3GPP TSG-T (Terminals) Meeting #20
Hämeenlinna, Finland
4 - 6 June, 2003

TP-030113

Agenda Item: 5.2.3

Source: T2

Title: Change Request to AT commands

Document for: Approval

_____

Spec	CR	Rev	Rel	Subject	Cat	Version-Current	Version-New	T2 Tdoc	Workitem
27.007	110	-	Rel-6	Correction of references	F	6.2.0	6.3.0	T2-030259	TEI6

CR-Form-v7

CHANGE REQUEST

⌘	**27.007 CR 110**	⌘**rev**	**-**	⌘	Current version:	**6.2.0**	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: UICC apps⌘ ☐ ME **X** Radio Access Network ☐ Core Network ☐

Title: ⌘	Correction of references		
Source: ⌘	T2		
Work item code:⌘	TEI6	***Date:*** ⌘	02/05/2003
Category: ⌘	**F**	***Release:*** ⌘	Rel-6

Use <u>one</u> of the following categories:	Use <u>one</u> of the following releases:
F *(correction)*	*2 (GSM Phase 2)*
A *(corresponds to a correction in an earlier release)*	*R96 (Release 1996)*
B *(addition of feature),*	*R97 (Release 1997)*
C *(functional modification of feature)*	*R98 (Release 1998)*
D *(editorial modification)*	*R99 (Release 1999)*
Detailed explanations of the above categories can	*Rel-4 (Release 4)*
be found in 3GPP TR 21.900.	*Rel-5 (Release 5)*
	Rel-6 (Release 6)

Reason for change: ⌘	Incorrect references
Summary of change:⌘	The reference in +CHLD where the integer type parameter is defined is incorrect; it shall be 6.5.5.1 instead of 4.5.5.1 ITU V.25ter recommendation "Serial asynchronous automatic dialling and control", has been renumbered as V.250 (02/98), and its Annex A as V.251 (02/98) without being republished. Any reference to V.25ter troughout the specification shall be changed to V.250.
Consequences if ⌘ ***not approved:***	Incorrect references will confuse the the applicability of the AT-commands.

Clauses affected: ⌘	7.13 1, 2, 3.1, 4, 4.1, 4.3, 5, 5.8, 5.10, 6, 6.2, 6.3, 6.4, 6.5, 6.8, 6.9, 6.11, 6.20, 6.25, 6.26, 6.27, 7.7, 7.8, 7.10, 7.17, 9.2, 10.1.9, 10.1.10, 10.1.11, 10.1.12, 10.1.15, 10.1.16, 10.2.1, 10.2.1.1, 10.2.1.2, 10.2.2, 10.2.2.1, 10.2.2.2, 10.2.2.3, 11.2.2, AnnexA, AnnexB, AnnexC

		Y	N		
Other specs ⌘		☐	☐	Other core specifications ⌘	
affected:		☐	☐	Test specifications	
		☐	☐	O&M Specifications	

Other comments: ⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at http://www.3gpp.org/specs/CR.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

7.13   Call related supplementary services +CHLD

Table 1: +CHLD action command syntax

Command	Possible response(s)
+CHLD=[<n>]	*+CME ERROR: <err>*
+CHLD=?	[+CHLD: (list of supported <n>s)]

Description

This command allows the control of the following call related services:

- a call can be temporarily disconnected from the MT but the connection is retained by the network;

- multiparty conversation (conference calls);

- the served subscriber who has two calls (one held and the other either active or alerting) can connect the other parties and release the served subscriber's own connection.

Calls can be put on hold, recovered, released, added to conversation, and transferred similarly as defined in 3GPP TS 22.030 [19]. Refer subclause 9.2 for possible <err> values.

This is based on the GSM/UMTS supplementary services HOLD (Call Hold; refer 3GPP TS 22.083 [5] clause 2), MPTY (MultiParty; refer 3GPP TS 22.084 [22]) and ECT (Explicit Call Transfer; refer 3GPP TS 22.091 [29]). The interaction of this command with other commands based on other GSM/UMTS supplementary services is described in the GSM/UMTS standards.

NOTE: Call Hold, MultiParty and Explicit Call Transfer are only applicable to teleservice 11.

It is recommended (although optional) that 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)).

Defined values

<n>: integer type; equals to numbers entered before SEND button in 3GPP TS 22.030 [19] subclause ~~4.5.5.1~~ 6.5.5.1

NOTE: The "directory number" case shall be handled with dial command D, and the END case with hangup command H (or +CHUP). The 4*"directory number" case is handled with +CTFR command.

Implementation

Optional.

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1   Scope

The present document specifies a profile of AT commands and recommends that this profile be used for controlling Mobile Termination (MT) functions and GSM/UMTS network services from a Terminal Equipment (TE) through Terminal Adaptor (TA). The command prefix +C is reserved for Digital Cellular in ITU-T Recommendation ~~V.25ter~~V.250 [14]. The present document has also the syntax details used to construct these extended GSM/UMTS commands. Commands from ITU-T Recommendation ~~V.25ter~~V.250 [14] and existing digital cellular standards (TIA

IS-99 [15] and TIA IS-135 [16]) are used whenever applicable. Some of the new commands are defined such way that they can be easily applied to MT of networks other than GSM/UMTS. ITU-T T.31 [11] and T.32 [12] fax AT commands may be used for GSM/UMTS fax transmission from TE. GSM/UMTS Short Message Service AT commands are defined in 3GPP TS 27.005 [24]. GPRS AT commands are defined in clause 10 of this specification. The present document assumes an abstract architecture comprising a TE (e.g. a computer) and a MT interfaced by a TA (see figure 1). The span of control of the defined commands should allow to handle any physical implementation that this abstract architecture may lead to:

:

2   References

[14]   ITU-T Draft new Recommendation ~~V.25ter~~V.250: "Serial asynchronous automatic dialling and control".

