER are recived correctly.

- Execution command confirms correct reception of a new message.
- Test command returns an OK string.

Note: When +CSMS is set to 1, If +CNMA command is not issued within 15 seconds after a +CMT new message indication, then C-AT automatically acknowledges to the network positively, and no +CNMA is needed after timeout, giving +CNMA after timeout will result in +CMS error. CNMI parameters will NOT be reset automatically.

8.17.1 Syntax of Command

Command	Possible Response(s)
if text mode (+CMGF=1): +CNMA if PDU mode (+CMGF=0):+CNMA[=<n>[,<length>[<CR>PDU is given<ctrl-Z/ESC>]]]	OK or+CMS ERROR: <err>
+CNMA=?	+CNMA: (list of supported <n>s) in PDU mode

8.17.2 Defined Values

Possible values of <n>

0 command operates similarly as defined for the text mode (default)

1 send RP-ACK

2 send RP-ERROR

Possible values of <length>

Length of the PDU in PDU mode Note: All parameters (<n>, <length> and PDU) are optional. Please refer to +CNMI also

8.18 Read Message +CMGR

This command returns message with location value <index> from message storage <mem1> to the TE

- Set command returns message with location value <index> from message storage <mem1> to the TE
- Test command returns an OK

8.18.1 Syntax of Command

Command syntax: AT+CMGR=<index>

Command	Possible Response(s)

TEXT+CMGR=<index>	if text mode (+CMGF=1), command successful and SMS-DELIVER:+CMGR: <stat>,<oa>,[<alpha>], <scts>[, <tooa>,<fo>, <pid>,<dcs>,<sca>,<tosca>, <length>]<CR><LF><data>
	if text mode (+CMGF=1), command successful and SMS-SUBMIT+CMGR: <stat>,<da>,[<alpha>][, <toda>, <fo>,<pid>,<dcs>, [<vp>],<sca>, <tosca> ,<length>]<CR><LF><data>
	if text mode (+CMGF=1), command successful and SMS-STATUS-REPORT:
	+CMGR: <stat>,<fo>,<mr>,[<ra>], [<tora>], <scts>, <d_t> ,<st>
	if text mode (+CMGF=1), command successful and SMS-COMMAND:+CMGR: <stat>, <fo>,<ct>[, <pid> ,[<mn>],[<da>],[<toda>], <length><CR><LF> <cdata>]
	if text mode (+CMGF=1),command successful and CBM storage:+CMGR: <stat>,<sn>, <mid>,<dcs>, <page>,<pages> <CR><LF><data> otherwise:
	+CMS ERROR: <err>

PDU +CMGR=<index>	if PDU mode (+CMGF=0) and command successful: +CMGR: <stat>,[<alpha>],<length><CR><LF> <pdu> otherwise: +CMS ERROR: <err>
+CMGR=?	OK

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 before display . If reading fails final result code +CMS ERROR: <err> is returned. See chapter Message Service Failure Result Code for <err> values.

8.18.2 Defined Values

Also refer section 7.1 Parameter Definitions

8.19 List Messages +CMGL

This command returns message with status value <stat> or all messages when

<stat>
is not provided, from message storage <mem1> to the TE

- Set command displays message with status value <stat> or all messages from message storage <mem1> to the TE.
- Test command gives the list of supported <stat>s.

8.19.1 Syntax of Command

Command syntax: AT+CMGL=<stat>

Command	Possible Response(s)

Text Mode +CMGL [=<stat>]	if text mode (+CMGF=1),command successful and SMS-SUBMITs and/or SMSDELIVERs:
	+CMGL: <index>,<stat>, <oa/da>,[<alpha>], [<scts>][,<tooa/toda>
	,<length>]<CR><LF><data>[<CR><LF>
	+CMGL: <index>,<stat>, <da/oa>,[<alpha>], [<scts>][,<tooa/toda>, <length>]<CR><LF><data>[...]]
	if text mode (+CMGF=1), command successful and SMS-STATUS-REPORTs:
	+CMGL: <index>, <stat>,<fo>, <mr>, [<ra>], [<tora>], <scts>, <d-t>,<st>[<CR><LF>
	+CMGL: <index>, <stat>, <fo>, <mr>,[<ra>], [<tora>],<scts>,<d_t>,<st>[...]]
	if text mode (+CMGF=1), command successful and SMS-COMMANDs:
	+CMGL: <index>,<stat>,<fo>,<ct> [<CR><LF> +CMGL: <index>,<stat>, <fo>,<ct>[...]] text mode (+CMGF=1), command successful and CBM storage:
	+CMGL : <index>,<stat>,<sn>, <mid>, <page>, <pages> <CR><LF><data>[<CR><LF>
	+CMGL : <index>,<stat>,<sn>, <mid>,<page>, <pages><CR><LF><data>[...]]
	otherwise:
	+CMS ERROR: <err>

PDU Mode +CMGL[=<stat>]	if PDU mode (+CMGF=0) and command successful: +CMGR: <stat>,[<alpha>],<length><CR><LF> <pdu> otherwise: +CMS ERROR: <err>

+CMGL=?	+CMGL: (list of supported <stat>s)

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, SMSSTATUS- 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.

8.19.2 Defined Values

<stat>

Integer type in PDU mode (default 0), or string type in text mode (default REC UNREAD); 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

8.20 Initiate Resending of SMS over CS if GPRS Fails +XCSSMS

This command allows to initiate resending of SMS over CS (circuit switched) if the sending over GPRS is failed.The resending feature is limited by a <timer_value> indicated in the set syntax; after expiration of

the corresponding timer the SMS will be sent as specified by the setting +CGSMS.

- Set command returns allows to initiate resending of SMS over CS (circuit switched) if the sending over GPRS is failed.
- Read command returns the status of the timer.
- Test command gives the list of supported <status>s and list of supported <timer>s values.

8.20.1 Syntax of Command

Command syntax:
AT+XCSSMS=<timer_value>

Command	Possible Response(s)
AT+XCSSMS=1	OK +CME ERROR: <err>
AT+XCSSMS?	+XCSSMS: <status> OK
AT+XCSSMS=?	+XCSSMS: (0-1),(1-48)i.e.(list of supported <status>s),(list of supported <timer_value>s) OK

8.20.2 Defined Values

<timer_value>

Indicates the runtime of the used timer; if this timer is running, the SMS can be resent via CS; the parameter is in range of 1-48 units of 30 minutes.

<status>

0: resending via CS is not active. (default)

1: resending of SMS via CS, if GPRS sending fails, is active.

8.21 Status of external SMS storage +XTESM

This command indicates the status of the external SMS storage.

- Set command indicates the status of the external SMS storage.
- Read command returns the status of the external SMS storage.
- Test command returns list of supported memory capacity.

8.21.1 Syntax of Command

Command syntax: AT+XTESM=<mem_capacity>

Command	Possible Response(s)
AT+XTESM=<mem_capacity>	OK or CME ERROR: <err>
AT+XTESM?	+XTESM: <mem_capacity> OK
AT+XTESM=?	+XTESM: (list of supported <mem_capacity>) OK

8.21.2 Defined Values

<mem_capacity>

status of the external SMS storage which may be:

0: memory capacity free (default)

1: memory capacity full

8.22 Detection of Signal DR_SM_FINISHED_IND +XSMS

This command is triggered by sdl signal DR_SM_FINISHED_IND. When enabled, the command sends an URC which shows whether signal has been received or not.

- This Set commands when enabled, the command sends an URC which shows whether signal has been received or not.

- Read command returns status of <mode> and <state>.
- Test command returns list of supported <mode>s.

8.22.1 Syntax of Command

Command	Possible Response(s)
AT+XSMS=1	OK or +CME ERROR: <err>
AT+XSMS?	+XSMS: <mode>,<state> OK
AT+XSMS=?	+XSMS: (list of supported <mode>s) OK

8.22.2 Defined Values

<mode> may be

0 XSMS disabled (default)

1 XSMS enabled

<state> may be

0 DR_SM_INIT_FINISHED_IND has been not received (default)

1 DR_SM_INIT_FINISHED_IND has been received

8.23 Send 3GPP2 SMS Message +XCMGS3GPP2

This command sends an SMS in 3GPP2 binary format with payload length up to 256 bytes.

- Set command lets user send 3GPP2 SMS in Binary PDU mode.
- Test command will result in "OK" response.

8.23.1 Syntax of Command

Command	Possible Response(s)

AT+XCMGS3GPP2=<length><message_type><CR>PDU is given<ctrl-Z/ESC>	if sending successful:
	OK
	if sending fails:
	+CMS ERROR: <err>

AT+XCMGS3GPP2=?	OK

8.23.2 Description

Execution command sends message from a TE to the network. If sending fails in a network or an ME error, final result code +CMS ERROR: <err> is returned.

8.23.3 Defined Values

<length>

must indicate the number of total octets coded in the PDU to be given

<message_type>

type of 3gpp2 message, defined values are given below

0 : Invalid

1 : Point to Point

2 : Acknowledge

3 : BroadCast

The entered text should be formatted as follows

- The PDU shall be hexadecimal format (similarly as specified for <pdu>) and given in one continuous line; ME/TA converts this coding into the actual octets of PDU.
- sending can be cancelled by giving <ESC> character (IRA 27) during the input
- <ctrl-Z> (IRA 26) must be used to indicate the ending of PDU

Note: AT+CMGF has no impact on this command.

8.24 Enable/Disable the 3GPP2 MT SMS URC +XCMT3GG P2

This command is used to enable/disable the +XCMT3GPP2 Unsolicited response code. Unsolicited response code to indicate the arrival of a new mobile terminating SMS in
3GPP2 binary format with length up to 256 bytes.

- Set command enable the +XCMT3GPP2.
- Test command will result in "<list of supported values> OK" response.

8.24.1 Syntax of Command

Command	Possible Response(s)
AT+XCMT3GPP2=<n>	OK +CMS ERROR: <err>
AT+XCMGS3GPP2=?	+ XCMT3GPP2: (list of supported <n>s) OK

8.24.2 Defined Values

<length>

must indicate the number of total octets coded in the PDU to be given

<n>

type of 3gpp2 message, defined values are given below

1: Enable URC

0: Disable URC

Note: If XCMT3GPP2 URC is enabled, then buffer unsolicited result codes in the TA when TA-TE link is reserved (e.g. in on-line data mode) and flush them to the TE after reservation. Otherwise forward them directly to the TE.

9 Phone Book Commands

9.1 Select Phonebook Memory Storage +CPBS

- Set command selects phonebook memory storage <storage>, which is used by other phonebook commands.
- Read command returns currently selected memory.
- Test command returns supported storages as compound value.

9.1.1 Syntax of the Command

+CPBS parameter command syntax

Command	Possible Response(s)
+CPBS=<storage>[,<password>]	OK or +CME ERROR: <err>
+CPBS?	+CPBS: <storage>[,<used>,<total>] OK or +CME ERROR: <err>
+CPBS=?	+CPBS: (list of supported <storage>s) OK

9.1.2 Defined values

<storage>

values reserved by the present document:
"FD" SIM/USIM fixdialling phonebook
"LD" SIM/UICC last dialling phonebook (LD phonebook can't be deleted)
"ON" SIM (or MT) own numbers (MSISDNs) list (reading of this storage may be available through +CNUM also)
"SM" SIM/UICC phonebook (default) "BL" Blacklist phonebook (delete only)
"EC" SIM emergency-call-codes phonebook (read only) "AP" Selected application phonebook
"BN" SIM barred-dialling-number (EF_BDN) phonebook (only valid with PIN2)
"SN" SIM service-dialling-number (EF_SDN) phonebook (read only)

<password>

string type value representing the PIN2-code required when selecting PIN2-code locked <storage>s above

<used>

integer type value indicating the number of used locations in selected memory

<total>

integer type value indicating the total number of locations in selected memory

9.2 Find Phonebook Entries +CPBF

This command returns the phonebook entries from the current phonebook (previously
Selected by +CPBS),which alphanumeric field starts with string <findtext>.

Set command command returns phonebook entries (from the current phonebook memory storage selected with +CPBS) which alphanumeric field starts with string <findtext>.

Test command returns the maximum lengths of <number>, <text>, <group>, <secondtext>
, <email>,<sip_uri> and <tel_uri> fields.

9.2.1 Syntax of the Command

Command Syntax: AT+CPBF=<findtext>

Response

Syntax:[+CPBF:<index1>,<number>,<type>,<text>[,<hidden>][,<gro

up>] [,<adnumber>][,<adtype>][,<secondtext>][,<email>]]

<CR><LF>

+CPBF:

<index2>,<number>,<type>,<text>[,<hidden>]

[,<group>][,<adnumber>][,<adtype>][,<secondtext

>][,<email>]]]

+CPBF action command syntax

Command	Possible Response(s)
+CPBF=<findtext>	[+CPBF:<index1>,<number>,<type>,<text>[,<hidden>][,<group>][,<adnumber>][,<adtype>][,<secondtext>][,<email>]] OK or +CME ERROR: <err>
+CPBF=?	+CPBF: [<nlength>],[<tlength>],[<glength>],[<slength>],[<elength>] OK or +CME ERROR: <err>

9.2.2 Defined values

<index1>, <index2>, <index>:

integer type values in the range of location numbers of phonebook memory

<number>

string type phone number of format <type>

<type>

type of address octet in integer format (refer TS 24.008 [8] subclause 10.5.4.7)

<text>

string type field of maximum length <tlength>; character set as specified by command
Select TE Character Set +CSCS

<group>

string type field of maximum length <glength>; character set as specified by command
Select TE Character Set +CSCS

<adnumber>

string type phone number of format <adtype>

<adtype>

type of address octet in integer format (refer TS 24.008 [8] subclause 10.5.4.7)

<secondtext>

string type field of maximum length <slength>; character set as specified by

command
Select TE Character Set +CSCS

<email>

string type field of maximum length <elength>; character set as specified by command
Select TE Character Set +CSCS

<nlength>

integer type value indicating the maximum length of field <number>

<tlength>

integer type value indicating the maximum length of field <text>

<glength>

integer type value indicating the maximum length of field <group>

<slength>

integer type value indicating the maximum length of field <secondtext>

<elength>

integer type value indicating the maximum length of field <email>

<hidden>

indicates if the entry is hidden or not

0 phonebook entry not hidden

1 phonebook entry hidden

9.3 Write Phonebook Entry +CPBW

- Set command writes phonebook entry in location number <index> in the current phonebook memory storage selected with +CPBS. Entry fields written are phone num- ber <number> in format <type> and <text> associated with the number. If all fields except <index> are omitted, the corresponding entry is deleted. If the <index> is left out, but <number> is given, entry is written to the first free location in the phonebook.
- Read command returns the last <written_index> value, or -1 if information about previous value is not available.

- Test command returns location range supported by the current storage as a compound value, the maximum length of <number> field, supported number formats of the storage, the maximum length of <text> field, the maximum length of <group>, the maximum length of <secondtext>, the maximum length of <email>, the maximum length of <sip_uri> and the maximum length of <tel_uri>.

  In case of SIM storage, the lengths may not be available. Note: Wildcard chracters (*,?) in the phone number of FDN (fixed number phonebook) are allowed.

9.3.1 Syntax of the Command

AT+CPBW=[<index>][,<number>[,<type>[,<text>[,<group>
[,<adnumber>[,<adtype> [,<secondtext>[,<email> [,<hidden>]]]]]]]]

Command	Possible Response(s)
+CPBW=[<index>][,<number>[,<type>[,<text>[,<group>[,<adnumber>[,<adtype>[,<secondtext>[,<email>[,<hidden>]]]]]]]]	+CPBW: <written_index> OK or +CME ERROR: <err>
+CPBW?	+CPBW: <written_index> OK or +CPBW:-1 OK
+CPBW=?	+CPBW: (list of supported<index>s),[<nlength>], (list of supported<type>s),[<tlength>],[<glength>],[<alength>],[<slength>],[<elength>] OK

9.3.2 Defined values

<index>

integer type values in range of location numbers of phonebook memory.

<number>

string type phone number of format <type>

<type>

type of address octet in integer format. Default 145 when vailab string includes interna- tional access code character "+", otherwise 129

<text>

string type field of maximum length <tlength>

<hidden>

indicates if the entry is hidden or not - only available, if a UICC with an active USIM
application is present

0 phonebook entry not hidden

1 phonebook entry hiddensubclause 10.5.4.7)

<group>

string type field of maximum length <glength>

<adnumber>

string type phone number of format <adtype>

<adtype>

type of address octet in integer format (refer TS 24.008[8] subclause 10.5.4.7)

<secondtext>

string type field of maximum length <slength>

<email>

string type field of maximum length <elength>

<nlength >

integer type value indicating the maximum length of field <number>

<tlength>

integer type value indicating the maximum length of field <text> (40).

<glength>

integer type value indicating the maximum length of field <group>

<alength>

integer type value indicating the maximum length of field <adnumber>

<slength>

integer type value indicating the maximum length of field <secondtext>

<elength>

integer type value indicating the maximum length of field <email>

<written_index>

integer type value indicating the last location number <index> of the written phonebook entry
Remark: Read command returns the last <written_index> value, or -1 if informa- tion about previous value is not. Changing the current phonebook memory storage with
+CPBS to another storage invalidates the last<written_index> value.

Note: Optional parameters <nlength>,<tlength>,<glength>,<alength>,<slength>,<elength> are applicable only for a 3G UICC.

9.4 Read Phonebook Entries +CPBR

This execution command returns phonebook entries in location number range <index1>
<index2> from the current phonebook memory storage selected with +CPBS. If
<index2> is left out, only location <index1> is returned.

Note: Wildcard chracters (*, ?) in the phone number of FDN (fixed number phonebook) are allowed.

9.4.1 Syntax of the Command

Command syntax: AT+CPBR=<index1>[,<index2>]

Response syntax: [+CPBR:
<index1>,<number>,<type>,<text>[,<hidden>][,<group>]

[,<adnumber>][,<adtype>][,<secondtext>][,<email>]] [[...]<CR><LF>

+CPBR:

<index2>,<number>,<type>,<text>[,<hidden>][,<group>][,<adnu

mber>] [,<adtype>][,<secondtext>][,<email>]]]

+CPBR action command syntax

Command	Possible Response(s)

+CPBR=<index1>[,<index2>]	[+CPBR: <index1>,<number>,<type>, <text>[,<hidden>][,<group>][,<adnumber>] [,<adtype>][,<secondtext>][,<email>]] [[...] OK or +CME ERROR: <err>
+CPBR=?	+CPBR: (list of supported<index>s), [nlength],[tlength],[<glength>], [<alength>],[<slength>],[<elength>] OK

9.4.2 Defined values

<index1>, <index2>, <index>

integer type values in the range of location numbers of phonebook memory

<number>

string type phone number of format <type>

<type>

type of address octet in integer format

<text>

string type field of maximum length <tlength>

<hidden>

indicates if the entry is hidden or not - only available, if a UICC with an active USIM
application is present

0 phonebook entry not hidden

1 phonebook entry hidden

<group>

string type field of maximum length <glength>

<adnumber>

string type phone number of format <adtype>

<adtype>

type of address octet in integer format (refer TS 24.008[8] subclause 10.5.4.7)

<secondtext>

string type field of maximum length <slength>

<email>

string type field of maximum length <elength>

<nlength>

integer type value indicating the maximum length of field <number>

<tlength>

integer type value indicating the maximum length of field <text> (40).

<glength>

integer type value indicating the maximum length of field <group>

<alength>

integer type value indicating the maximum length of field <adnumber>

<slength>

integer type value indicating the maximum length of field <secondtext>

<elength>

integer type value indicating the maximum length of field <email>

Note: Optional parameters
<nlength>,<tlength>,<glength>,<alength>,<slength>,<elength>
are applicable only for a 3G UICC.

9.5 URC PhoneBook Ready +PBREADY

+PBREADY URC will be displayed when the phone book is ready for read and write operation on boot-up.

9.6 Write Phonebook Entry +XCPBW

This execution command writes phonebook entry in location number <index> in the current phonebook memory storage selected with +CPBS. Entry fields written are phone number <number> in format <type> and <text> associated with the number. If all fields except <index> are omitted, the corresponding entry is deleted. If the <index> is left out, but <number> is given, entry is written to the first free location in the phonebook.

Note: Wildcard chracters (*, ?) in the phone number of FDN (fixed number phonebook)
are allowed.

9.6.1 Syntax of Command

AT+XCPBW=[<index>][,<number>[,<type>[,<text>[,<group>[,<no_of_adnumber>[,<adnumber1>
[,<adtype1>[,<adnumber2>[,<adtype2>[,…[,<adnumber_n>[,<adtype_n>[,<no_of_secondtext> [,<secondtext1>[,<secondtext2> [,…[,<secondtext_n>
[,<n_of_email> [,<email1>[,
<email2>[,…[,<email_n> [,<hidden>]]]]]]]]]]]]]]]]]]]]]]

Command	Possible Response(s)
+XCPBW=[<index>][,<number>[,<type>[,<text>[,<group>[,<no_of_adnumber>[,<adnumber1>[,<adtype1>[,<adnumber2>[,<adtype2>[,…[,<adnumber_n>[,<adtype_n>[,<no_of_secondtext>[,<secondtext1>[,<secondtext2>[,…[,<secondtext_n>[,<n_of_email> [,<email1>[,<email2>[,…[,<email_n> [,<hidden>]]]]]]]]]]]]]]]]]]]]]]	OK or +CME ERROR: <err>
+XCPBW=?	+XCPBW: (list of supported <index>s),[<nlength>],(list of supported<type>s),[<tlength>],[<glength>],<no_of_alength>[,(<alength1,alength2,…alength_n)] ,<no_of_slength>[,(<slength1,slength2,…slength_n)] ,<no_of_elength>[,(<elength1,elength2,…elength_n)] OK

9.6.2 Defined values

See +CPBW command

9.7 Read Phonebook Entries +XCPBR

This execution command returns phonebook entries in location number range <index1> <index2> from the current phonebook memory storage selected with +CPBS. If <index2> is left out, only location <index1> is returned

Note: Wildcard chracters (*, ?) in the phone number of FDN (fixed number phonebook) are allowed.

9.7.1 Syntax of the Command

Command syntax:

AT+XCPBR=<index1>[,<index2>]

Response syntax: [+XCPBR:
<index1>,<number>,<type>,<text>[,<hidden>][,<group>
],<no_of_adnumber1>[<adnumber1>,<adtype1>,<adnumber2>,<adtype2>...,<adnumber
_n>,<adtype_n>],<no_of_secondtext>[,<secondtext1>,<secondtext2>,...<secondtext
_n>],<no_of_ email>[,< email1>,<email 2>,...<email_n>]] [[...]<CR><LF>

[+XCPBR:
<index2>,<number>,<type>,<text>[,<hidden>][,<group>],<no_of_adnumber1>
[<adnumber1>,<adtype1>,<adnumber2>,<adtype2>...,<adnumber_n>,<adtype_n>]
,<no_of_secondtext> [,<secondtext1>,<secondtext2>,...<secondtext_n>],<no_of_ email>
[,< email1>,<email 2>,...<email_n>]]

+CPBR action command syntax

Command	Possible Response(s)
+XCPBR=<index1>[,<index2>]	[+XCPBR: <index1>,<number>,<type>,<text>[,<hidden>][,<group>],<no_of_adnumber1>[<adnumber1>,<adtype1>,<adnumber2>,<adtype2>...,<adnumber_n>,<adtype_n>],<no_of_secondtext>[,<secondtext1>,<secondtext2>,...<secondtext_n>],<no_of_ email>[,< email1>,<email2>,...<email_n>]] [[...] +CME ERROR: <err>
+XCPBR=?	+XCPBR: (list of supported <index>s),[<nlength>],(list of supported<type>s),[<tlength>],[<glength>],<no_of_alength>[,(<alength1,alength2,...alength_n)] ,<no_of_slength>[,(<slength1,slength2,...slength_n)] ,<no_of_elength>[,(<elength1,elength2,...elength_n)] OK

9.7.2 Defined values

See +CPBR command

10 IMS Commands

10.1 Domain configuration options for Outgoing SMS +X ISMSCFG

This commands used to change the configuration for outgoing SMS.

- Set command is used to set the configuration parameter which will be used to route the outgoing sms either over CPS or IMS(IP Multimedia Core Network Subsystem)
- Read command will give the current domain selected to route the outgoing SMS
- Test command returns the parameter options If IMS is set as the network for outgoing SMS then other 2G/3Gsettings for outgoing SMS will be ignored ie, IMS settings will have higher priority while sending SMS.

  Note 1: +CGSMS command which tells to send SMS in 2G/3Gettings will be ignored if
  IMS network is set by this command.

  Note 2: This command is available only on LTE platform.

10.1.1 Syntax of the Command

Command syntax: AT+XISMSCFG=<CONFIG_name>

Command	Possible Response(s)
AT+XISMSCFG=<config_name>	OK or +CME ERROR: <err>
AT+XISMSCFG?	+XISMSCFG=<config_name> OK
AT+XISMSCFG=?	+XISMSCFG : (0,1) OK

10.1.2 Defined values

<config_name>:

0 Indicates that the SMS service is not to be invoked over the IP networks. (default)

1 Indicates that the SMS service is preferred to be invoked over the IP networks.

<err>:

4 Operation Not Suppported if parameters are wrong

100 Unknown error

Note: This command is available only when IMS_VOIP_SUPPORT flag is defined

10.2 Set SRVCC parameters +XISRVCC

This command is used to configure SRVCC parameters for transferring call sessions from
IMS to CS domain.

- Set command configures the SRVCC parameters.
- Test command returns range of parameters supported.
- URC indicates SRVCC sync needed

10.2.1 Syntax of the command

Command syntax : AT+ XISRVCC = <no_of_call_sessions>, <call_id>, <tid>, <tid_flag>
, < is_emergengency_call>, <call_state>, <aux_state>, <mpty_aux_state>, <phone_
no>, <ton_npi>, <pi_si>[,<call_id>, <tid>, <tid_flag>, < is_emergengency_call>, <call
_state>, <aux_state>, <mpty_aux_state>, <phone_no>, <ton_npi>, <pi_si>[,....]]

- XISRVCC notifications:

+XISRVCC:<srv
cc_ho_status>

Command	Possible responses

AT+ XISRVCC = < no_of_call_sessions >, <call_ id>, <tid>, <tid_flag>,< is_emergengency_call>, <call_state>, <aux_state>, <mpty_aux_state>, <phone_no>, <ton_npi>, <pi_si>[,<call_id>, <tid>, <tid_flag>,< is_emergengency_call>, <call_state> , <aux_state>, <mpty_aux_state>, <phone_no>, <ton_npi>, <pi_si>[,....]]	OK or +CME ERROR: <err>
AT+ XISRVCC=?	+ XISRVCC: (1 - max < no_of_call_sessions>) OK

10.2.2 Defined values

<no_of_call_sessions>

is the number of call sessions to be transferred from IMS to CS domain.

Note 1: There can be 1 multiparty call session (maximum 5 participants) and 1 single call session in the list. Note 2: This command is available only on LTE platform.

<call_id>

is the call ID of the call to be transferred.

<tid>

is Transaction identifier value (valid range 0-7), according to 3GPP TS 24.007 sec
11.2.3.1.3.

<tid_flag>

is the indication for MO or MT call.

0 MO call

1 MT call

< is_emergengency_call>

is the indication of emergency call. 0 Non emergency call 1 Emergency call

<call_state>

is the current state of the call.

0 Call state corresponding to the call state U10 defined in 3GPP TS 24.008, sec 5.1.2.1.10

<aux_state>

Is the auxiliary sate of the call. 0 Aux state is Idle, Call state is active 2 Held Call

<mpty_aux_state>

is MPTY call aux state.

0 Aux state is Idle, Call state is active

2 This call is in the MPTY

<phone_no>

is the phone number in string format.

<ton_npi>

is the type of Number & numbering Plan Identification incl. ext bit of <phone_no> in hex
(see 3GPP TS 24.008, Table 10.5.118).

<pi_si>

is the Presentation Indicator and Screening Indicator in hex(see 3GPP TS 24.008, Table
10.5.120).

<srvcc_ho_status>

is the SRVCC HO status for SYNC needed.

3 SRVCC SYNC needed.

Note: This command is available only when IMS_VOIP_SUPPORT flag is defined

10.3 IMS Single Radio Voice Call Continuity +CISRVCC

SRVCC provides the ability to have a seamless handover of a voice call between the PS domain and the CS domain for calls that are anchored in IMS, when the UE is capable of transmitting/receiving on only one of those access networks (PS or CS) at a given time.

- Set command informs MT about the SRVCC Support. MT normally updates the network when changing this parameter.
- Read command returns the status of the MT stored SRVCC Support.
- Test command returns

supported values.

10.3.1 command syntax

AT+CISRVC
C=[<uesrvc
c>]

Command	Possible response(s)
+CISRVCC=[<uesrvcc>]	OK or +CME ERROR: <err>
+CISRVCC?	+CISRVCC: <uesrvcc> OK Or +CME ERR
+CISRVCC=?	+CISRVCC: (list of supported <uesrvcc>s) OK Or +CME ERR

10.3.2 Defined values

<uesrvcc>

integer type. SRVCC support status

0 The UE does not have SRVCC support (default)

1 The UE has SRVCC support

Note: This command is available only when IMS_VOIP_SUPPORT flag is defined

10.4 IMS Client Registration 1 Deregistration in network +XIREG

This command is used to perform the registration/de-registration of IMS client with network.The execution of the command may take a long time,

during which the terminal will be unavailable. The command will be abort able at any point.

Note 1: Only 1 IMS client session is possible at any given time. User must first configure the session's parameters using AT+XICFG command before trying to register using AT+XIREG.

Note 2: This command is available only on LTE platform.

10.4.1 Syntax of the Command

Command syntax:
AT+XIREG=<mode>

Command	Possible Response(s)
AT+XIREG=<mode>	OK or +CME ERROR: <err>
AT+XIREG?	+XIREG: <mode> OK
AT+XIREG=?	+XIREG: (0,1) OK

10.4.2 Defined values

<mode>:

0 Deregister IMS client from network. (default)

1 Register IMS client to network.

<err>:

31 If there is a network time-out.

50 If wrong parameter is given.

100 Unknown error.

175 If requested facility is not subscribed.

179 If service is unavailable.

Note: This command is available only when IMS_VOIP_SUPPORT flag is defined

10.5 Configuration of IMS Client +XICFG

This command is used to configure the IMS managed objects in VoLTE functionality. The configurations are persistent.

10.5.1 Syntax of the Command

Command syntax:
AT+XICFG=<IMS_APN>,<outbound_proxy_name>,<outbound_proxy_port>,<private_user_id>,<home_network_domain_name>,<XCAP_auth_username>,<XCAP_auth_password>,<XCAP_auth_type>,<logger_level>

Command	Possible Response(s)
AT+XICFG=<IMS_APN>,<outbound_proxy_name>,<outbound_proxy_port>,<private_user_id>,<home_network_domain_name>,<XCAP_auth_username>,<XCAP_auth_password>,<XCAP_auth_type>,<logger_level>	OK or +CME ERROR: <err>
AT+XICFG?	+XICFG: <IMS_APN>,<outbound_proxy_name>,<outbound_proxy_port>,<private_user_id>,<home_network_domain_name>,<XCAP_auth_username>,<XCAP_auth_password>,<XCAP_auth_type>,<logger_level> OK
AT+XICFG=?	OK

10.5.2 Defined values

<IMS_APN>:

It is a string value, representing a network access point name.

<outbound_proxy_port>:

It's a string value which is Proxy-Call Session Control Function. This parameter defines an FQDN or an IPv4 address to an IPv4 P-CSCF. Possible value is a string (qualified domain name or IPv4 address). More information can be seen at 3GPP TS 24.167.

<Outbound_proxy_port>:

It is an Integer value outbound_proxy_port_number.

<Private_user_id>:

It's a string value. In case an ISIM is available this parameter shall be taken from the ISIM. If the ISIM is not available, this parameter is derived from the IMSI parameter in the USIM according to the procedures described in 3GPP TS 23.003. For early IOTs, this parameter is also available through configuration parameter command. Type is string.

Example: 234150999999999@ims.mnc015.mcc234.3gppnetwork.org. More information can be seen at 3GPP TS 24.167.

<home_network_domain_name>:

A string value, Indicates the operator' s home network domain. Type is string. Example
: ims.mnc015.mcc234.3gppnetwork.org. More information can be seen at 3GPP TS
24.167.