3.1   Definitions

underline   Underlined defined subparameter value is the recommended default setting of this subparameter. In *parameter type* commands, this value should be used in factory settings which are configured by ~~V.25ter~~V.250 [14] command &F0. In *action type* commands, this value should be used when subparameter is not given.

4   AT command syntax

This clause summarizes general aspects on AT commands and issues related to them.

TE software implementors must take account that future versions of this specification may include additional parameters beyond what is expected in any response to an AT Set Command, Read Command, Test Command, or unsolicited result code. Implementations must therefore analyse all parameters provided from the TA and discard (ignore) any parameters received following the parameters expected by the TE software.

For further information refer ITU-T Recommendation ~~V.25ter~~V.250 [14].

4.1   Command line

See figure 2 for general structure of a command line. Standardized *basic* commands are found only in ~~V.25ter~~V.250 [14]. GSM/UMTS commands use syntax rules of *extended* commands. Every extended command has a *test command* (trailing =?) to test the existence of the command and to give information about the type of its subparameters. *Parameter type* commands also have a *read command* (trailing ?) to check the current values of subparameters. *Action type* commands do not store the values of any of their possible subparameters, and therefore do not have a read command.

4.3   ITU-T ~~V.25ter~~V.250 [14] TE-TA interface commands

Table 1 summarizes ~~V.25ter~~V.250 [14] commands relating to command line and response formatting, and TA-TE interface operation. All are applicable to GSM/UMTS terminals.

Table 1: ~~V.25ter~~V.250 commands relating to TE-TA interface

Command	Subclause	Impl.	Use in GSM/UMTS
S3=[<value>]	6.2.1	mand.	command line termination character (mandatory default setting IRA 13)
S4=[<value>]	6.2.2	mand.	response formatting character (recommended default IRA 10)
S5=[<value>]	6.2.3	mand.	command line editing character (recommended default IRA 8)
E[<value>]	6.2.4	mand.	command echo (recommended default 1 i.e. TA echoes commands back)
Q[<value>]	6.2.5	mand.	result code suppression (recommended default 0 i.e. TA transmits result codes)
V[<value>]	6.2.6	mand.	TA response format (recommended default 1 i.e. verbose format)
X[<value>]	6.2.7	mand.	defines CONNECT result code format; values manufacturer specific
&C[<value>]	6.2.8	mand.	determines how ITU-T V.24 circuit 109 (or equivalent) relates to the detection of received line signal from remote end (recommended default 1 i.e. 109 operation relates to detection of received signal)
&D[<value>]	6.2.9	mand.	determines how TA responds when ITU-T V.24 circuit 108/2 (or equivalent) is changed from ON to OFF condition during online data state
+IPR=[<value>]	6.2.10	opt.	fixed TE data rate (recommended default 0 i.e. automatic detection)
+ICF=[<format>[,<parity>]]	6.2.11	opt.	TE-TA character framing (recommended default 3,3 i.e. eight data bits, no parity, 1 stop bit)
+IFC=[<by_te> [,<by_ta>]]	6.2.12	opt.	TE-TA local flow control (recommended default 2,2 i.e. TE uses ITU-T V.24 circuit 133 (or equivalent), and TA circuit 106 (or equivalent))
+ILRR=[<value>]	6.2.13	opt.	determines whether the used local TE-TA data rate is informed using intermediate result code +ILRR: <rate> before going online data state after call answering or originating

5 General commands

ITU-T Recommendation ~~V.25ter~~V.250 [14] includes "Generic DCE Control" commands with the prefix +G. These commands are for the identification of the TA. Four of those commands are adapted here to be the identification commands of the MT. Syntax is otherwise similar but the prefix is +CG. TIA IS-99 [15] uses same commands for base station identification.

5.8   ITU-T ~~V.25ter~~V.250 [14] generic TA control commands

Table 9: ~~V.25ter~~V.250 generic TA control commands

Command	Subclause	Impl.	Use in GSM/UMTS
Z[<value>]	6.1.1	mand.	TA sets all parameters to their defaults as specified by a user memory profile or by the manufacturer, and resets TA
&F[<value>]	6.1.2	mand.	TA sets all parameters to their defaults as specified by the manufacturer
I[<value>]	6.1.3	opt.	request manufacturer specific information about the TA (software cannot use this command to determine the capabilities of a TA)
+GMI	6.1.4	mand.	request TA manufacturer identification (may equal to +CGMI)
+GMM	6.1.5	mand.	request TA model identification (may equal to +CGMM)
+GMR	6.1.6	mand.	request TA revision identification (may equal to +CGMR)
+GSN	6.1.7	opt.	request TA serial number identification (may equal to +CGSN)
+GOI	6.1.8	opt.	request ISO system global object identification of the TA (general format defined in ITU-T Recommendation X.208; encoding rules in ITU-T Recommendation X.209)
+GCAP	6.1.9	mand.	request overall capabilities of TA; the response code for a TA building on this document shall be +CGSM
+GCI=<T.35>	6.1.10	opt.	selects the country of installation for the TA using ITU-T Recommendation T.35 Annex A country codes

5.9

5.10   Informative examples

When beginning to build a communication link, a general TE application controlling a TA needs to determine the TA and the MT to which it is connected. ~~V.25ter~~V.250 [14] has seven commands for TA identification from which four are mandatory to be implemented in a TA. An example of this command sequence requesting manufacturer (+GMI), model (+GMM), revision (+GMR) and serial number (+GSN) information would be:

:

The present document defines commands for MT identification which are similar to those for TA identification in ~~V.25ter~~V.250 [14], for an example:

6   Call control commands and methods

This clause describes the control of GSM/UMTS calls. Normal data and fax call control is done as in ITU-T Recommendations ~~V.25ter~~V.250 [14], T.31 [11] and T.32 [12]. For voice call originating, refer subclause "ITU-T ~~V.25ter~~V.250 dial command D".

6.2   ITU-T ~~V.25ter~~V.250 [14] dial command D

~~V.25ter~~V.250 [14] dial command D lists characters that may be used in a dialling string for making a call or controlling supplementary services in accordance with 3GPP TS 22.030 [19]. Their use in GSM/UMTS is listed in this subclause, as well as new dial modifiers applicable only to GSM/UMTS are introduced. For a MT supporting AT commands only, it is mandatory to support the control of supplementary services in accordance with 3GPP TS 22.030 [19] through the dial command or through the specific supplementary service commands (+CCFC, +CLCK, etc.), where 3GPP TS 22.030 [19] identifies the supplementary services as mandatory.

~~V.25ter~~V.250 dialling 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)

~~V.25ter~~V.250 modifier characters

, (implementation of this character is mandatory for GSM/UMTS, but it may be ignored)

T P (implementation of these characters is mandatory for GSM/UMTS, but they are ignored)

! W @ (implementation of these characters is optional for GSM/UMTS, and they are ignored)

~~V.25ter~~V.250 semicolon character

6.3   Direct dialling from phonebooks

GSM/UMTS MT and SIM/UICC can contain phonebooks which have a phone number and an alphanumeric field for each phonebook entry location. The use of ~~V.25ter~~V.250 [14] dialling command ensures that direct dialling from MT and SIM/UICC phonebook is possible through ordinary communications software which just gives the phone number field to be filled and then use the D command to originate the call. Available memories may be queried with Select Phonebook Storage test command +CPBS=?, and location range for example with Read Phonebook Entries test command +CPBR=?.

Responses

Possible error responses include +CME ERROR: <err> when error is related to MT functionality. Refer subclause 9.2 for possible error values. Otherwise TA responses can have values defined by ~~V.25ter~~V.250 [14] and commands Service Reporting Control +CR and Connected Line Identification Presentation +COLP. Detailed error report of an unsuccessful originated call failed in a GSM/UMTS network error can be obtained with command Extended Error Report +CEER (if implemented).

6.4 Call mode +CMOD

Table 12: +CMOD parameter command syntax

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

Description

Set command selects the call mode of further dialling commands (D) or for next answering command (A). Mode can be either single or alternating (in the present document, terms "alternating mode" and "alternating call" refer to all GSM/UMTS bearer and teleservices that incorporate more than one basic service (voice, data, fax) within one call). When single mode is selected the call originating and hangup procedures are similar to procedures specified in ITU-T Recommendations V.25ter V.250 [14], T.31 [11] and T.32 [12]. In GSM/UMTS there can be voice followed by data (refer 3GPP TS 22.002 [1]), alternating voice/data (refer 3GPP TS 22.002 [1]) and alternating voice/fax calls (refer 3GPP TS 22.003 [2]). Refer next two subclauses for alternating call control methods.

6.5 Hangup call +CHUP

Table 13: +CHUP action command syntax

Command	Possible response(s)
+CHUP	
+CHUP=?	

Description

Execution command causes the TA to hangup the current GSM/UMTS call of the MT.

NOTE: The purpose of this command is not to replace the V.25ter V.250 [14] command H, but to give an assured procedure to terminate an alternating mode call. Refer next subclause.

6.8 Radio link protocol +CRLP

Table 15: +CRLP parameter command syntax

Command	Possible response(s)
+CRLP=[<iws>[,<mws>[,<T1>[,<N2>[,<ver>[,<T4>]]]]]]	
+CRLP?	+CRLP: <iws>,<mws>,<T1>,<N2>[,<ver1>[,<T4>]] [<CR><LF>+CRLP: <iws>,<mws>,<T1>,<N2>[,<ver2>[,<T4>]] [...]]
+CRLP=?	+CRLP: (list of supported <iws>s),(list of supported <mws>s), (list of supported <T1>s),(list of supported <N2>s)[,<ver1> [,(list of supported <T4>s)]] [<CR><LF>+CRLP: (list of supported <iws>s),(list of supported <mws>s),(list of supported <T1>s),(list of supported <N2>s) [,<ver1>[,(list of supported <T4>s)]] [...]]