<XCAP_auth_username>:

It's a string value. HTTP digests "username", for accessing an XDMS using the XCAP protocol.

<XCAP_auth_password>:

It's a string value. HTTP digests password. This field can be left blank, if password is null.

<XCAP_auth_type>:

It's a string value , which is authentication method for XDMS over XCAP. For example, DIGEST.

<logger_level>:

It's an Integer value, to indicate logging level.

<err>:

50 If wrong parameter is given

100 Unknown error

Note: This command is available only when IMS_VOIP_SUPPORT flag is defined

10.6 Service Specific Access Control restriction status +CSSAC

This command refers to SSAC (Service Specific Access Control) related information which is used by IMS Client. The command provides the current status of the parameters for SSAC.

10.6.1 Syntax of the Command

Command	Possible Response(s)
AT+CSSAC	+CSSAC: <BFVoice>,<BFVideo>,<BTVoice>,<BT Video> OK Or +CME ERROR: <err>
AT+CSSAC=?	OK

10.6.2 Defined values

<BFVoice>

integer type; (parameter shows the barring factor for voice. <BFVoice> is mapped to
Barring Factor for voice as in table below)

Table 1.5.2: Value of BFVoice and its interpretation by IMS Client

<BFVoice>	BarringFactor-Voice as specified in 3GPP TS 24.173
0	0
1	0,05
2	0,1
3	0,15
4	0,2
5	0,25
6	0,3
7	0,4
8	0,5
9	0,6
10	0,7
11	0,75

12	0,8
13	0,85
14	0,9
15	0,95
16	1

<BFVideo>

integer type (parameter shows the barring factor . <BFVoice> is mapped to the Barring
Factor as in the table below.)

Table 1.5.3: Value of BFVideo and its interpretation by IMS Client

<BFVideo>	**BarringFactor-Video as specified in 3GPP TS 24.173**
0	0
1	0,05
2	0,1
3	0,15
4	0,2
5	0,25
6	0,3
7	0,4
8	0,5
9	0,6
10	0,7
11	0,75
12	0,8
13	0,85
14	0,9
15	0,95
16	1

<BTVoice>

integer type; (parameter shows the barring timer for voice. <BTVoice> is mapped to the
BarringTime-Voice as in table below)

Table 1.5.4: Value of BTVoice and its interpretation by IMS client

<BTVoice>	BarringTime-Voice as specified in 3GPP TS 24.173
0	0
1	4
2	8
3	16
4	32
5	64
6	128
7	256
8	512

<BTVideo>

integer type; (parameter shows the barring timer for video.
<BFVideo> is mapped to the BarringTime-Video as in table below)

Table 1.5.5: Value of BTVideo and its interpretation by IMS client

<BTVideo>	BarringTime-Video as specified in 3GPP TS 24.173
0	0
1	4
2	8
3	16
4	32
5	64
6	128
7	256
8	512

Note: This command is available only when IMS_VOIP_SUPPORT flag is defined

10.7 IMS Network Reporting +CIREP

- Set command enables or disables reporting of SRVCC handoverinformation (see 3GPP TS 24.237) and of IMS Voice Over PS sessions indicator information, by the following unsolicited result codes:

+CIREPI: <nwimsvops> IMS Voice Over PS sessions (IMSVOP S) supported indication from the network.

+CIREPH: <srvcch> Provides Single Radio Voice Call Continuity (SRVCC) handover information.

- Read command returns the status of result code presentation and the IMSVOPS sup- ported indication.
- Test command returns supported values.

10.7.1 Syntax of the Command

Command	Possible Response(s)
AT+CIREP=< reporting>	OK Or +CME ERROR: <error>
AT+CIREP?	+CIREP: <reporting>,<nwimsvops> OK Or +CME ERROR: <error>
AT+CIREP=?	+CIREP: <reporting>,<nwimsvops> OK Or +CME ERROR: <error>

10.7.2 Defined values

<reporting>:

integer type. Enables or disables reporting of changes in the IMS voice over PS session supported indication received from the network and reporting of SRVCC handover information.

0 Disable reporting (default)

1 Enable reporting

<nwimsvops>:

integer type. Gives the last IMS Voice Over PS session(IMSVOPS) supported indication received from network.

0 IMSVOPS support indication is not received from network, or is negative.

1 IMSVOPS support indication as received from network is positive.

<srvcch>:

integer type. SRVCC handover information.

0 PS to CS SRVCC handover has started in the CS domain ("Handover Command" indicating SRVCC received).

1 PS to CS SRVCC handover successful ("Handover Complete" sent).

2 PS to CS SRVCC handover cancelled ("Handover Failure" sent).

3 PS to CS SRVCC handover, general non

specific failure. Note :

1: Value 3, general non specific failure, might be used e.g. in the case of handover cancellation as specified in 3GPP TS 24.301 subclause 6.6.2

2: This command is available only when IMS_VOIP_SUPPORT flag is defined

10.8 registration information +CIREG

The set command controls the presentation of an unsolicited result code +CIREGU: <reg_info>[,<ext_info>] when there is a change in the MT's IMS registration information. The read command returns <n>, that shows whether reporting is enabled or disabled, <reg_info> that shows whether one or more of the public user identities are registered and optionally <ext_info>, that shows the status of the MT's IMS capabilities.

10.8.1 Syntax of the Command

Command syntax: AT+CIREG=<n>

Command	Possible Response(s)
AT+CIREG=<n>	OK or +CME ERROR: <err>
AT+CIREG?	+CIREG: : <n>,<reg_info>[,<ext_info>] OK
AT+CIREG=?	+CIREG: (0-2) OK

10.8.2 Defined values

<n>:

integer type. Enables or disables reporting of changes in the MT's IMS registration information

0 disable reporting. (default)

1 enable reporting (parameter <reg_info>).

2 enable extended reporting (parameters <reg_info> and <ext_info>).

<reg_info>:

integer type. Indicates the IMS registration status

0 not registered.

1 registered.

<ext_info>:

numeric value in hexadecimal format. The value range is from 1 to FFFFFFFF. It is a sum of hexadecimal values, each representing a particular IMS capability of the MT. This parameter is not present if the IMS registration status is "not registered".

1 RTP-based transfer of voice

4 SMS using IMS functionality

The parameter <ext_info>=5 means that both RTP-based transfer of voice according to MMTEL and SMS using IMS functionality can be used. Note: This command is available only when IMS_VOIP_SUPPORT flag is defined

11 GPS Commands

11.1 MT Location Request Notification +CMTLR

This command is used to enable/disable the unsolicited result code.

- Set command is used to enable/disable the unsolicited result code.
- Read command reads the subscribe set ie.Notification is enabled or disabled.
- Test command returns list of supported <subscribe>s..

+CMTLR: <handle_id>,<notification_type>,<location_type>,<client_external_id>,<client_name>,<plane>

11.1.1 Syntax of the Command

AT+CMTLR=<subscribe>

Command	Possible Response(s)
AT+CMTLR=<subscribe>	OK or CME ERROR: <error>
AT+CMTLR?	+CMTLR: <subscribe> OK
AT+CMTLR=?	+CMTLR: (0-3) OK

11.1.2 Defined values

<subscribe>

0 Disables reporting and positioning (default)

1 Notifications of MT-LR over control plane.

2 Notifications of MT-LR over SUPL.

3 Notifications of MT-LR over control plane and SUPL

<handle_id>

0-255

<notification_type>

0 The subscription may stipulate that positioning the user by a third party is allowed and the network may choose to inform the user as a matter of courtesy

1 Locating the user is permitted if the user ignores the notification

2 Locating the user is forbidden if the user ignores the notification.

<location_type>

0 Current location

1 Current or Last location known

2 Initial location

<client_external_id>

String Type

<client_name>

String Type

<plane>

0 Control plane

1 Secure user plane (SUPL)

11.2 MT Location Request Disclosure Allowance +CMTL RA

This command is used to verify wheather the disclosure of the location of MS is allowed or not.

- Set command allows or disallows disclosure of the location of MS.
- Read command reads values allow/handle_id.
- Test command returns list of supported <allow> values .

11.2.1 Syntax of the Command

AT+CMTLRA=<allow>,<handle_id>

Command	Possible Response(s)
AT+CMTLRA=<allow>,<handle_id>	OK or CME ERROR: <error>
AT+CMTLRA?	+CMTLRA: <allow>,<handle_id> OK
AT+CMTLRA=?	+CMTLRA: (0,1) OK

11.2.2 Defined values

<allow>

0 (Default) Location disclosure allowed

1 Location disclosure not allowed

<handle_id>

0(Default)-255

11.3 Positioning Control +CPOS

This command is used positioning control.

- Set command cause TE to enter the transparent mode for sending XML formatted data according to XML DTD for <pos> Subsequent to +CPOS:

-The TA shall send a two character sequence <CR><LF> after command line is termi- nated with <CR>.

-Then text can be entered from TE to ME/TA.

-The echoing of entered characters back from the TA is controlled by V.25ter echo command E.

-Sending may be cancelled by giving <ESC> character (IRA 27).

-<ctrl-Z> (IRA 26) shall be used to indicate the ending of the message body.

- Test command returns none.

11.3.1 Syntax of the Command

Command syntax : AT+CPOS<cr>

text is entered<ctrl-z/esc>

Command	Possible Response(s)
AT+CPOS <CR> text is entered <ctrl-Z/ESC>	OK or CME ERROR: <error>
AT+CPOS=?	OK

11.3.2 Defined Events

<location>

string type in UTF-8. This parameter provides an XML-formatted string of GAD-shape positioning data similar to what is defined in XML DTD below. This parameter shall not be subject to conventional character conversion as per +CSCS

<assist_data>

string type in UTF-8. This parameter provides an XML-formatted string of assistance data as defined in XML DTD below. This parameter shall not be subject to conventional character conversion as per +CSCS.

<GPS_meas>

string type in UTF-8. This parameter provides an XML-formatted string of GPS mea- surement data as defined in XML DTD below. This parameter shall not be subject to conventional character conversion as per +CSCS.

<GPS_assist_req>

string type in UTF-8. This parameter provides an XML-formatted string for requesting assistance data as defined in XML DTD below. This parameter shall not be subject to conventional character conversion as per +CSCS.

<GNSS_meas>

string type in UTF-8. This parameter provides an XML-formatted string of GPS measure- ment data as defined in XML DTD below for LPP procedures and GANSS procedures in RRLP and RRC. This parameter shall not be subject to conventional character conversion as per +CSCS.

<pos_err>

string type in UTF-8. This parameter provides an XML-formatted string of positioning error parameters as defined in XML DTD below. This parameter shall not be subject to conventional character conversion as per +CSCS.

<capability_req>

string type in UTF-8. This parameter provides an XML-formatted string for requesting capability data as defined in XML DTD below. This parameter shall not be subject to conventional character conversion as per +CSCS.

<capabilities>

string type in UTF-8. This parameter provides an XML-formatted string for providing capability data as defined in XML DTD below. This parameter shall not be subject to conventional character conversion as per +CSCS.

NOTE : An XML-formatted string intended for +CPOS can be split e.g. in order to prevent that the string becomes too long. Where to split an XML-formatted string is implementation specific.

NOTE : The elements declared as EMPTY are there as placeholders to indicate future extensions. The XML is currently GPS centric and do not include every possible element of assistance data. Particularly, there is nothing related to GANSS .

11.3.3 XML DTD for <pos>

```
< ?xml version= 1.0 ?>
< ,DOCTYPE pos[
```

```
< ,ELEMENT pos
(location|assist_data|pos_meas|GPS_meas|GNSS_meas|GPS_assist_req|capability_req|capabiliti
es|pos_err)>
]>
```

NOTE : The XML DTD for "pos" is the top-level definition of all positioning

events, containing elements going in both directions between the MS and the network. The subelements of "pos" are superset definitions of the positioning events. A variable amount of these elements can be sent. Sent elements must follow the rules for the XML, e.g. elements postfixed by "?" and can occur zero or more times. The total delivery must be a complete specification. Sub-elements cannot be delivered without being preceeded with an element reference from the above level.

NOTE: GNSS_meas currently supports only gnss_id="GPS"

11.3.4 XML DTD for <location>

<,ELEMENT location (location_parameters,time_of_fix?)>

<,ELEMENT time_of_fix (#PCDATA)>

NOTE : The element "location_parameters" provides one or more XML-formatted strings of GAD-shape positioning data as defined in table for <location parameters>.

11.3.5 XML DTD element for <assist_data>

<,ELEMENT assist_data

(GPS_assist?,msr_assist_data?,system_info_assist_data?,more_assist_data?,ext_container?, rel98_assist_data_ext?,rel5_assist_data_ext?,rel7_assist_data_ext?)>

<,ELEMENT GPS_assist

(status_health?,BTS_clock_drift?,ref_time?,location_parameters?,DGPS_corrections?, nav_model_elem∗,ionospheric_model?,UTC_model?,almanac?,acqu_assist?,GPS_rt_integrity?)>

<,ELEMENT ref_time (GPS_time,GSM_time?,GPS_TOW_assist∗)>

<,ELEMENT GPS_time (GPS_TOW_msec,GPS_week)>

<,ELEMENT GPS_TOW_msec (#PCDATA)>

<,ELEMENT GPS_week (#PCDATA)>

<,ELEMENT GPS_TOW_assist (sat_id,tlm_word,anti_sp,alert,tlm_res)>

<,ELEMENT sat_id (#PCDATA)>

<,ELEMENT tlm_word (#PCDATA)>

<,ELEMENT anti_sp (#PCDATA)>

<,ELEMENT alert (#PCDATA)>

<,ELEMENT tlm_res (#PCDATA)>

<,ELEMENT DGPS_corrections

(sat_id,IODE,UDRE,PRC,RRC,delta_PRC2?,delta_RRC2?)>

<,ELEMENT IODE (#PCDATA)>

<,ELEMENT UDRE (#PCDATA)>

<,ELEMENT PRC (#PCDATA)>

<,ELEMENT RRC (#PCDATA)>

<,ELEMENT delta_PRC2 (#PCDATA)>

<,ELEMENT delta_RRC2 (#PCDATA)>

<,ELEMENT nav_model_elem (sat_id,sat_status,ephem_and_clock?)>

<,ELEMENT sat_status EMPTY>

<,ATTLIST sat_status literal (NS_NN-U|ES_NN-U|NS_NN|ES_SN|REVD) #REQUIRED >

<,ELEMENT ephem_and_clock (l2_code,ura,sv_health,iodc,l2p_flag,esr1,esr2,esr3,esr4,tgd,toc,af2,af1,af0,crs,delta_n,m0,cuc,ecc,cus,power_half,toe,fit_flag,aoda,cic,omega0,cis,i0,crc,omega,omega_dot,idot)>

<,ELEMENT l2_code (#PCDATA)>

<,ELEMENT ura (#PCDATA)>

<,ELEMENT sv_health (#PCDATA)>

<,ELEMENT iodc (#PCDATA)>

<,ELEMENT l2p_flag (#PCDATA)>

<,ELEMENT esr1 (#PCDATA)>

<,ELEMENT esr2 (#PCDATA)>

<,ELEMENT esr3 (#PCDATA)>

<,ELEMENT esr4 (#PCDATA)>

<,ELEMENT tgd (#PCDATA)>

<,ELEMENT toc (#PCDATA)>

<,ELEMENT af2 (#PCDATA)>

<,ELEMENT af1 (#PCDATA)>

<,ELEMENT af0 (#PCDATA)>
<,ELEMENT crs (#PCDATA)>
<,ELEMENT delta_n (#PCDATA)>
<,ELEMENT m0 (#PCDATA)>
<,ELEMENT cuc (#PCDATA)>
<,ELEMENT ecc (#PCDATA)>
<,ELEMENT cus (#PCDATA)>
<,ELEMENT power_half (#PCDATA)>
<,ELEMENT toe (#PCDATA)>
<,ELEMENT fit_flag (#PCDATA)>
<,ELEMENT aoda (#PCDATA)>
<,ELEMENT cic (#PCDATA)>
<,ELEMENT omega0 (#PCDATA)>
<,ELEMENT cis (#PCDATA)>
<,ELEMENT i0 (#PCDATA)>
<,ELEMENT crc (#PCDATA)>
<,ELEMENT omega (#PCDATA)>
<,ELEMENT omega_dot (#PCDATA)>
<,ELEMENT idot (#PCDATA)>
<,ELEMENT ionospheric_model
(alfa0,alfa1,alfa2,alfa3,beta0,beta1,beta2,beta3)>
<,ELEMENT alfa0 (#PCDATA)>
<,ELEMENT alfa1 (#PCDATA)>
<,ELEMENT alfa2 (#PCDATA)>
<,ELEMENT alfa3 (#PCDATA)>
<,ELEMENT beta0 (#PCDATA)>
<,ELEMENT beta1 (#PCDATA)>
<,ELEMENT beta2 (#PCDATA)>
<,ELEMENT beta3 (#PCDATA)>
<,ELEMENT UTC_model (a1,a0,tot,wnt,dtls,wnlsf,dn,dtlsf)>
<,ELEMENT a1 (#PCDATA)>
<,ELEMENT a0 (#PCDATA)>

<,ELEMENT tot (#PCDATA)>

<,ELEMENT wnt (#PCDATA)>

<,ELEMENT dtls (#PCDATA)>

<,ELEMENT wnlsf (#PCDATA)>

<,ELEMENT dn (#PCDATA)>

<,ELEMENT dtlsf (#PCDATA)>

<,ELEMENT almanac (wna,alm_elem*)>

<,ELEMENT wna (#PCDATA)>

<,ELEMENT alm_elem (data_id?,sat_id,alm_ecc,alm_toa,alm_ksii,alm_omega_dot,alm_sv_health,alm_power_half, alm_omega0,alm_omega,alm_m0,alm_af0,alm_af1)>

<,ELEMENT data_id (#PCDATA)>

<,ELEMENT alm_ecc (#PCDATA)>

<,ELEMENT alm_toa (#PCDATA)>

<,ELEMENT alm_ksii (#PCDATA)>

<,ELEMENT alm_omega_dot (#PCDATA)>

<,ELEMENT alm_sv_health (#PCDATA)>

<,ELEMENT alm_power_half (#PCDATA)>

<,ELEMENT alm_omega0 (#PCDATA)>

<,ELEMENT alm_omega (#PCDATA)>

<,ELEMENT alm_m0 (#PCDATA)>

<,ELEMENT alm_af0 (#PCDATA)>

<,ELEMENT alm_af1 (#PCDATA)>

<,ELEMENT acqu_assist (tow_msec,sat_info)>

<,ELEMENT tow_msec (#PCDATA)>

<,ELEMENT sat_info (sat_id,dopl0,dopl_extra?,code_ph,code_ph_int,GPS_bitno,srch_w,az_el?)>

<,ELEMENT dopl0 (#PCDATA)>

<,ELEMENT dopl_extra (dopl1,dopl1_uncert)>

<,ELEMENT dopl1 (#PCDATA)>

<,ELEMENT dopl1_uncert EMPTY>

<,ATTLIST dopl1_uncert literal (hz12-5|hz25|hz50|hz100|hz200) #REQUIRED>

< ,ELEMENT code_ph (#PCDATA)>

< ,ELEMENT code_ph_int (#PCDATA)>

< ,ELEMENT GPS_bitno (#PCDATA)>

< ,ELEMENT srch_w (#PCDATA)>

<,ELEMENT az_el (az,elev)>

<,ELEMENT az (#PCDATA)>

<,ELEMENT elev (#PCDATA)>

<,ELEMENT GPS_rt_integrity (#PCDATA)>

<,ELEMENT msr_assist_data EMPTY>

<,ELEMENT system_info_assist_data EMPTY>

<,ELEMENT more_assist_data EMPTY>

<,ELEMENT ext_container EMPTY>

<,ELEMENT rel98_assist_data_ext EMPTY>

<,ELEMENT rel5_assist_data_ext EMPTY>

<,ELEMENT rel7_assist_data_ext EMPTY>

11.3.6 XML DTD element for <pos_meas>

<,ELEMENT pos_meas (meas_abort|assist_data_reset|RRLP_meas|RRC_meas)>

<,ELEMENT meas_abort EMPTY>

<,ELEMENT assist_data_reset EMPTY>

<,ELEMENT RRLP_meas (RRLP_pos_instruct)>

<,ELEMENT RRLP_pos_instruct

(RRLP_method_type,RRLP_method,resp_time_seconds,mult_sets)>

<,ELEMENT RRLP_method_type

(ms_assisted|ms_assisted_no_accuracy|ms_based|ms_based_pref|ms_assisted_pref)>

<,ELEMENT ms_assisted (method_accuracy)>

<,ELEMENT method_accuracy (#PCDATA)>

<,ELEMENT ms_assisted_no_accuracy EMPTY>

<,ELEMENT ms_based (method_accuracy)>

<,ELEMENT ms_based_pref (method_accuracy)>

<,ELEMENT ms_assisted_pref (method_accuracy)>

<,ELEMENT RRLP_method EMPTY>

<,ATTLIST RRLP_method literal (gps) #REQUIRED>

<,ELEMENT resp_time_seconds (#PCDATA)>

<,ELEMENT mult_sets EMPTY>

<,ATTLIST mult_sets literal (multiple|one) #REQUIRED>

<,ELEMENT RRC_meas (rep_quant,rep_crit)>

<,ELEMENT rep_quant (RRC_method_type,RRC_method,hor_acc?,vert_acc?)>

<,ATTLIST rep_quant gps_timing_of_cell_wanted (true|false) "false"
addl_assist_data_req (true|false) #REQUIRED>

<,ELEMENT RRC_method_type EMPTY>

<,ATTLIST RRC_method_type literal

(ue_assisted|ue_based|ue_based_pref|ue_assisted_pref) #REQUIRED>

<,ELEMENT RRC_method EMPTY>

<,ATTLIST RRC_method literal (otdoa|gps|otdoaOrGPS|cellID) #REQUIRED>

<,ELEMENT hor_acc (#PCDATA)>

<,ELEMENT vert_acc (#PCDATA)>

<,ELEMENT rep_crit (no_rep|event_rep_crit|period_rep_crit)>

<,ELEMENT no_rep EMPTY>

<,ELEMENT event_rep_crit (event_par∗)>

<,ELEMENT event_par (rep_amount,meas_interval,event_specific_info?) >

<,ATTLIST event_par report_first_fix (true|false) #REQUIRED>

<,ELEMENT rep_amount EMPTY>

<,ATTLIST rep_amount literal (ra1|ra2|ra4|ra8|ra16|ra32|ra64|ra-Infinity) #REQUIRED>

<,ELEMENT meas_interval EMPTY>

<,ATTLIST meas_interval literal (e5|e15|e60|e300|e900|e1800|e3600|e7200) #REQUIRED>

<,ELEMENT event_specific_info (tr_pos_chg|tr_SFN_SFN_chg|tr_SFN_GPS_TOW)>

<,ELEMENT tr_pos_chg EMPTY>

<,ATTLIST tr_pos_chg literal

(pc10|pc20|pc30|pc40|pc50|pc100|pc200|pc300|pc500|pc1000|pc2000|pc5000|pc10000|pc20000

|pc50000|pc100000) #REQUIRED>

<,ELEMENT tr_SFN_SFN_chg EMPTY>

<,ATTLIST tr_SFN_SFN_chg literal (c0-25|c0-5|c1|c2|c3|c4|c5|c10|c20|c50|c100|c200|c500|c1000|c2000|c5000)

#REQUIRED>

<,ELEMENT tr_SFN_GPS_TOW EMPTY>

<,ATTLIST tr_SFN_GPS_TOW literal (ms1|ms2|ms3|ms5|ms10|ms20|ms50|ms100) #REQUIRED>

<,ELEMENT period_rep_crit EMPTY>

<,ATTLIST period_rep_crit rep_amount (ra1|ra2|ra4|ra8|ra16|ra32|ra64|ra-Infinity)

"ra-Infinity">

<,ATTLIST period_rep_crit rep_interval_long (ril0|ril0-25|ril0-5|ril1|ril2|ril3|ril4|ril6|ril8|ril12|ril16|ril20|ril24

|ril28|ril32|ril64) #REQUIRED>

11.3.7 XML DTD element for <GPS_meas>

<,ELEMENT GPS_meas (ref_time_only,meas_params*)>

<,ELEMENT ref_time_only (tow_msec)>

<,ELEMENT tow_msec (#PCDATA)>

<,ELEMENT meas_params (sat_id,carr2_noise,dopl,whole_chips,fract_chips,multi_path,psr_rms_err)>

<,ELEMENT carr2_noise (#PCDATA)>

<,ELEMENT dopl (#PCDATA)>

<,ELEMENT whole_chips (#PCDATA)>

<,ELEMENT fract_chips (#PCDATA)>

<,ELEMENT multi_path EMPTY>

<,ATTLIST multi_path literal (not_measured|low|medium|high) #REQUIRED>

<,ELEMENT psr_rms_err (#PCDATA)>

11.3.8 XML DTD element for <GPS_assist_req>

<,ELEMENT GPS_assist_req (nav_addl_data?)>

<,ATTLIST GPS_assist_req alm_req (true|false) "false"

UTC_model_req (true|false) "false"

ion_req (true|false) "false" nav_model_req (true|false) "false" DGPS_corr_req (true|false) "false" ref_loc_req (true|false) "false" ref_time_req (true|false) "false" aqu_assist_req (true|false) "false" rt_integr_req (true|false) "false">

<,ELEMENT nav_addl_data

(GPS_week,GPS_toe,ttoe_limit,addl_req_sat∗)>

<,ELEMENT GPS_week (#PCDATA)>

<,ELEMENT GPS_toe (#PCDATA)>

<,ELEMENT ttoe_limit (#PCDATA)>

<,ELEMENT addl_req_sat (sat_id,iode)>

<,ELEMENT iode (#PCDATA)>

11.3.9 XML DTD element for <pos_err>

<,ELEMENT pos_err (err_reason)>

<,ELEMENT err_reason_EMPTY>

<,ATTLIST err_reason literal

(undefined_error|not_enough_gps_satellites|gps_assist_data_missing) #REQUIRED>

11.3.10 XML DTD element for <capability_req>,capabilities>

<,ELEMENT capability_req EMPTY>

<,ELEMENT capabilities

(GPS_method?,GPS_aid?)>

<,ELEMENT GPS_Method (MSA_sup?,MSB_sup?,Standalone_sup?)>

<,ELEMENT MSA_sup EMPTY>

<,ATTLIST MSA_sup fta_sup CDATA "000"> < ,-- as LPP fta-MeasSupport -- >

<,ELEMENT MSB_sup EMPTY>

<,ATTLIST MSB_sup fta_sup CDATA "000" velocity_sup (true|false) "false">

<,ELEMENT Standalone_sup EMPTY>

<,ATTLIST Standalone_sup fta_sup CDATA "000" < ,-- as LPP fta-MeasSupport --
>

velocity_sup (true|false) "false">

<,ELEMENT GPS_aid
(almanac_sup?,UTC_model_sup?,ionospheric_sup?,nav_model_sup?,DGPS_sup?,
ref_loc_sup?,ref_time_sup?,acquisition_sup?,rt_integr_sup?)>

<,ELEMENT almanac_sup EMPTY>

<,ELEMENT UTC_model_sup EMPTY>

<,ELEMENT ionospheric_sup EMPTY>

<,ELEMENT nav_model_sup EMPTY>

<,ELEMENT DGPS_sup EMPTY>

<,ELEMENT ref_loc_sup EMPTY>

<,ELEMENT ref_time_sup EMPTY>

<,ELEMENT acquisition_sup EMPTY>

<,ELEMENT rt_integr_sup EMPTY>

11.3.11 XML DTD element for <GNSS_meas>

<,ELEMENT GNSS_meas (code_phase_ambiguity?,sat_meas_params_gnss∗)>

<,ATTLIST GNSS_meas gnss_id GPS|SBAS|QZSS|Galileo|Glonass) "GPS">

<,ELEMENT code_phase_ambiguity (#PCDATA)>

<,ELEMENT sat_meas_params_gnss

(sat_id,carr2_noise,doppler_mps?,code_phase_ms,integer_code_phase?,multi_path,psr_rms_err,adr?)>

<,ATTLIST sat_meas_params_gnss measured_signal

(GPS_L1|GPS_L1C|GPS_L2C|GPS_L5|SBAS_L1|GLO_G1|GLO_G2|GLO_G3) "GPS_L1">

<,ELEMENT doppler_mps (#PCDATA)>

<,ELEMENT code_phase_ms (#PCDATA)>

<,ELEMENT integer_code_phase (#PCDATA)>

<,ELEMENT adr (#PCDATA)>

NOTE: GNSS_meas is used for reporting measurements results for GNSS procedures i.e. proceures where: GNSS_allowed_methods, GNSS_assist was received or where acqu_assist uses units of ms. Currenlty only gnss_id="GPS" is supported.

11.4 Positioning Reporting +CPOSR

This command is used to enable/disable the unsolicited result code.

- Set command is used to enable/disable the unsolicited result code. The XML formatted string may be sent as one or more unsoliciated result codes. Each part of the XML Formatted string is sent as one unsoliciated result code prefixed by +CPOSR: and terminated with<CTRL-Z>
- Read command reads the current mode set ie,mode is enabled or disabled.
- Test command returns list of supported <mode>s.

+CPOSR: < positioning data in XML Format ><CTRL-Z>

11.4.1 Syntax of the Command

AT+CPOSR=<mode>

Command	Possible Response(s)
AT+CPOSR=<mode>	OK or CME ERROR: <error>
AT+CPOSR?	+CPOSR: <mode> OK
AT+CPOSR=?	+CPOSR: (list of supported mode's) OK

11.4.2 Defined values

<allow>

0 (Default) Disable Reporting

1 Enable Reporting

11.4.3 Defined Events

<assist_data>

string type in UTF-8. This parameter provides an XML-formatted string of assistance data as defined in XML DTD in CPOS description. This parameter shall not be subject to conventional character conversion as per +CSCS.

<pos_meas>

string type in UTF-8. This parameter provides an XML-formatted string of position measurements data as defined in XML DTD in CPOS description. This parameter shall

not be subject to conventional character conversion as per +CSCS.

<capabilities>
string type in UTF-8. This parameter provides an XML-formatted string for providing capability data as defined in XML DTD defined in CPOS description. This parameter shall not be subject to conventional character conversion as per +CSCS.

11.5 Additional Positioning Reporting +XCPOSR

This command is used to enable/disable the unsolicited result code.

- Set command is used to enable/disable the unsolicited result code. The XML formatted string may be sent as one or more unsoliciated result codes. Each part of the XML Formatted string is sent as one unsoliciated result code prefixed by +XCPOSR: and terminated with<CTRL-Z>
- Read command reads the current mode set ie,mode is enabled or disabled.
- Test command returns list of supported <mode>s.

+XCPOSR: < positioning data in XML Format ><CTRL-Z>

11.5.1 Syntax of the Command

AT+XCPOSR=<mode>

Command	Possible Response(s)
AT+XCPOSR=<mode>	OK or CME ERROR: <error>
AT+XCPOSR?	+XCPOSR: <mode> OK
AT+XCPOSR=?	+XCPOSR: (list of supported mode's) OK

11.5.2 Defined values

<allow>

0 (Default) Disable Reporting

1 Enable Reporting

11.5.3 Defined Events

<assist_data_reset>

Indication to AP to reset the assistance data. Element of <pos_meas>.string type in UT F-8. This parameter provides an XML-formatted string of positioning error parameters as defined in XML DTD in <pos_meas>. This parameter shall not be subject to conventional character conversion as per +CSCS.

11.6 Mobile originated location request +CMOLR

This command is used to verify wheather the disclosure of the location of MS is allowed or not.

- Set command initiates Mobile Originated

Location Request

- Read command reads the current settings of the parameters <enable>, <method>, <hor_accset>, <hor_acc>, <ver_req>, <ver_acc_set>, <ver_acc>, <vel_req>, <rep_mode>, <timeout>, <interval>, <shape_rep>, <plane> and <thirdpartyaddress>

  .

- Test command returns list of supported <allow> values.

Note: The parameters <hor_acc>, <veracc_set>, <ver_acc> and <plane> are only applicable in certain configurations. The parameter <interval> is only applicable if periodic reporting is specified. The parameter <third-party-address> is only applicable if reporting to third party is specified.