Description

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NOTE 1: If radio link protocol is not used, but some other error correcting protocol (for transparent data calls), ~~V.25ter~~V.250 [14] Error Control Selection test command +ES=? may be used to indicate the presence of the protocol.

6.9   Service reporting control +CR

Table 16: +CR parameter command syntax

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

Description

:

NOTE: This command replaces ~~V.25ter~~V.250 [14] command Modulation Reporting Control +MR, which is not appropriate for use in the GSM/UMTS network. Possible error control (other than radio link protocol) and data compression reporting can be enabled with ~~V.25ter~~V.250 commands Error Control Reporting +ER and Data Compression Reporting +DR.

6.11   Cellular result codes +CRC

Table 18: +CRC parameter command syntax

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

Defined values

:

<PDP_type> ,<PDP_addr> and <APN> are as defined in the Define PDP Context (+CGDCONT) command. 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. If the MT is unable to announce to the TE the network's request (for example it is in ~~V.25ter~~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.

6.20   Voice Hangup Control +CVHU

Table 27: +CVHU parameter command syntax

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

Description

Set command selects whether ATH or "drop DTR" shall cause a voice connection to be disconnected or not. By voice connection is also meant alternating mode calls that are currently in voice mode. (See subclause 6.6).

NOTE: When <mode> = 2, this command must be seen in conjunction with the ~~V.25ter~~V.250 [14] command &D. Else &D shall be ignored.

6.25   ITU-T ~~V.25ter~~V.250 [14] call control commands

Table 32: ~~V.25ter~~V.250 call control commands

Command	Subclause	Impl.	Use in GSM/UMTS
D[<dial_ string>][;]	6.3.1	mand.	originates a call
T	6.3.2	mand.	ignored (select tone dialling)
P	6.3.3	mand.	ignored (select pulse dialling)
A	6.3.5	mand.	answer a call
H[<value>]	6.3.6	mand.	hang-up a single mode call; for alternate mode call refer subclause "Hangup call +CHUP" (only value equal to zero needed)
O[<value>]	6.3.7	mand.	returns TA to online data state from online command mode (only value equal to zero needed)
S0=[<value>]	6.3.8	mand.	sets the number of call indications (rings) before automatically answering the call; value equalling zero disables automatic answering and is the default
S6=[<value>]	6.3.9	mand.	ignored (pause before blind dialling)
S7=[<value>]	6.3.10	mand.	sets number of seconds to wait for completion of call answering or originating procedure before giving up and disconnecting
S8=[<value>]	6.3.11	mand.	sets number of seconds to wait when comma dial modifier encountered in dial string of D command (default is 2 seconds)
S10=[<value>]	6.3.12	mand.	sets number of tenths of seconds to wait before disconnecting after TA has indicated the absence of received line signal
L[<value>]	6.3.13	mand.	ignored (monitor speaker loudness)
M[<value>]	6.3.14	mand.	ignored (monitor speaker mode)

6.26   ITU-T ~~V.25ter~~V.250 [14] data compression commands

Table 33: ~~V.25ter~~V.250 data compression commands

Command	Subclause	Impl.	Use in GSM/UMTS
+DS=[<dir>[,<neg> [,<P1>[,<P2>]]]]	6.6.1	mand. when V.42bis	controls ITU-T Recommendation V.42bis data compression functions; for subparameter defaults in GSM/UMTS refer 3GPP TS 24.022 [18]
+DR=[<value>]	6.6.2	mand. when V.42bis	determines whether the use of V.42bis is informed using intermediate result code +DR: <type> before going online data state after call answering or originating

6.27   Informative examples

The alternating mode call handling (voice and fax, or voice and data) and the data call setup commands are defined such that the dialling command of ~~V.25ter~~V.250 [14] (D) still always originates a call. The purpose is to support all current TE applications using the dialling command as default. Fax calls are controlled following the rules of ITU-T T.31 [11] and T.32 [12] standards.

Two new commands are created for controlling the alternating mode calls. First one, Call Mode (+CMOD), selects between single and alternating mode. Because this is a crucial command, it is defined that the value is set back to zero (single mode) after every successfully originated alternating mode call. Also on power-up and factory or user resets, the value is set to zero. The second new command, Hangup Call (+CHUP), is not a replacement of ~~V.25ter~~V.250 [14] command H, but a command which reliably disconnects the call in GSM/UMTS network. This is defined because the H command is used to switch from fax or data mode to voice mode.

Service Reporting Control command (+CR) is defined similarly as the reporting of modulation, V.18, error control, and data compression which are ~~V.25ter~~V.250 [14] features used to show information about the type of the established connection before the CONNECT intermediate result code. +CR command has one subparameter which specifies whether the intermediate result code +CR: <serv> is returned or not. The result code should be returned before any ~~V.25ter~~V.250 [14] reporting result codes. An example of setting up an asynchronous 9600 bit/s modem connection with service reporting:

7.7 Calling line identification restriction +CLIR

Table 40: +CLIR parameter command syntax

Command	Possible response(s)
+CLIR=[<n>]	
+CLIR?	+CLIR: <n>,<m>
+CLIR=?	+CLIR: (list of supported <n>s)

Description

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NOTE: On a per call base CLIR functionality is explained in subclause "ITU-T ~~V.25ter~~V.250 [14] dial command".