Note: <vel_req>, <timeout> and <NMEA-rep> are not supported currently. But the order is maintained. Input will be as below sample example (<vel_req>,<timeout> and <NMEA-rep> shall be left empty):
AT+CMOLR=2,5,1,122,1,1,100,,1,,1000,64,0,, "123456789"

11.6.1 Syntax of the Command

Command	Possible Response(s)
AT+CMOLR=<enable>[,<method>[,<hor_accset>[,<hor_acc>[,ver_req>[,<veraccset>[,<ver_acc>[,<velreq>[,<repmode>[<timeout>[,<interval>[,<shaperep>[,<plane>[,<NMEA-rep>[,<third_party_address>]]]]]]]]]]]]]	OK or CME ERROR: <error>
AT+CMOLR?	+CMOLR: <enable>,<method>,<hor_accset>,[<hor_acc>],<ver_req>,[<ver_accset>],[<ver_acc>],<vel_req>,<repmode>,<timeout>,[<vailable>],<shaperep>,<plane>,<NMEA-rep>,[<third_party_address>] OK or CME ERROR: <error>

AT+CMOLR=?	+CMOLR: (list of supported <enable>s), (list ofsupported <method>s), (list of supported <hor_accset>s), (list of supported <hor_acc>s), (list ofsupported <ver_req>s), (list of supported <veraccset>s), (list of supported <ver_acc>s), (list of supported <vel_req>s),(list of supported <interval>s), (list of supported <shaperep>s), (list of supported <plane>s) OK

11.6.2 Defined values

<allow>

0 (Default) Location disclosure allowed

1 Location disclosure not allowed

<handle_id>

0(Default)-255

<enable>

integer type. Enables and disables reporting location as a result of a MO-LR. Only one
<method> can be enabled at any given time.

0 Disables reporting and positioning.

2 Enables reporting of GAD shapes by unsolicited result code +CMOLRG: <location_
parameters>. Lack of data at each timeout is indicated by an unsolicited result code +CMOLRE.

NOTE 1: The string of <location_parameters> intended for +CMOLR ,can be split into multiple unsolicited result codes e.g. in order to prevent that the string in the unsolicited result code becomes too long. How to split the string is implementation specific.

<method>

integer type. Method for MO-LR. The default value is implementation specific.

0 Unassisted GPS. Autonomous GPS only, no use of assistance data.

1 Assisted GPS (see NOTE 2).

5 Transfer to third party.This method makes the parameters <shape-rep> and <NME A-rep> irrelevant (any values are accepted and disregarded).The third party address is given in the parameter <thirdparty-address>

<hor_acc_set>

integer type.

0 Horisontal accuracy not set/specified.

1 Horizontal accuracy set in parameter <hor_acc>.

<hor_acc>

integer type. Requested accuracy as horizontal uncertainty exponent (refer to 3GP P TS 23.032 [76] subclause 6.2). The value range is 0-127. The default value is implementation specific.

<ver_req>

integer type. 0 Vertical coordinate (altitude) is not requested, 2D location fix is accept- able. The parameters <ver_acc_set> and <ver_acc> do not apply.

1 Vertical coordinate (altitude) is requested, 3D location fix is required.

<ver_acc_set>

integer type.

0 Vertical accuracy not set/specified.

1 Vertical accuracy set/specified in parameter <ver_acc>.

<ver_acc>

integer type. Requested accuracy as vertical uncertainty exponent (refer to 3GPP TS 23.
032 [76] subclause 6.4). The value range is 0-127. The default value is implementation specific.

<vel_req>

NOTE: Currently not supported as REL8 integer type. Requested velocity type (refer to
3GPP TS 23.032 [76] subclause 8.6). ETSI 3GPP TS 27.007 version 8.13.0 Release 8
123 ETSI TS 127 007 V8.13.0 (2010-10)

0 Velocity not requested.

1 Horizontal velocity requested.

2 Horizontal velocity and vertical velocity requested.

3 Horizontal velocity with uncertainty requested.

4 Horizontal velocity with uncertainty and vertical velocity with uncertainty requested.

<rep_mode>

integer type. Reporting mode. The default value is implementation specific.

0 Single report, the timeout for the MO-LR response request is specified by <timeout>.

1 Periodic reporting, the timeout for each MO-LR response request is specified by
<timeout> and the interval between each MO-LR is specified by <interval>.

<timeout>

NOTE: Currenlty not supported as REL8

integer type. Indicates how long the MS will wait for a response after a MO-LR request. The value range is in seconds from 1 to 65535. The default value is implementation specific.

<interval>

integer type. The parameter is applicable to periodic reporting only. Determine the interval between periodic MO-LRs. The value range is in seconds from 1 to 65535, and must be greater than or equal to <timeout>. The default value is implementation specific.

<shape_rep>

integer type. This parameter is a sum of integers each representing a certain GAD shape that will be accepted in the unsolicited result code <location_parameters>. Note that only one GAD shape is present per unsolicited result code. The default value is implementation specific.

1 Ellipsoid point.

2 Ellipsoid point with uncertainty circle.

4 Ellipsoid point with uncertainty ellipse.

8 Polygon.

16 Ellipsoid point with altitude.

32 Ellipsoid point with altitude and uncertainty ellipsoid.

64 Ellipsoid arc.

<plane>

0 Control plane.

<NMEA-rep>

NOTE: Currenlty not supported

<third_party_address>

string type. The parameter is applicable to reporting to third party only, and specifies the address to the third party. This parameter has to be specified when <method> value is set to 5.

<location_parameters>

string type in UTF-8. This parameter provides XML-formatted strings of GADshape positioning data as defined in in cpos XML DTD. This parameter shall not be subject to conventional character conversion as per +CSCS. The XML according to the DTD in cpos

XML DTD may be provided in one or multiple unsolicited result codes.

11.7 Mobile Originated Location Request Error +CMOLRE

This command is used to enable or disable string on numeric error displaz in CMOLRE

unsolicited error response.

- Set command enables or disables string or numeric error format.
- Read command reads the current settings.
- Test command returns list of supported values.

11.7.1 Syntax of the Command

Command	Possible Response(s)
AT+CMOLRE=<enable>	OK or CME ERROR: <error>
AT+CMOLRE?	+CMOLRE: <enable> OK or CME ERROR: <error>
AT+CMOLRE=?	+CMOLRE: (list of supported <enable>s) OK

11.7.2 Defined Values

<allow>

0 (Default) Numeric display

1 String display

11.8 Time Stamp Generation +XLGTSR

This command is used to request the modem to generate the 2G or 3G or LTE time stamp depends upon the RAT to which the modem is connected.

- Action command triggers the modem to generate the time stamp
- Read command reads either 2G or 3G or LTE parameters
- Test command returns success

2G response:

+XLGTSR : <bsic>,<time_slot>,<bit_number>,<bcch_carrier>,<ref_frame>,<timing_advance>

3G response:

+XLGTSR :
<gpstimingcellframes_mspart>,<gpstimingcellframes_lspart>,<refcellsfn>,
<refcellpsc>, <modem_state>

LTE response :

+XLGTSR: <physical_cell_id>,<earfcn>[,<sfn>]

11.8.1 Syntax of the Command

Command	Possible Response(s)
AT+XLGTSR=[<pulse_duration>]	+XLGTSR: <2G params> or <3G params> or < LTE params > OK or CME ERROR: <error>
AT+XLGTSR?	+XLGTSR: <2G params> or <3G params> or < LTE parmas > OK
AT+XLGTSR=?	OK

11.8.2 Defined values

<pulse_duration>

1-8

<bsic>

0-63

<time_slot>

0-7

<bit_number>

0-156

<bcch_carrier>

0-1023

<ref_frame>

0-2097151

<timing_advance>

0-63

<gpstimingcellframes_mspart>

0-16383

<gpstimingcellframes_lspart>

0-4294967295

<refcellsfn>

0-4095

<refcellpsc>

0-511

<modem_state>

0 Cell Dedicated Channel State

1 Cell Forward Access Channel State

2 Invalid Modem state

<physical_cell_id>

integer type, and is Physical cell identity of the reference cell

<earfcn>

integer type, EUTRAN channel number, ranges from 0 to 65535

<sfn>

integer type and contain System frame number at which HW pulse was generated ranges, from 0 to 1023

11.9 LCS capabilities + XLCAPS

This command is used to request the modem to generate the 2G or 3G time stamp depends upon the RAT to which the modem is connected. This command provides unsolicited the LCS capabilities.

- Set Commad will enable or disable the URC.
- Read Command will give the current status of LCS capability.

- Test command will give the possible supported values.

For RRC/RRLP:

URC:

+XLCAPS:<agps_ms_a>,<agps_ms_b>,<rrlp>,<rrc>,<gps_auto

nomous> For LTE:

URC:+XLCAPS:<agps_ms_a>,<agps_ms_b>,<rrlp>,<rrc>,<gps

_autonomous>,

<llp>,<llp_fta>,<llp_otdoa>, <lpp_ecid>, <glonass_support>

11.9.1 Syntax of the Command

Command	Possible Response(s)
AT+XLCAPS=<mode>	OK or CME ERROR: <error>
AT+XLCAPS?	For RRC/RRLP: +XLCAPS:<agps_ms_a>,<agps_ms_b>,<rrlp>, <rrc>,<gps_autonomous> OK or For LTE: +XLCAPS:<agps_ms_a>,<agps_ms_b>,<rrlp>, <rrc>,<gps_autonomous>, <llp>,<llp_fta>,<llp_otdoa>,<lpp_ecid>, <glonass_support> OK

AT+XLCAPS=?	For RRC/RRLP: +XLCAPS: (range of <agps_ms_a>), (range of < agps_ms_b>),(listof <rrlp>),(list of <rrc>),(list of <gps_autonomous>) OK or For LTE: +XLCAPS: (range of <agps_ms_a>),(range of <agps_ms_b>),(list of <rrlp>),(list of <rrc>),(list of <gps_autonomous>),(range of <lpp>),(range of < lpp_fta>),(list of <lpp_otdoa>),(list of <lpp_ecid>),(list of <glonass_support>) OK

<mode>

0 disable (default)

1 enable

<agps_ms_a>,<agps_ms_b>,<rrlp>,<rrc>,<gps_autonomous>,<lpp>,<lpp_fta>,<lpp_otdoa>,<lpp_ecid>,<glonass_support>

0 not supported

1 supported

<agps_ms_a>

MS assisted GPS

<agps_ms_b>

MS Based GPS

<rrlp>

Radio Resource LCS Protocol

<rrc>

Radio Resource Control

<gps_autonomous>

Autonomous GPS

<lpp>

LTE Positioning Protocol(LPP) is supported.

<lpp_fta>

Fine Time Assistance (FTA) measurement

<lpp_otdoa>

Observed Time Difference of Arrival(OTDOA) positioning method

<lpp_ecid>

Enhanced cell id(positioning method)

<glonass_support>

Support of GLObal'naya NAvigatsionnaya Sputnikovaya Sistema (Russian GNSS) or Global Navigation Satellite System

12 SIM TOOL KIT Dedicated Mode Commands

12.1 STKPRO

This command displays the list of supported proactive commands. Test command returns set of proactive commands supported. Only test command is allowed. In addition there is an unsolicited result code +STKPRO: <proactive_cmd>...

- +STKPRO: 01, <type>
- +STKPRO: 05, <event_list>
- +STKPRO: 16, <number>, <subaddr>, <type>, <alpha_1>, <icon_id1>, <alpha_2>,<icon_id2>
- +STKPRO: 17, <ss_data>, <alpha>, <icon_id>, <ref_number>
- +STKPRO: 18, <dcs>, <hex_string>, <alpha>, <icon_id>, <ref_number>
- +STKPRO: 19, <alpha>, <icon_id>, <ref_number>
- +STKPRO: 20, <alpha>, <icon_id>, <dtmf_string>
- +STKPRO: 21, <URL>, <alpha>, <icon_id>
- +STKPRO: 32, <tone>, <unit>, <interval>, <alpha>, <icon_id>
- +STKPRO: 33, <type>, <dcs>, <hex_string>, <icon_id>
- +STKPRO: 34, <type>, <dcs>, <hex_string>, <icon_id>
- +STKPRO: 35, <type>, <dcs>, <hex_string>, <max_rsp_len>, <min_rsp_len>,<defaulttext>, <icon_id>

- +STKPRO: 36, <type>, <alpha>, <item_id>, <total_items>, <item_text>, <next_action>, <default_item>, <icon_id>, <icon_id_list_element>
- +STKPRO: 37, <type>, <alpha>, <item_id>, <total_items>, <item_text>, <next_action>, <icon_id>, <icon_id_list_element>
- +STKPRO: 38,<type>
- +STKPRO: 40, <dcs>, <hex_string>, <icon_id>
- +STKPRO: 52, <type>, <alpha>, <icon_id>
- +STKPRO: 53, <language> -+STKPRO: 64,<cmd_qualifier>,<alpha_id>,<icon_refrence>,<dialing_number>,<reconnect_interval>, <reconnect_unit>, <idle_interval>, <idle_ unit>, <bearer_type>, <bearer_parameter>, <buffer_size>, <login_dcs>, <login_ text>, <password_dcs>, <password_text>, <transaport_level>, <transport_port>,<sub_address>, <destination_address_type>, <destination_address>

12.1.1 syntax of the command

Command	Possible Response(s)
AT+STKPRO=?	+STKPRO=01,05,16,17,18,19,20,21,32,33,34,35,36, 37,38,40,52,53,64 OK

12.1.2 Defined Values

Possible values of <alpha>,<alpha_1>,<alpha_2>,<item_text>,<default text>:

text string

Possible values of <dcs>:

data coding scheme

Possible values of <default_item>:

default item (s. item_id)

Possible values of <event_list> may be:

- 04: User activity event
- 05: Idle screen available event
- 07: Language selection
- 08: Browser Termination event

Possible values of <hex_string> :

string containing data in hexadecimal format

Possible values of <icon_id>,<icon_id1>,<icon_id2>,<icon_id_list_element>:

icon identifier list object (list containing icon id's. Example:<icon_id1>,<icon_id2>)

Possible values of <interval>:

time duration in number of units

Possible values of <item_id>:

item identifier (Identifier of item chosen s. GSM11.14)

Possible values of <language>:

2 bytes string indicating the language

Possible values of <max rsp len>:

maximum response length

Possible values of <min rsp len>:

minimum response length

Possible values of <next_action>:

next action

Possible values of <number>:

called party number

Possible values of <proactive_cmd> may be:

- 01: refresh
- 05: set up event list

- 16: set up call
- 17: send SS
- 18: send USSD
- 19: send SMS
- 20: send DTMF
- 21: launch browser
- 32: play tone
- 33: display text
- 34: get inkey
- 35: get input
- 36: select item
- 37: set up menu
- 38: language setting
- 40: set up idle mode text
- 52: run at cmd info
- 53: language notification
- 64: open channel
- 129: end of the proactive session

Possible values of <ref_number>:

reference number

Possible values of <subaddr>:

called party subaddr.

Possible values of <ss_data>:

data string

Possible values of <type>:

integer as command qualifier; possible value 4 meaning "language"

Possible values of <tone> tone may be:

01: dial tone

02: call subscriber busy

03: congestion

04: radio path acknowledge

05: radio path not available

06: error / special information

07: call waiting tone

08: ringing tone

10: general beep

11: positive acknowledgement tone

12: negative acknowledgement or error tone

Possible values of <total items>:

total items

Possible values of <unit> may be:

0: minutes

1: seconds

2: tenth of seconds

Possible values of <URL> :

URL that shall be loaded

Possible values of <reconnect_interval>:

A duration for reconnect tries. The interval specifies the time interval of the duration in multiples of the time unit used. The range is from 1 to 255. 0 indicates a non-existing duration object.

Possible values of <reconnect_unit> :

used with <reconnect_interval>

MINUTES = 0,

SECONDS = 1,

UNIT_TENTH_OF

_SECONDS = 2

Possible values of <idle_interval> :

Defines the duration when an idle connection is released automatically.
If not present, the terminal never shall releases a connection
automatically. The range is from 1 to 255.
0 indicates a non-existing duration object.

Possible values of

<idle_unit> : used

with < idle_interval

> MINUTES = 0,

SECONDS = 1,

UNIT_TENTH_OF

_SECONDS = 2

Possible values of

<bearer_type>:

CIRCUIT_SWITCHED =

1,

PACKET_SWITCHED=

2,

DEFAULT = 3,

INVALID = 255

Possible values of <bearer_parameter> :

The parameters value gives detailed information dependent on the type. Hex String

Possible values of <buffer_size> :

The buffer the terminal shall allocate for channel data. The terminal may
allocate less or more than the this

Possible values of <login_dcs> :

The data coding scheme of the text string. Text strings may be coded in 7-bit, 8-bit or
UCS2 (16-bit) for user authentication data if requested by the bearer connection.

Possible values of <login_text> :

Specifies user authentication data if requested by the bearer connection.
Coding based on <login_dcs>

Possible values of <password_dcs> :

The data coding scheme of the text string. Text strings may be coded in 7-bit, 8-bit or
UCS2 (16-bit) for user authentication data if requested by the bearer connection.

Possible values of <password_text> :

Specifies user authentication data if requested by the bearer connection.
Coding based on <password_dcs>

Possible values of <transaport_level> :

Specifies the transport layer protocol of the UICC/terminal connection

UDP = 1, ///< UDP (as defined in

RFC 768 [9]). TCP = 2, ///< TCP

(as defined in RFC 793 [10]).

INVALID = 255 /// No transport protocol specified (CAT takes care about transport layer).

Possible values of <transport_port> :

speicifies the port number. Integer

Possible values of <sub_address> :

A called party sub address for CS bearers only.

Possible values of <destination_address_type>:

IP4 = 33, ///< IP

v4 IP address.

IP6 = 87, ///< IP

v6 IP address.

INVALID = 255 ///< Unknown address type.

Possible values of <destination_address> :

Specifies the destination point of the connection. Hex string.

12.2 STKTR

This action command allows entering the response to a SIM application TK proactive command which was displayed by the unsolicited result code +STKPRO.

-Set command allows entering the proactive response to SIM application TK. If fails returns CME ERROR.

-Test command returns supported proactive response list.

12.2.1 syntax of the command

AT+STKTR=<proactive_cmd> [,<result>,<add_result> [,<last_cmd>][,<dcs>][,<hex string>]]

The parameters depend on the proactive command:

+STKTR: 01, <result>, [<add_result>] refresh

+STKTR: 05, <result> set up event list

+STKTR: 16, <result>, [<add_result>] set up call

+STKTR: 17, <result>, <add_result> send SS

+STKTR: 18, <result>, <add_result> send USSD

+STKTR: 19, <result>, <add_result> send SMS

+STKTR: 20, <result>,[<add_result>] send DTMF

+STKTR: 21: <result> launch browser

+STKTR: 32, <result>, <add_result> play tone

+STKTR: 33, <result>, <add_result> display text

+STKTR: 34, <result>, <add_result>,0,<dcs>,<hex_string> get inkey

+STKTR: 35, <result>, <add_result>,0,<dcs>,<hex_string> get input

+STKTR: 36, <result>, <add_result>,0,<dcs>,<hex_string> select item

Note: the 0 stands for the parameter <last_cmd> which is obsolete but not removed so far

+STKTR: 37, <result>, <add_result> set up menu

+STKTR: 38, <language as integer, e.g.28261> language setting

+STKTR: 40, <result>, <add_result> set up idle mode text

+STKTR: 52, <result>, <add_result> run at cmd info

+STKTR: 53, <result>, <add_result> language notification

Note: For the general results (<result>) 32, 33, 38, 52, 53, 55, 56, 57 and 58, it is mandatory for the ME to provide a specific cause value as additional information. For others additional information will be ignored.

+STKTR: 64,
<result>[,<add_result>,<last_cmd>,<buffer_size>,<open_channel_id>,
<link_status>,<channel_status_state>,<bearer_description_type>,<bearer_description_
params>,<address_type>,<address>]

Command	Possible Response(s)
AT+STKTR=1,0	OK or CME ERROR: <error>
AT+STKTR=?	+STKTR=01,05,16,17,18,19,20,21,32,33 ,34,35,36, 37,38,40,52,53,64 OK

12.2.2 Defined Values

Possible values of <add_result> :

additional result

Possible values of <dcs> :

data coding scheme

Possible values of <hex_string> :

string in hexadecimal format

Possible values of <last_cmd> :

last command

Possible values of <proactive_cmd> :

decimal code indicates the command (refer +STKPRO)

Possible values of <result> may be (decimal code indicated):

- 0: command performed successfully
- 1: command performed with partial comprehension
- 2: command performed with missing information
- 3: REFRESH performed with additional Efs read
- 4: command performed successfully, but requested icon could not be displayed
- 5: command performed but modified by call control by SIM
- 6: command performed successfully, limited service

- 7: command performed with modification
- 16: proactive SIM session terminated by the user
- 17: backward move in the proactive SIM session requested by the user
- 18: no response from user
- 19: help information required by the user
- 20: USSD or SS transaction terminated by the user
- 32: ME currently unable to process command
- 33: network currently unable to process the command
- 34: user did not accept call set-up request
- 35: user cleared down call before connection or network release
- 36: action in contradiction with the current timer state
- 37: interaction with call control by SIM, temporary problem
- 38: launch browser generic error code
- 48: command beyond ME's capabilities
- 49: command type not understood by ME
- 50: command data not understood by ME
- 51: command number not known by ME
- 52: SS return error
- 53: SMS RP ERROR
- 54: error, required values are missing
- 55: USSD return error
- 56: MultipleCard commands error, if class "a" is supported
- 57: interaction with call control by SIM or MO short message control by SIM
- 58: bearer independent protocol error (if class "e" is supported)

Possible values of <buffer_size>:

size of the allocated buffer.

Possible values of <open_channel_id>:

The channel ID may range from 1 to 7. 0 indicates the 'Invalid' value

Possible values of <link_status>:

Enabled means Link established or Packet data service activated.
Disabled means Link not established or Packet data service not activated.

1 - Enabled

0 - Disabled

Possible values of <channel_status_state>:

Link State // 00 - means No further info can be given as per spec

Possible values of <bearer_description_type>:

The bearer type which can be used to decode the bearer description value

01, < Circuit switched UTA_SIM_TK_BEARER.

02, < Packet switched UTA_SIM_TK_BEARER (GPRS).

03, < Terminal default UTA_SIM_TK_BEARER.

255 < Invalid bearer value. Indicates an unknown bearer type which is not supported by this interface version.

Possible values of <bearer_description_params>:

Hex String,The parameters value gives detailed information dependent on the type

Possible values of <address_type>:

The type of address. Ipv4/Ipv6

33, ///< IP v4 IP address.

87, ///< IP v6 IP address.

Possible values of <address>:

Address data dependent of type.

The representation for IPV4 shall be like "x.x.x.x" where 0<x<=255

The representation for IPV6 shall be like "x.x.x.x.x.x.x.x.x.x.x.x.x.x.x.x" where 0<x<=255

12.3 STKENV

This command allows to send a SIM APPL TK envelope command. Set command allows sending a SIM APPL TK envelope command. If fails returns CME ERROR :<error>

12.3.1 syntax of the command

AT+STKENV=<envelope_cmd>,<optio

nal_ENV_data>

AT+STKENV=214,7,<language>

AT+STKENV=214,8,<cause>

AT+STKENV=211,<item_id>,<help_requested>

AT+STKENV=211,1,<call_id>,<call_direction>

Command	Possible Response(s)
AT+STKENV=<envelope_cmd>,<optional_ENV_ data>	OK or CME ERROR: <error>
AT+STKENV=?	+STKENV: OK

12.3.2 Defined Values

Possible values of <cause> may be:

- 00: User Termination
- 01: Error Termination

Possible values of <envelope_cmd> supported envelope commands:

- code 211 (hexa D3): menu selection (needs)
- code 214 (hexa D6): Event download (only one event can be included in the <event_list>)

Possible values of <item_id>:

item identification

Possible values of <help_requested> indicates help requested and may be:

- 1: help is requested
- 0: help is not requested

Possible values of <language> :

currently used language in the DTE (coding see 11.14)

Possible values of <call_id> :

Call ID

Possible values of <call_direction> may be:

- 0: MT Call
- 1: MO Call

Possible values of <optional_ENV_data> indicates command code related pa- rameters as follows:

- for code 211 (hexa D3): <item_identifier>
- for code 214 (hexa D6): <event_list>

12.4 STKPROF

This command allows reading and changing the terminal profile data. The terminal profile sent by external STK client states the facilities relevant to SIM Application Toolkit that is supported.

12.4.1 syntax of the command

AT+STKPROF=<length>,<data>

Command	Possible Response(s)
AT+STKPROF=4,"1F7F"	OK or CME ERROR: <error>
AT+STKPROF?	+STKPROF: <length>,<data> e.g. +STKPROF=4,"1F7F" OK
AT+STKPROF=?	OK

12.4.2 Defined Values

Possible values of <length>:

integer type value; length of the characters that are sent to TE in <data>

Note: <length> set to 0 forces a reset to the default terminal profile stored in the ME.

Possible values of <data>:

terminal profile data coded in hex format.

12.5 SIM -APPL -TK call control commands

The SIMAP call control status is displayed using the unsolicited result code.

12.5.1 syntax of the command

+STKCC: <cc_comand>... defined as:

- +STKCC: 1,<res_val>,<alpha>,<number>
- +STKCC : 2,<res_val>,<alpha>,<ss_code>
- +STKCC : 3,<res_val>,<alpha>,<ussd_code>
- +STKCC : 4,<res_val>,<alpha>,<ton_npi>,<sc_addr>,<ton_npi>,<dest_addr>

Command	Possible Response(s)
URC	+STKCC: 1,<res_val>,<alpha>,<number>

12.5.2 Defined Values

Possible values of <cc_command> may be:

- 1: set up call
- 2: send SS
- 3: send USSD
- 4: send SM

Possible values of <res_val>:

call control result value

Possible values of <alpha> :

text string

Possible values of <number> :

called party number

Possible values of <ton_npi> :

type of number and numbering plan

Possible values of <sc_addr> :

service centre address

Possible values of <dest_addr>:

destination address

12.6 SIM-APPL-TK proactive session status

The SIMAP proactive session status is displayed using the unsolicited result code

12.6.1 syntax of the command

+STKCNF: <proactive_cmd>,<result>,<add_result>,<sw1>

Command	Possible Response(s)
URC	+STKCNF: <proactive_cmd>,<result>,<add_result>,<sw1>

12.6.2 Defined Values

Possible values of <proactive_cmd> :

decimal code indicates the command that was finished (refer +STKPRO)

Possible values of <result>:

general result code

Possible values of <add_result>:

additional result code

Possible values of <sw1> status of the last response may be:

- 0: command to SIM was suppressed because of multiple terminal response or wrong client
- other responses see GSM 11.11

13 Bluetooth Commands

13.1 XBCON Connect to BT SAP mode

This command is used to switch the modem to the required BT SAP mode. In server mode, Modem will receive SIM_CARD_NOT_PRESENT status from SIM and same will be communicated to AP also. Also, all SIM related AT Commands will result in SIM NOT INSERTED error. For any SIM related operation only BT SAP commands to be used. Note: CAT_BT_CMDS flag needs to be enabled to get all BT commands.

13.1.1 Syntax of the command

Command syntax: AT+ XBCON = <op_mode>, <change_mode>, <reject_mode>

Command	Possible Response(s)
AT+XBCON = <op_mode>, <change_mode>, <reject_mode>	OK or CME ERROR: <err>
AT+XBCON?	+CME ERROR: <err>
AT+XBCON=?	+ XBCON: (0-1),(0-1),(0-1) OK or +CME ERROR: <err>

13.1.2 Defined values

<op_mode>

Operation Mode: 0 BT SAP Server modes

1 BT SAP Client mode (Client mode is currently not supported)

<Change_mode>

The change mode indicates, if the Application wants to shutdown the current operation gracefully or immediately:

0 gracefully, or Time out

1 immediately

<reject_mode>

The reject mode indicates; if the Application allows rejecting BTSAP connection request due to ongoing tasks :

0 Reject is not allowed.

1 Reject is allowed

13.2 XBDISC Disconnect BT SAP

This command disconnects BT SAP. Initiated by the BT SAP Client or by the Application itself. Once disconnect is successful, SIM INSERTED indication received from SIM and All SIM related initialization requence will be started. Same will be communicated to AP as before.

13.2.1 Syntax of the command

Command syntax: AT+XBDISC

Command	Possible Response(s)
AT+XBDISC	OK or CME ERROR: <err>
AT+XBDISC?	+CME ERROR: <err>
AT+XBDISC=?	OK or +CME ERROR: <err>

13.2.2 Defined values

None

13.3 XBATR Request ATR from stack to application

In BT SAP server mode, this command is used to request the ATR from the stack to the Application. During reset, Modem stores the ATR value and gives the same , when AP request it.

13.3.1 Syntax of the command

Command syntax: AT+XBATR

Command	Possible Response(s)
AT+XBATR	+ XBATR: <status>, <data_ATR> OK or CME ERROR: <err>
AT+XBATR?	+CME ERROR: <err>
AT+XBATR=?	OK or +CME ERROR: <err>

13.3.2 Defined values

<status>:

0 OK, request processed correctly

1 No Reason defined

2 Card not accessible

3 Card (already) powered off

4 Card Removed

6 Data Not available

7 Not Supported

<data_ATR>

Hex Data (an array of bytes)

Usage:

AT+XBATR

+XBATR:

1,123456789ABCDE

10BA OK

13.4 XBAPDU Forward command APDU from application to SIM

In BT SAP server mode, this command is used to Forward command APDU from appli- cation to SIM. Other SIM related AT Command like CSIM, CRSM, CGLA etc., won't work in this mode because in BT SAP mode, modem will receive SIM NOT INSERTED from the BT SAP module. Hence Error message will be given to non_BT SAP command.

13.4.1 Syntax of the command

Command syntax: AT+ XBAPDU =<data: command_APDU >

Command	Possible Response(s)
AT+XBAPDU = <data: command_APDU >	+ XBAPDU: <status>, [<data:Response_APDU>] OK or CME ERROR: <err>
AT+XBAPDU?	+CME ERROR: <err>
AT+XBAPDU=?	OK or +CME ERROR: <err>

13.4.2 Defined values

<Status>:

0 OK, Request processed correctly

1 Error no reason defined

2 Card not accessible

3 Card (already) powered off

4 Card removed

5 Data not available

6 Not Supported

<data: Command_APDU >:

Hex Data (an array of bytes). CP supports Command_APDU up to 261 bytes long

<data: Response_APDU >:

Hex Data (an array of bytes). CP supports Response_APDU up to 258 bytes long

Usage:

AT+XBAPDU = "123456789ABCDEBA"

+XBAPDU: 0,

123456789ABCDE10B

A OK

13.5 XBPWR Power ON the SIM

In BT SAP server mode, this command is used to Power ON,OFF and Reset the SIM.

13.5.1 Syntax of the command

Command syntax: AT+ XBPWR =<action>

Command	Possible Response(s)
AT+ XBPWR =<action>	+ XBPWR: <status> OK or CME ERROR: <err>
AT+XBPWR?	+CME ERROR: <err>
AT+XBPWR=?	+ XBPWR: (0-2) OK or +CME ERROR: <err>

13.5.2 Defined values

<Action>:

0 SIM Power ON

1 SIM Power OFF

2 SIM RESET

<Status>:

0 OK, Request processed correctly

1 Error no reason defined

2 Card not Accessible

3 Card already powered OFF

4 Card removed

5 Card already powered ON

6 Data Not vailable

7 Not Supported

Usage:

AT+ XBPWR =0

+XBPWR: 0

OK

13.6 XBCSTAT Enable or Disable unsolicited SIM CARD Status response

In BT SAP server mode, this command is used to Enable or Disable unsolicited SIM CARD Status response.

13.6.1 Syntax of the command

Command syntax: AT+XBCSTAT =<mode>

Command	Possible Response(s)
AT+XBCSTAT =<mode>	OK or CME ERROR: <err>

AT+XBCSTAT?	+ XBCSTAT: <mode>,<status> OK +CME ERROR: <err>
AT+XBCSTAT=?	+ XBCSTAT: (0-1) OK or +CME ERROR: <err>

13.6.2 Defined values

<mode>:

0 Disable unsolicited response

1 Enable unsolicited response

<Status>:

0 Unknown

1 Card Reset

2 Card not accessible

3 Card removed

4 Card inserted

5 Card recovered

Usage:

AT+ XBCSTAT =1

OK

Response URC:

+XBCSTAT: 1

OK

13.7 XBCRDSTAT Get Card Reader Status

In BT SAP server mode, this command is used to get the Card reader Status.