7.8 Connected line identification presentation +COLP

Table 41: +COLP parameter command syntax

Command	Possible response(s)
+COLP=[<n>]	
+COLP?	+COLP: <n>,<m>
+COLP=?	+COLP: (list of supported <n>s)

Description

:

When enabled (and called subscriber allows), +COLP: <number>,<type>[,<subaddr>,<satype> [,<alpha>]] intermediate result code is returned from TA to TE before any +CR or ~~V.25ter~~V.250 [14] responses. It is manufacturer specific if this response is used when normal voice call is established.

7.10 Closed user group +CCUG

Table 43: +CCUG parameter command syntax

Command	Possible response(s)
+CCUG=[<n>[,<index>[,<info>]]]	
+CCUG?	+CCUG: <n>,<index>,<info>
+CCUG=?	

Description

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Set command with `<n>=1` enables to control the CUG information on the air interface as a default adjustment for all following outgoing calls. The interaction of this command with other commands based on other GSM/UMTS supplementary services is described in the GSM/UMTS standard.

NOTE: On a per call base CUG functionality is explained in subclause "ITU-T ~~V.25ter~~V.250 [14] dial command".

7.17   Supplementary service notifications +CSSN

Table 50: +CSSN parameter command syntax

Command	Possible response(s)
+CSSN=[<n>[,<m>]]	
+CSSN?	+CSSN: <n>,<m>
+CSSN=?	+CSSN: (list of supported <n>s),(list of supported <m>s)

Description

This command refers to supplementary service related network initiated notifications. The set command enables/disables the presentation of notification result codes from TA to TE.

When `<n>=1` and a supplementary service notification is received after a mobile originated call setup, intermediate result code +CSSI: <code1>[,<index>] is sent to TE before any other MO call setup result codes presented in the present document or in ~~V.25ter~~V.250 [14]. When several different <code1>s are received from the network, each of them shall have its own +CSSI result code.

9.2   Mobile Termination error result code +CME ERROR

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NOTE: ITU-T ~~V.25ter~~V.250 [14] command V does not affect the format of this result code.

10.1.9   PS attach or detach +CGATT

Table 112: CGATT action command syntax

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

Description

The execution command is used to attach the MT to, or detach the MT from, the Packet Domain service. After the command has completed, the MT remains in ~~V.25ter~~V.250 command state. If the MT is already in the requested state, the command is ignored and the OK response is returned. If the requested state cannot be achieved, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command.

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

The read command returns the current Packet Domain service state.

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

NOTE: This command has the characteristics of both the ~~V.25ter~~V.250 action and parameter commands. Hence it has the read form in addition to the execution/set and test forms.

Defined Values

<state>: indicates the state of PS attachment
    0 - detached
    1 - attached
    Other values are reserved and will result in an ERROR response to the execution command.

Implementation

Optional.

10.1.10   PDP context activate or deactivate +CGACT

Table 113: CGACT action command syntax

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

Description

The execution command is used to activate or deactivate the specified PDP context (s). After the command has completed, the MT remains in ~~V.25ter~~V.250 command state. If any PDP context is already in the requested state, the state for that context remains unchanged. If the requested state for any specified context cannot be achieved, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command. If the MT is not PS attached when the activation form of the command is executed, the MT first performs a PS attach and them attempts to activate the specified contexts. If the attach fails then the MT responds with ERROR or, if extended error responses are enabled, with the appropriate failure-to-attach error message.

:

NOTE.   This command has the characteristics of both the ~~V.25ter~~V.250 action and parameter commands. Hence it has the read form in addition to the execution/set and test forms.

10.1.11   PDP Context Modify +CGCMOD

Table 114: CGCMOD action command syntax

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

Description

The execution command is used to modify the specified PDP context (s) with repect to QoS profiles and TFTs. After the command has completed, the MT returns to ~~V.25ter~~V.250 online data state. If the requested modification for any

specified context cannot be achieved, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command.

10.1.12 Enter data state +CGDATA

Table 115: +CGDATA action command syntax

Command	Possible Response(s)
+CGDATA=[<L2P> ,[<cid> [,<cid> [,...]]]]	CONNECT ERROR
+CGDATA=?	+CGDATA: (list of supported <L2P>s)

Description

The execution command causes the MT to perform whatever actions are necessary to establish communication between the TE and the network using one or more Packet Domain PDP types. This may include performing a PS attach and one or more PDP context activations. If the <L2P> parameter value is unacceptable to the MT, the MT shall return an ERROR or +CME ERROR response. Otherwise, the MT issues the intermediate result code CONNECT and enters ~~V.25ter~~V.250 online data state.

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

The detailed behaviour after the online data state has been entered is dependent on the PDP type. It is described briefly in 3GPP TS 27.060[34] and in more detail in 3GPP TS 29.061[39] and the specifications for the relevant PDPs. 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 context activation takes place during the PDP startup, one or more <cid>s may be specified in order to provide the information needed for the context activation request(s).