13.7.1 Syntax of the command

Command syntax: AT+XBCRDSTAT

Command	Possible Response(s)
AT+XBCRDSTAT	+ XBCRDSTAT: <status>, <card_reader_status> OK or CME ERROR: <err>
AT+XBCRDSTAT?	+CME ERROR: <err>
AT+XBCRDSTAT=?	OK or +CME ERROR: <err>

13.7.2 Defined values

<Status>:

0 OK, Request processed correctly

1 Error no reason defined

2 Card not Accessible n\ 3 Card already powered OFF

4 Card removed

5 Card already powered ON

6 Data Not vailable

7 Not Supported

<card_reader_status>:

One byte. It represents card reader identity and status.

The value of this byte indicates the identity and status of

a card reader. Bits 1-3 = identity of card reader x.

bit 4 0 = Card reader is not removable

1 = Card reader is removable

bit 5 0 = Card reader is not present

1 = Card reader is present

bit 6 0 = Card reader present is not ID-1 size

1 = Card reader present is ID-1 size bit 7 0 = No card present
1 = Card is present in reader bit 8 0 = No card powered
9 = Card in reader is powered

Usage:
AT+XBCRDSTAT OK

Response :
+XBCRDSTAT: 1 ,34

14 Appendix

14.1 List of Response Codes and Description

Result	Code Description
OK	Acknowledges successful execution
CONNECT	A connection has been established. DS changes from Command State to Data State.
RING	The DS has detected an incoming call signal from the network
NO CARRIER	The connection has been terminated or the attempt to establish a connection failed
ERROR	Unknown Command, command line maximum length exceeded, parameter value invalid, or other problem with processing the command line
BUSY	Engaged (busy) signal detected
CONNECT <datarate>	Same as CONNECT but includes status parameter "data rate".
CONNECT VOICE	Same as CONNECT but for Voice-Calls
CONNECT FAX	Same as CONNECT but for FAX Calls
CRING	The DS has detected an incoming call signal from the network when +crc command is enabled.
DISCONNECT	A call connection has been disconnected.

14.2 Appendix A +CMEE Error code

List of Error command which will be part of CMEE command

Error Code	Description
0	phone failure
1	no connection to phone
2	phone-adaptor link reserved
3	operation not allowed

4	operation not supported
5	PH-SIM PIN required
6	PH-FSIM PIN required
7	PH-FSIM PUK required
10	SIM not inserted
11	SIM PIN required
12	SIM PUK required
13	SIM failure
14	SIM busy
15	SIM wrong
16	incorrect password
17	SIM PIN2 required
18	SIM PUK2 required
20	memory full
21	invalid index
22	not found
23	memory failure
24	text string too long
25	invalid characters in text string
26	dial string too long
27	invalid characters in dial string
30	no network service
31	network timeout
32	network not allowed - emergency calls only
40	network personalization PIN required
41	network personalization PUK required
42	network subset personalization PIN required
43	network subset personalization PUK required
44	service provider personalization PIN required
45	service provider personalization PUK required
46	corporate personalization PIN required
47	corporate personalization PUK required
48	hidden key required
49	EAP method not supported
50	Incorrect parameters
100	unknown

103	Illegal MS
106	Illegal ME
107	GPRS service not allowed
111	PLMN not allowed
112	Location area not allowed
113	Roaming not allowed in this location area
132	Service not supported
133	Service not subscribed
134	Service option temporarily out of order
149	PDP authentication error
201	Alternate SIM conflict
500	CTS Handover on Progress
501	Cellular Protocol Stack Out of service state
502	CTS Unspecified Error
800	SIM Security unspecified error

14.3 Appendix B +NEER Error code

List of Error command which will be part of NEER command

Network Error Code (NEER)	Description
2	SIM not provisioned
3	SIM not allowed
4	Call Failed <IMSI unknown in VLR>
5	Call Failed <IMEI not accepted>
6	Phone not allowed
7	GPRS Service not allowed
8	GPRS Service and Non GPRS service not allowed
9	MS Identity cannot be Derived by network
10	Implicitly Detached
11	SOS/Emergency calls only <PLMN not allowed>
12	SOS/Emergency calls only <Location Area not allowed >
13	SOS/Emergency calls only <Roaming not allowed in this location area>
15	No Suitable cells in Location Area

16	MSC Temporarily Not Reachable
20	MAC FAILURE
21	SYNCH FAILURE
22	Error Congestion
23	SIM not allowed
32	Service Option Not supported
33	Requested Service option not subscribed
34	Service temporarily out of order
38	Call cannot be Identifed
40	NO PDP Context Active
48	Retry on New Cell beginning
63	Retry on New Cell End
95	Semantically Incorrect message
96	Invalid mandatory information
97	Message type non existent or Not implemented
98	Message type not compatible with protocols state
99	Information element non existent or Not implemented
100	Conditional IE Error
101	Message Not Compatible with Protocol state
111	Protocol error unspecified
--	Not Registered
--	Invalid SIM
--	Attach Not Allowed
--	No Cell Available
--	Searching PLMN
--	Searching PLMN Ended
--	No Carrier

--	Authentication Failure
--	Power Down
--	Forbidden PLMN
--	Forbidden LAI
--	Detached
--	Disabled
--	Invalid Parameter
--	Rejected By Network
--	Internal Failure
--	Attach temporarily Barred
--	No Cause
--	Registration In Progress
--	Registration Request
--	User Abort

14.4 Appendix C +CEER Error cause

Failure cause (used in +CEER)

SL.No	ICause value	Diagnostic
1	1	unassigned (unallocated) number
2	3	no route destination
3	6	channel unacceptable

4	8	operator determined barring
5	16	normal call clearing
6	17	user busy
7	18	no user responding
8	19	user alerting, no answer
9	21	call rejected
10	22	number changed
11	26	non selected user clearing
12	27	destination out of order
13	28	invalid number format (incomplete number)
14	29	facility rejected
15	30	response to STATUS ENQUIIRY
16	31	normal, unspecified
17	34	no circuit / channel available
18	38	network out of order
19	41	temporary failure
20	42	switching equipment congestion
21	43	access information discarded
22	44	requested circuit / channel not available
23	47	resources unavailable, unspecified
24	49	quality of service unavailable
25	50	requested facility not subscribed
26	55	incoming calls barred with in the CUG
27	57	bearer capability not authorized
28	58	bearer capability not presently available
29	63	service or option not available, unspecified
30	65	bearer service not implemented
31	68	ACM equal to or greater than AC Mmax
32	69	requested facility not implemented

33	70	only restricted digital information bearer capability is
34	79	service or option not implemented, unspecified
35	81	invalid transaction identifier value
36	87	user not member of CUG
37	88	incompatible destination
38	91	invalid transit network selection
39	95	semantically incorrect message
40	96	invalid mandatory information
41	97	message type non-existent or not implemented
42	98	message type not compatible with protocol state
43	99	information element non-existent or not implemented
44	100	conditional IE error
45	101	message not compatible with pro- tocol state
46	102	recovery on timer expiry
47	103	Illegal MS
48	106	Illegal ME
49	107	GPRS service not allowed
50	111	protocol error, unspecified
51	112	Location area not allowed

52	113	Roaming not allowed in this loca- tion area
53	124	MBMS bearer capabilities insuffi- cient for the service
54	125	LLC or SNDCP failure
55	126	Insufficient resources
56	127	Missing or unknown APN
57	128	Unknown PDP address or PDP type
58	129	User authentication failed
59	130	Activation rejected by GGSN
60	131	Activation reject,unspecified
61	132	Service not supported
62	133	Requested service option not sub- scribed
63	134	Service option temporarily out of order
64	135	NSAPI already used
65	136	Regular PDP context deactivation
66	137	QoS not accepted
67	138	Network failure
68	139	Reactivation requested
69	140	Feature not supported
70	141	Semantic error in the TFT opera- tion

71	142	Syntactical error in the TFT opera- tion
72	143	Unknown PDP context
73	144	Semantic errors in packet filter(s)
74	145	Syntactical errors in packet fil- ter(s)
75	146	PDP context without TFT already activated
76	148	Unspecified GPRS error
77	149	PDP authentification error
78	212	APN restriction

14.5 Appendix D +CEER Error cause

Internal failure cause for +CEER (continuation of Appendix C)

SL.No	Cause value	Diagnostic
1	0	No cause information available
2	256	Internal unspecified
3	257	Out of memory
4	258	Invalid parameters
5	259	Data call active
6	260	Speech call active
7	262	Missing ACM information
8	263	Temporary forbidden
9	264	Called party is blacklisted
10	265	Blacklist is full
11	266	No Service
12	267	Limited service
13	268	Client conflict
14	269	Dual Service call active
15	271	Unknown SIM error

16	274	Active Client is Gone
16	277	SIM status failure
17	278	Rejected by call control
18	279	FDN failed
19	280	BDN failed
20	283	CCBS possible
21	284	Invalid alternate service line
22	285	LND overview
23	287	MM network failure unspecified
24	288	MM no service
25	289	MM access class barred
26	290	MM RR no resource
27	291	MM ME busy
28	292	MM unspecified
29	301	MMI not registered
30	303	Rejected by user
31	304	Rejected due to time out
32	306	Disconnected due to SIM TK call
33	307	Pending SIM TK call setup
34	310	SIM reset
35	340	MM sapi3 release
36	341	MM lower layer failure
37	342	MM authentification failure
38	343	MM PS reject
39	344	MM service rejected
40	345	MM abort by network
41	346	MM timeout
42	347	MM detach
43	348	MM RR connection release
44	349	MM not registered
45	350	MM reestablishment failure
46	351	Failure due to handover
47	352	Link establishment failure
48	353	Random access failure
49	354	Radio link aborted
50	355	Lower layer failure in Layer 1

51	356	Immediate Assignment Reject
52	357	Failure due to paging
53	358	Abnormal release unspecified
54	359	Abnormal release channel unac-ceptable
55	360	Abnormal release timer expired
56	361	Abnormal release no act on radio path
57	362	Preemptive release
58	363	UTRAN configuration unknown
59	364	Handover impossible
60	365	Channel mode unacceptable
61	366	Frequency not implemented
62	367	Originator leaving call group area
63	368	Lower layer failure from network
64	369	Call already cleared
65	370	Semantically incorrect message
66	371	Invalid mandatory info
67	372	Message type non existing
68	373	Message type incompatible in state
69	374	Conditional information element
70	375	No cell allocation available
71	376	Protocol error unspecified
72	377	Normal event
73	378	Unspecified
74	379	Preemptive release
75	380	Congestion
76	381	RE establishment reject
77	382	Directed sig conn establishment
78	383	User inactivity
79	384	Lower layer failure downlink
80	385	Lower layer failure uplink
81	386	Cell barred due to authentication
82	387	signalling connection release
83	388	CS connection release triggered by
84	389	RRC connection establishment

85	390	RRC connection establishment reject
86	391	resource conflict
87	392	Layer 2 sequence error
88	393	Layer 2 T200 exp N200 plus 1 times
89	394	Layer 2 unsolicited DM resp MFES
90	395	Layer 2 contention resolution
91	396	Layer 2 normal cause
92	397	RR connection release due to BAN D
93	400	MM RR connection error while release
94	500	16 Normal call clearing cause extension: user disconnected
95	510	16 Normal call clearing cause extension: Remote user / NW dis-connected for call status is rather than CALL PROCEEDING
96	511	16 Normal call clearing cause extension: Remote user / NW dis-connected for call status is CALL PROCEEDING
97	512	Request rejected, BCM violation

NOTE: Cause Values 500,510 and 511 ie., normal call clearing extension feature is under flag FEAT_CAT_CEER16_EXTENSION

14.6 Appendix E

Failure cause from 3GPP 24.008 (used in +CEER SS categories)

SS network error cause (acc 3GPP 24.008, 4.5 except internal error 0 and 255) can be

0 MN_MS_INT_SS_ERROR - This is used when the SS operation was unsuccessful due to an MS internal reason

255 MN_MS_INT_SS_TIME_OUT - This is used when the SS operation was unsuccessful due to a missing answer from the network

1 MN_UNKNOWN_SUBSCRIBER

9 MN_ILLEGAL_SUBSCRIBER

10 MN_BEARER_SERVICE_NOT_

11 MN_TELESERVICE_NOT_PROVISIONED

12 MN_ILLEGAL_EQUIPMENT

13 SYNONYM MN_CALL_BARRED

16 MN_ILLEGAL_SS_OPERATION

17 MN_SS_ERROR_STATUS

18 MN_SS_NOT_AVAILABLE

19 MN_SS_SUBSCRIPTION_VIOLATION

20 MN_SS_INCOMPATIBILITY

21 MN_FACILITY_NOT_SUPPORTED

27 MN_ABSENT_SUBSCRIBER

29 MN_SHORT_TERM_DENIAL

30 MN_LONG_TERM_DENIAL

34 MN_SYSTEM_FAILURE

35 MN_DATA_MISSING

36 MN_UNEXPECTED_DATA_VALUE

37 MN_PW_REGISTRATION_FAILURE

38 MN_NEGATIVE_PW_CHECK

43 MN_NUMBER_OF_PW_ATTEMPTS_VIOLATION

54 MN_POS_METHOD_FAILURE

71 MN_UNKNOWN_ALPHABET

72 MN_USSD_BUSY

121 MN_REJECTED_BY_USER

122 MN_REJECTED_BY_NETWORK

123 MN_DEFLECTION_TO_SERVER_SUBSCRIBED

124 MN_SPECIAL_SERVICE_CODE

125 MN_INVALID_DEFLECTED_NUMBER

126 MN_MAX_NUMBER_OF_MPTY_PARTICIPANTS_EXCEEDED

127 MN_RESOURCES_NOT_AVAILABLE

SS network GSM cause (acc 3GPP 24.008, section 10.5.4.11 "Cause", all values greater than 255 are internal values)

1 MN_UNASSIGNED_NUMBER

3 MN_NO_ROUTE

6 MN_CHANNEL_UNACCEPTABLE

8 MN_OPERATOR_BARRING

16 MN_NORMAL_CALL_CLEARING

17 MN_USER_BUSY

18 MN_NO_USER_RESPONDING

19 MN_USER_ALERTING_NO_ANSWER

21 MN_CALL_REJECTED

22 MN_NUMBER_CHANGED

26 MN_NON_SELECTED_USER_CLEARING

27 MN_DESTINATION_OUT_OF_ORDER

28 MN_INVALID_NUMBER_FORMAT

29 MN_FACILITY_REJECTED

30 MN_RESPONSE_TO_STATUS_ENQUIRY

31 MN_NORMAL_UNSPECIFIED

34 MN_NO_CIRCUIT_AVAILABLE

38 MN_NETWORK_OUT_OF_ORDER

41 MN_TEMPORARY_FAILURE

42 MN_SWITCH_CONGESTION

43 MN_ACCESS_INFORMATION_DISCARDED

44 MN_REQUESTED_CIRCUIT_NOT_AVAILABLE

47 MN_RESOURCES_UNAVAILABLE

49 MN_QUALITY_UNAVAILABLE

50 MN_FACILITY_NOT_SUBSCRIBED

55 MN_INCOMING_CALLS_BARRED_IN_CUG

57 MN_BEARER_CAPABILITY_NOT_ALLOWED

58 MN_BEARER_CAPABILITY_NOT_AVAILABLE

63 MN_SERVICE_NOT_AVAILABLE

65 MN_BEARER_SERVICE_NOT_IMPLEMENTED

68 MN_ACM_GREATER_OR_EQUAL_TO_ACMMAX

69 MN_FACILITY_NOT_IMPLEMENTED

70 MN_ONLY_RESTRICTED_DIGITAL

79 MN_SERVICE_NOT_IMPLEMENTED

81 MN_INVALID_TI

87 MN_USER_NOT_IN_CUG

88 MN_INCOMPATIBLE_DESTINATION

91 MN_INVALID_TRANSIT_NETWORK

95 MN_SEMANTICS_INCORRECT

96 MN_INVALID_MANATORY_INFORMATION

97 MN_UNKNOWN_MESSAGE_TYPE_1

98 MN_UNEXPECTED_MESSAGE_TYPE

99 MN_UNEXPECTED_IE

100 MN_CONDITIONAL_IE_ERROR

101 MN_UNKNOWN_MESSAGE_TYPE_2

102 MN_RECOVERY_ON_TIMER_EXPIRY

111 MN_PROTOCOL_ERROR

127 MN_INTERWORKING

256 MN_VOID_CAUSE

257 MN_OUT_OF_MEMORY

258 MN_INVALID_PARAM

259 MN_DATA_CALL_ACTIVE

260 MN_SPEECH_CALL_ACTIVE

261 MN_DTMF_REJECTED_DURING_MO_CALL_SETUP

262 MN_MOC_SETUP_REJ_DUE_TO_MISSING_ACM_INFO_IND

263 MN_TEMPORARY_FORBIDDEN_CALL_ATTEMPT

264 MN_CALLED_PARTY_IS_BLACKLISTED

265 MN_BLACKLIST_IS_FULL_NO_AUTO_CALL_ATTEMPTS

266 MN_TEMPORARY_FORBIDDEN_CALL_ATTEMPT_NO_SERVICE

267 MN_TEMPORARY_FORBIDDEN_CALL_ATTEMPT_LIMITED_SERVICE

268 MN_CLIENT_TEMPORARY_BARRED

269 MN_DUAL_SERVICE_CALL_ACTIVE

270 MN_ATC_FCLASS_NOT_SPEECH

271 MN_SI_UNKNOWN_ERROR

272 MN_DTMF_REJECTED_DUE_TO_CALL_HELD_OR_MPARTY

273 MN_CLIENT_NOT_REGISTRATED

274 MN_ACTIVE_CLIENT_GONE

275 MN_DTMF_REJECTED_DUE_TO_DATA_TRANSMISSION

276 MN_NO_APPROPRIATE_DTMF_ENTRY

277 MN_SIM_STATUS_FAILURE

278 MN_REJ_BY_CALL_CONTROL

279 MN_FDN_FAILED

280 MN_BDN_FAILED

281 MN_ONLY_ERROR

282 MN_NOT_IN_SPEECH_CALL

283 MN_CCBS_POSSIBLE

284 MN_INVALID_ALS_LINE

285 MN_LND_OVERFLOW

286 MN_DTMF_REJECTED_NO_TCH_AVAILABLE

287 MN_NW_FAILURE_UNSPECIFIED

288 MN_MS_NO_SERVICE

289 MN_MS_ACCESS_CLASS_BARRED

290 MN_MS_NO_RESOURCE

291 MN_MS_SERVICE_BUSY

292 MN_MS_FAILURE_UNSPECIFIED

293 MN_DTMF_REJECTED_DUE_TO_SUP_TIMER_EXPIRY

300 MN_SIMTK_SETUP_MODE_NOT_SUPPORTED

301 MN_MMI_NOT_REGISTERED

302 MN_SIMTK_SETUP_REJ_DUE_TO_MISSING_ACM_INFO_IND

303 MN_SIMTK_SETUP_REJECTED_BY_THE_USER

304 MN_SIMTK_SETUP_REJECTED_TIME_OUT

305 MN_SIMTK_CALL_CONNECTED

306 MN_DISCONNECT_DUE_TO_SIMTK_SETUP

307 MN_SIMTK_SETUP_REJ_DUE_TO_PENDING_SIMTK_SETUP

308 MN_SIMTK_CALL_CONNECTED_NO_ICON_DISPLAY

309 MN_PENDING_SIMTK_SETUP

310 MN_SIMTK_SIM_RESET

311 MN_SIMTK_DTMF_TRANSMITTED

312 MN_SIMTK_DTMF_TRANSMITTED_NO_ICON_DISPLAY

313 MN_USER_DID_NOT_ACCEPT_CALL_SETUP

314 MN_PROACTIVE_SIM_APPL_TERMINATED_BY_USER

315 MN_SIMTK_ME_UNABLE_SCREEN_BUSY

316 MN_SIMTK_ME_UNABLE_NO_SPECIFIC_CAUSE

317 MN_SIMTK_UNSPECIFIED

318 MN_SETUP_SS_ERR

319 MN_SIMTK_NET_UNABLE_NO_SPECIFIC_CAUSE

320 MN_SIMTK_USSD_TRANSACTION_TERMINATED_BY_USER

330 MN_PHONEBOOK_NOT_AVAILABLE

331 MN_ATC_NO_MATCHING_PHONEBOOK_ENTRY

332 MN_ATC_INVALID_DIALED_NUMBER

333 MN_ATC_SETUP_TEMPORARY_BLOCKED

334 MN_ATC_NO_PERMISSION

335 MN_ATC_INVALID_CALL_SETTINGS

336 MN_ATC_BLOCKING_CALL_PRESENT

SS network reject cause (acc 3GPP 24.008, 3.6.7, table 3.13 Tag 128 MN_GENERAL_PROBLEM With causes (3GPP 24.080, Table 3.14)

0 MN_UNRECOGNIZED_COMPONENT

1 MN_MISTYPED_COMPONENT

2 MN_BADLY_STRUCTURED_COMPONENT

129 MN_INVOKE_PROBLEM

With causes (3GPP 24.008, Table 3.15)

0 MN_DUPLICATE_INVOKE_ID

1 MN_UNRECOGNIZED_OPERATION

2 MN_MISTYPED_PRO_PARAMETER

3 MN_RESOURCE_LIMITATION

4 MN_INITIATING_RELEASE

5 MN_UNRECOGNIZED_LINKED_ID

6 MN_LINKED_RESPONSE_UNEXPECTED

7 MN_UNEXPECTED_LINKED_OPERATION

130 MN_RETURN_RESULT_PROBLEM With causes (3GPP 24.008, Table 3.16)

0 MN_UNRECOGNIZED_INVOKE_ID

1 MN_RETURN_RESULT_UNEXPECTED

2 MN_MISTYPED_RES_PARAMETER

131 MN_RETURN_ERROR_PROBLEM With causes

0 MN_UNRECOGNIZED_ERROR_INVOKE_ID

1 MN_RETURN_ERROR_UNEXPECTED

2 MN_UNRECOGNIZED_ERROR

3 MN_UNEXPECTED_ERROR

4 MN_MISTYPED_ERROR_PARAMETER

14.7 Appendix F +CMS Error cause

Below are the list of
CMS Error codes

CME Error code	Description
300	ME failure
301	SMS service reserved
302	Operation not allowed
303	Operation not supported
304	Invalid PDU mode param
305	Invalid text mode param
310	SIM not inserted
311	SIM PIN necessary

312	PH SIM PIN necessary
313	SIM failure
314	SIM busy
315	SIM wrong
320	Memory failure
321	Invalid memory index
322	Memory full
330	SMSC address unknown
331	No network service
332	Network timeout
500	Unknown error

/*From Table 8.4/3GPP TS 24.011 (part 1,2 & 3): Values from 1-127*/

CME Error code	Description
1	Unassigned(unallocated) Number
8	Operator determined barring
10	Call Barred
17	Network failure
21	Short Message transfer Rejected
22	Memory capacity Exceeded
27	Destination out of order(service)
28	Unidentified Subscriber
29	Facility Rejected
30	Unknown Subscriber
38	Network out of order(service)
41	Temporary Failure
42	Congestion
47	Resource Unavailable Unspecified
50	Requested facility not subscribed
69	Requested facility not implemented
81	Invalid Short Message transfer reference value
95	Semantically incorrect message
96	Invalid Mandatory Information
97	Message-type non-existent or not implemented

98	Message not compatible with short message protocol state
99	Information element non-existent or not implemented
111	Protocol error unspecified
127	Interworking Unspecified

/* 80 - 8F TP-PID errors. */

CME Error code	Description
128	Telematic interworking not supported(MO)
129	Short message Type 0 not supported(MO/MT)
130	Cannot replace short message(MO/MT)
143	Unspecified TP-PID error(MO/MT)

/* 90 - 9F TP-DCS errors. */

CME Error code	Description
144	Data coding scheme (alphabet) not supported(MO)
145	Message class not supported(MT)
159	Unspecified TP-DCS error(MO/MT)

/* A0 - AF TP-Command errors. */

CME Error code	Description
160	Command cannot be actioned(MO)
161	Command unsupported(MO)
175	Unspecified TP-Command error(MO)
176	TPDU not supported(MO/MT)
192	Service Centre(SC) busy(MO)
193	No SC subscription(MO)
194	SC system failure(MO)
195	Invalid Short Message Entity(SME) address(MO)
196	Destination SME barred(MO)
197	SM rejected duplicated SM(MO)
198	TP-VPF(validity period format) not supported(MO)
199	TP-VP(validity period) not supported(MO)

208	(U)SIM SMS storage full(MT)
209	No SMS storage capability in (U)SIM (MT)
210	Error in MS(MT)
211	Memory capacity exceeded(MT)
212	(U)SIM Application Toolkit busy(MT)
213	(U)SIM Data Download error(MT)
255	Unspecified error cause(MO/MT)
287	Network failure unspecified
290	Network no resource
296	"Radio Resources not Aailable due to DUAL SIM operation"}
297	"Out of service due to DUAL SIM operation"}
340	NO CNMA Acknowledgement expected
512	This and the following codes are manufacturer specific. Relay path Acknowledgement
513	SMS timer expired
514	SMS forwarding availability failed
515	SMS forwarding availability aborted
516	Invalid TP-MESSAGE-Type Indicator
517	No TP-Status Report in Phase 1
518	No TP-Reject-Duplicate in Phase 1
519	No TP-Reply-Path in Phase 1
520	No TP-User-Data-Header in Phase 1
521	Missing TP-Validity-Period
522	Invalid TP-Service-Centre-Time-Stamp
523	Missing TP-Destination-Address
524	Invalid TP-Destination-Address
525	Missing Service-Centre-Address
526	Invalid Service-Centre-Address
527	Invalid alphabet
528	Invalid TP-User-Data-Length
529	Missing TP-User-Data
530	TP-User-Data too long(large)
531	No command request in Phase 1
532	Command Request Invalid TP-Destination Address
533	Command Request Invalid TP-User-Data Length

534	Command Request Invalid TP-User-Data
535	Command Request Invalid TP-Command-Type
536	MN MNR creation failed
538	MS Network connection lost
539	Pending MO SM transfer
540	MO SMS rejected by SIM MO SMS control
541	RP ERROR OK
542	RP ERROR OK no icon display
543	FDN check failed
544	Service Centre Address(SCA) FDN failed
545	Destination Address(DA) FDN failed
546	BDN check failed
547	Unspecified SMS PP error
548	No Route To Destination
549	Channel Unacceptable
555	No Circuit/Channel Available
556	Access Information Discarded
557	Requested Circuit/Channel Not Available By Other Side
558	Quality Of Service Unavailable
560	Bearer Capability Not Authorized
561	Bearer Capability Not Presently Available
562	Service or Option Not Available, Unspecified
563	Bearer Service Not Implemented
564	ACM Equal to or Greater Than ACMmax
565	Only Restricted Digital Information Bearer Capability
566	Service or Option Not Implemented, Unspecified
567	User Not Member of CUG
568	Incompatible By Destination
569	Invalid Transit Network Selection
571	Message Not Compatible With Protocol State
572	Recovery On Timer Expiry
576	Data Call Active
577	Speech Call Active
579	MOC Setup Rejected Due to Missing ACM Info
580	Temporary Forbidden Call Attempt

581	Called Party is Blacklisted
583	Temporary Forbidden Call Attempt No Service
584	Temporary Forbidden Call Attempt Limited Service
585	Client Temporary Barred
586	Dual Service Call Active
587	Atc Fclass Not Speech
590	Client Not Registrated
591	Active Client Gone
595	Rejected By Call Control
596	FDN Failed
597	BDN Failed
601	Invalid ALS Line
604	MM No Service (out of coverage
605	MM Access Class Barred (RR_REL_IND During RR Conn. Establishment
606	ME Busy -CM Service Request Already Pending
608	Rejected Due To SUP Timer Expiry
609	Rejected Due To USSD Busy
610	Rejected Due To SS Busy
612	SIM Toolkit Request Is Rejected, Because Another
614	Rejected Because SIM Toolkit Request Is Not Yet
615	MN Setup SS Error
616	Call Controller Blocked (Other Call Command Pending
618	Environment Parameter Not Set Correctly (Fclass/
619	Other Blocking Call Present
620	Lower Layer Failure
621	The Authentication Proedure Failed
622	The Packet-Switched Registration Procedure Failed
623	CM Service Reject From The Network
624	The ABORT Message Was Received From The Net-
625	Timer Expiry
626	IMSI Deatch Was Initiated
627	Normal RR Connection Release (2G
628	Registration Failed
630	Failure Due To Handover
631	Link Establishment Failure

632	Random Access Failure
633	Radio Link Aborted
634	Lower Layer Failure in Layer 1
635	Immediate Assignment Reject
636	Failure Due To Paging
637	Abnormal Release Unspecified
638	Abnormal Release Channel Unacceptable
639	Abnormal Release Timer Expired
640	Abnormal Release No Act On Radio Path
641	Preemptive Release
642	UTRAN Configuration Unknown
643	Handover Impossible
644	Channel Mode Unacceptable
647	Lower Layer Failure From NW
649	Conditional IE Error
650	No Cell Allocation Available
653	Re Establishment Reject
654	Directed Sigconn Re Establishment
656	Release of RRC connection Witout Network Activity(3
657	Lower Layer Failure Uplink
658	Cell Barred Due To Authentication Failure
659	Signalling Connection Release
660	CS Connection Release Triggered By MM
661	RRC Connection Establishment Failure
662	RRC Connection Establsihment Reject With Redirec-
663	Resource Conflict
664	Layer Layer Failure in Layer 2
665	L2 Cause T200 Expiry N200 Plus 1 Times
669	RR Connection Release Due to BAND Change (2G
670	Release of the RRC Connection Due to Out of Service in
671	Release of the RRC Connection Due to Not Matching
672	Error Happens While Call Is Already Disconnected /
674	SIM Toolkit Cannot Initiate A Call, Because MMI Is
675	SIM Toolkit Call Setup Request Is Rejected Due User
676	Proactive SIM Appl Terminated By User

677	SIM Toolkit Originated SIM Reset (Refresh Request
680	Dial String/Number Incorrect

14.8 Appendix G +XERR Error cause

Internal failure cause for +XEER

SL.No	Cause value	Diagnostic
NO Value	0	No cause information available
SIM PB	100	ADN Memory Full
SIM PB	101	EXT1 Memory Full
SIM PB	102	ANR Memory Full
SIM PB	103	SNE Memory Full
SIM PB	104	EMAIL Memory Full
SIM ACCESS	200	Invalid Params
SIM ACCESS	201	Hex String Length error
SIM ACCESS	202	Currently Open or close req been executed
SIM ACCESS	203	SIM error SW1,SW2 available

14.9 Appendix H -List of Dummy Commands supported by C-AT

There are list of commands which are supported by C-AT but are functionally dummy implemented. These commands are dummy implemented to support WINDOWS dial up connection related use cases. These commands will not have any effect.

SL.No	COMMAND	RESPONCE
1	AT&F	OK
2	AT&C	OK
3	ATM	OK
4	AT	OK

14.10 Appendix I -Abortable Commannds by C-AT

List of Abortable Commannds by C-AT(Recommanded Abort Character is <esc>)

SL.No	C-AT Commands
1	+COPS Set and Test
2	+CCFC Set
3	+CLIP Read
4	+CLIR Read
5	+COLP Read
6	+CGACT Set and Read
7	+CGATT Set

When Abort is succesfull, ABORTED string will be given to TE.

14.11 Appendix K -Sim Pin Verification Required for the below AT Commands.

SL.No	C-AT Commands
1	ATD
2	AT+CMUT Set and Read
3	AT+CPAS Set
4	All Phone Book Commands
5	AT+CPOL Set , Read and Test
6	AT+CIMI Set
7	AT+CRSM Set
8	AT+CRLA Set
9	AT+CNUM Set
10	AT+XCFC Set
11	AT+XEMN Set
12	AT+XCSP Set
13	AT+CSVM Set, Read and Test
14	AT+XSVM Set and Read

15 Document History

Revision	Date	Changes
0	2013-08-15	First issue
1	2013-09-09	HN930-DC was removed from portfolio