During each PDP startup procedure the MT may have access to some or all of the following information -

> The MT may have a priori knowledge, for example, it may implement only one PDP type.

> The command may have provided an <L2P> parameter value.

> The TE may provide a PDP type and/or PDP address to the MT during in the PDP startup procedure.

If any of this information is in conflict, the command will fail.

Any PDP type and/or PDP address present in the above information shall be compared with the PDP type and/or PDP address in any context definitions specified in the command in the order in which their <cid>s appear. For a context definition to match -

> The PDP type must match exactly.

> The PDP addresses are considered to match if they are identical or if either or both addresses are unspecified. For example, a PPP NCP request specifying PDP type = IP and no PDP address would cause the MT to search through the specified context definitions for one with PDP type = IP and any PDP address.

The context shall be activated using the matched value for PDP type and a static PDP address if available, together with the other information found in the PDP context definition. If a static PDP address is not available then a dynamic address is requested.

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.25ter~~V.250 command state is re-entered and the MT returns the final result code OK.

In the event of an erroneous termination or a failure to start up, the ~~V.25ter~~V.250 command state is re-entered and the MT returns the final result code NO CARRIER or, if enabled, +CME ERROR. Attach, activate and other errors may be reported.

10.1.15 Automatic response to a network request for PDP context activation +CGAUTO

Table 117: CGAUTO parameter command syntax

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

Description

The set command disables or enables an automatic positive response (auto-answer) to the receipt of a Request PDP Context Activation message from the network. It also provides control over the use of the ~~V.25ter~~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 test command returns the values of <n> supported by the MT as a compound value.

When the +CGAUTO=0 command is received, the MT shall not perform a PS detach if it is attached. Subsequently, when the MT announces a network request for PDP context activation by issuing the unsolicited result code RING or +CRING, the TE may manually accept or reject the request by issuing the +CGANS command or may simply ignore the network request.

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.25ter~~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.

10.1.16 Manual response to a network request for PDP context activation +CGANS

Table 118: CGANS action command syntax

Command	Possible response(s)
+CGANS=[<response>, [<L2P>,[<cid>]]]	OK
	ERROR
+CGANS=?	+CGANS: (list of supported <response>s), (list of supported <L2P>s)

Description

The execution command requests the MT to respond to a network request for Packet Domain PDP context activation which has been signalled to the TE by the RING or +CRING: unsolicited result code. 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 ERROR or +CME ERROR response. Otherwise, the MT issues the intermediate result code CONNECT and enters ~~V.25ter~~V.250 online data state.

The detailed behaviour after the online data state has been entered is dependent on the PDP type. It is described briefly in 3GPP TS 27.060[34] and in more detail in 3GPP TS 29.061[39] and the specifications for the relevant PDPs. PDP context activation procedures shall take place prior to or during the PDP startup.

One or more <cid>s may be specified in order to provide the values needed for the context activation request.

During the PDP startup procedure the MT has the PDP type and the PDP address provided by the network in the Request PDP Context Activation message. The MT may also have some or all of the following information -

> The MT may have a priori knowledge, for example, it may implement only one PDP type.

> The command may have provided an <L2P> parameter value.

> The TE may provide one or both of PDP type and PDP address to the MT in the PDP startup.

If any of this information is in conflict, the command will fail.

If one or more <cid> is given then an attempt shall be made to identify an appropriate context definition by matching the PDP type and PDP address in the network request with the PDP type and PDP address in each of the specified context definitions (in the order in which their <cid>s appear in the command) as follows -

> The PDP type must match exactly.

> The PDP addresses are considered to match if they are identical or if the address in the context definition is unspecified.

The context shall be activated using the values for PDP type and PDP address provided by the network, together with the other information found in the PDP context definition. An APN may or may not re required, depending on the application.

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.

After data transfer is complete, and the layer 2 protocol termination procedure has completed successfully, the ~~V.25ter~~V.250 command state is re-entered and the MT returns the final result code OK

In the event of an erroneous termination or a failure to startup, the ~~V.25ter~~V.250 command state is re-entered and the MT returns the final result code NO CARRIER or, if enabled, +CME ERROR. Attach, activate and other errors may be reported. It is also an error to issue the +CGANS command when there is no outstanding network request.

10.2.1 MT originated PDP context activation

In this mode of operation, the MT behaves like an originating modem and accepts the normal ~~V.25ter~~V.250 commands associated with placing and clearing a call. If Packet Domain-specific configuration commands are required, they may be sent to the MT as part of the modem initialization commands.

10.2.1.1 Request Packet Domain service 'D'

Table 123: D command syntax

Command	Possible Response(s)
D*<GPRS_SC>[*[<called_address>] [*[<L2P>][*[<cid>[,<cid>[,…]]]]]]#	CONNECT ERROR

Description

This command causes the MT to perform whatever actions are necessary to establish communication between the TE and the external PDN.

The V.25ter V.250 'D' (Dial) command causes the MT to enter the V.25ter V.250 online data state and, with the TE, to start the specified layer 2 protocol. The MT shall return CONNECT to confirm acceptance of the command prior to entering the V.25ter V.250 online data state. No further commands may follow on the AT command line.

The detailed behaviour after the online data state has been entered is dependent on the PDP type. It is described briefly in clauses 9 (for IP) of 3GPP TS 27.060[34]. 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.

When the layer 2 protocol has terminated, either as a result of an orderly shut down of the PDP or an error, the MT shall enter V.25ter V.250 command state and return the NO CARRIER final result code.

10.2.1.2   Request Packet Domain IP service 'D'

Table 124: D command syntax

Command	Possible Response(s)
D*<GPRS_SC_IP>[*<cid>[,<cid>[,…]]]#	CONNECT ERROR

Description

This command causes the MT to perform whatever actions are necessary to establish communication between the TE and the external PDN.

The V.25ter V.250 'D' (Dial) command causes the MT to enter the V.25ter V.250 online data state and, with the TE, to start the specified layer 2 protocol. The MT shall return CONNECT to confirm acceptance of the command prior to entering the V.25ter V.250 online data state. No further commands may follow on the AT command line.

The detailed behaviour after the online data state has been entered is described briefly in clause 9, for IP, of 3GPP TS 27.060[34]. GPRS attachment and PDP context activation procedures may take place prior to or during the PDP startup if they have not already been performed using the +CGATT and +CGACT commands.

When the layer 2 protocol has terminated, either as a result of an orderly shut down of the PDP or an error, the MT shall enter V.25ter V.250 command state and return the NO CARRIER final result code.

10.2.2   Network requested PDP context activation

In this mode of operation, the MT behaves like an answering modem and accepts the normal V.25ter V.250 commands associated with answering a call. If Packet Domain-specific configuration commands are required, they may be sent to the MT as part of the modem initialization commands.

10.2.2.1   Automatic response to a network request for PDP context activation 'S0'

The V.25ter V.250 'S0=n' (Automatic answer) command may be used to turn off (n=0) and on (n>0) the automatic response to a network request for a PDP context activation.

When the 'S0=n' (n>0) command is received, the MT shall attempt to perform a PS attach if it is not already attached. Failure will result in ERROR being returned to the TE. Subsequently, the MT will announce a network request for PDP context activation by issuing the unsolicited result code RING to the TE, followed by the intermediate result code CONNECT. The MT then enters V.25ter 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.

10.2.2.2   Manual acceptance of a network request for PDP context activation 'A'

The ~~V.25ter~~V.250 'A' (Answer) command may be used to accept a network request for a PDP context activation announced by the unsolicited result code RING. The MT responds with CONNECT, enters ~~V.25ter~~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. It is an error to issue the 'A' command when there is no outstanding network request.

10.2.2.3   Manual rejection of a network request for PDP context activation 'H'

The ~~V.25ter~~V.250 'H' or 'H0' (On-hook) command may be used to reject a network request for PDP context activation announced by the unsolicited result code RING. The MT responds with OK. It is an error to issue the 'H' command when there is no outstanding network request.

NOTE: This is an extension to the usage of the 'H' command that is described in ITU-T ~~V.25ter~~V.250.

11.2.2   Termination of an Voice Group or Voice Broadcast Call 'H'

The ~~V.25ter~~V.250 'H' or 'H0' (On-hook) command may be used to terminate an ongoing voice group or voice broadcast call. The MT responds with OK. It is an error to issue the 'H' command when there is no outstanding network request.

It is an error to issue the 'H' command if the user is in group receive mode or the user is not the originator of the call and a ERROR or +CME ERROR result code is returned to the TE.

NOTE: This is an extension to the usage of the 'H' command that is described in ITU-T ~~V.25ter~~V.250.

Annex A (normative): Summary of commands from other standards

Summary of ITU-T Recommendation ~~V.25ter~~V.250 [14] commands applicable to GSM/UMTS:

Table A.1: ~~V.25ter~~V.250 commands applicable to GSM/UMTS

Name	~~V.25ter~~V.250 subclause	Description	Subclauses in the present document
&C	6.2.8	Circuit 109 (Received line signal detector) Behaviour	4.3
&D	6.2.9	Circuit 108 (Data terminal ready) Behaviour	4.3
&F	6.1.2	Set to Factory-defined Configuration	5.8/ 3
+DR	6.6.2	Data Compression Reporting	6.20
+DS	6.6.1	Data Compression	6.20
+GCAP	6.1.9	Request Complete Capabilities List	5.8
+GCI	6.1.10	Country of Installation	5.8
+GMI	6.14	Request Manufacturer Identification	5.8/ 5.1
+GMM	6.1.5	Request Model Identification	5.8/ 5.2
+GMR	6.1.6	Request Revision Identification	5.8/ 5.3
+GOI	6.1.8	Request Global Object Identification	5.8
+GSN	6.1.7	Request Product Serial Number Identification	5.8/ 5.4
+ICF	6.2.11	DTE-DCE Character Framing	4.3
+IFC	6.2.12	DTE-DCE Local Flow Control	4.3
+ILRR	6.2.13	DTE-DCE Local Rate Reporting	4.3
+IPR	6.2.10	Fixed DTE Rate	4.3
A	6.3.5	Answer	6.19/ 6.6
D	6.3.1	Dial	6.1-6.4/ 6.6
E	6.2.4	Command Echo	4.3
H	6.3.6	Hook Control	6.19/ 6.5/ 6.6
I	6.1.3	Request Identification Information	5.8
L	6.3.13	Monitor Speaker Loudness	6.19
M	6.3.14	Monitor Speaker Mode	6.19
O	6.3.7	Return to Online Data State	6.19
P	6.3.3	Select Pulse Dialling	6.19
Q	6.2.5	Result Code Suppression	4.3
S0	6.3.8	Automatic Answer	6.19
S10	6.3.12	Automatic Disconnect Delay	6.19
S3	6.2.1	Command Line Termination Character	4.3
S4	6.2.2	Response Formatting Character	4.3
S5	6.2.3	Command Line Editing Character	4.3
S6	6.3.9	Pause Before Blind Dialling	6.19
S7	6.3.10	Connection Completion Timeout	6.19
S8	6.3.11	Comma Dial Modifier Time	6.19
T	6.3.2	Select Tone Dialling	6.19
V	6.2.6	DCE Response Format	4.3/ 3/ 4.1/ 4.2
X	6.2.7	Result Code Selection and Call Progress Monitoring Control	4.3
Z	6.1.1	Reset To Default Configuration	5.8

The use of ITU-T Recommendation V.42 error control protocol is not specified for GSM/UMTS, but if a manufacturer chooses to implement it over transparent data service, +E prefixed commands of ~~V.25ter~~V.250 [14] shall be used.

Annex B (normative):
Summary of result codes

V.25terV.250 [14] result codes which can be used in GSM/UMTS and codes defined in the present document:

Table B.1: Result codes

Verbose result code (V.25terV.250 command V1 set)	Numeric (V0 set)	Type	Description
+CALV	as verbose	Unsolicited	refer subclause 8.16
+CCCM: <ccm>	as verbose	Unsolicited	refer subclause 7.16
+CCWA: <number>,<type>,<class>[,<alpha>]	as verbose	Unsolicited	refer subclause 7.12
+CCWV	as verbose	Unsolicited	refer subclause 8.28
+CDEV: <elem>,<text>	as verbose	Unsolicited	refer subclause 8.10
+CDIP:<number>,<type>[,<subaddr>,<satype>]	as verbose	Unsolicited	refer subclause 7.9
+CIEV: <ind>,<value>	as verbose	Unsolicited	refer subclause 8.10
+CKEV: <key>,<press>	as verbose	Unsolicited	refer subclause 8.10
+CLAV: <code>	as verbose	Unsolicited	refer subclause 8.
+CLIP: <number>,<type>[,<subaddr>,<satype>[,<alpha>]]	as verbose	Unsolicited	refer subclause 7.6
+CME ERROR: <err>	as verbose	Final	refer subclause 9.2
+COLP: <number>,<type>[,<subaddr>,<satype>[,<alpha>]]	as verbose	Intermediate	refer subclause 7.8
+CR: <type>	as verbose	Intermediate	refer subclause 6.9
+CREG: <stat>[,<lac>,<ci>]	as verbose	Unsolicited	refer subclause 7.2
+CRING: <type>	as verbose	Unsolicited	refer subclause 6.11
+CSSI: <code1>[,<index>]	as verbose	Intermediate	refer subclause 7.17
+CSSU: <code2>[,<index>[,<number>,<type>[,<subaddr>,<satype>]]]	as verbose	Unsolicited	refer subclause 7.17
+CTZV: <tz>	as verbose	Unsolicited	refer subclause 8.40
+CUSD: <m>[,<str>,<dcs>]	as verbose	Unsolicited	refer subclause 7.15
+CUUS1I: <messageI>	as verbose	Intermediate	refer subclause 7.25
+CUUS1U: <messageU>	as verbose	Unsolicited	refer subclause 7.25
+DR: <type>	as verbose	Intermediate	refer subclause 6.13
+ILRR: <rate>	as verbose	Intermediate	refer subclause 4.3
BUSY	7	Final	busy signal detected
CONNECT	1	Intermediate	connection has been established
CONNECT <text>	manufacturer specific	Intermediate	as CONNECT but manufacturer specific <text> gives additional information (e.g. connection data rate)
ERROR	4	Final	command not accepted
NO ANSWER	8	Final	connection completion timeout
NO CARRIER	3	Final	connection terminated
NO DIALTONE	6	Final	no dialtone detected
OK	0	Final	acknowledges execution of a command line
RING	2	Unsolicited	incoming call signal from network

> NOTE: From v6.2.0 onwards, ATV0 numeric result codes 5, 6, 7 for `NO DIALTONE, BUSY and NO ANSWER` respectively, have been replaced by numeric result codes 6, 7, 8 respectively, to be aligned with the values listed in ITU-T V.250 (previously V.25ter).

Annex C (informative):
Commands from TIA IS-101

C.1   Introduction

The "Voice Control Interim Standard for Asynchronous DCE", TIA IS-101, contains some commands that are useful when passing audio "data" (that is, data which represents audio information) between the computer and the TA.

Some of the following subclauses describe commands from IS-101 which are central to this TA application. However, with the exception of necessary extensions, these descriptions are not intended to replace the definitions found in IS-101. Other novel commands from the interim standard are not included because they are peripheral to TA operation.

NOTE 1: IS-101 also uses ~~V.25ter~~V.250 [14] AT commands, but these are not mentioned here.