G30 AT Commands Reference Guide

80389ST10087a Rev.2 – 2012-08-31

Making machines talk.

APPLICABILITY TABLE

PRODUCT
G30

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1. Introduction

1.1. Scope

This manual introduces the G30 AT commands, and describes how software developers can use these commands to communicate with the G30 device, and to create software applications that communicate with the G30 using these commands.

NOTE:

The integrator should read the corresponding SW release notes for the G30 version he is using to get information about differences from this manual.

1.2. Audience

This manual is intended for software developers who communicate with the G30 device using the AT commands, and create applications to communicate with the G30 device using the AT commands.

1.3. Contact Information, Support

For general contact, technical support, to report documentation errors and to order manuals, contact Telit Technical Support Center (TTSC) at:

TS-EMEA@telit.com
TS-NORTHAMERICA@telit.com
TS-LATINAMERICA@telit.com
TS-APAC@telit.com

Alternatively, use:

http://www.telit.com/en/products/technical-support-center/contact.php

For detailed information about where you can buy the Telit modules or for recommendations on accessories and components visit:

http://www.telit.com

To register for product news and announcements or for product questions contact Telit Technical Support Center (TTSC).

Our aim is to make this guide as helpful as possible. Keep us informed of your comments and suggestions for improvements.

Telit appreciates feedback from the users of our information.

1.4. Text Conventions

Danger – This information MUST be followed or catastrophic equipment failure or bodily injury may occur.

Caution or Warning – Alerts the user to important points about integrating the module, if these points are not followed, the module and end user equipment may fail or malfunction.

Tip or Information – Provides advice and suggestions that may be useful when integrating the module.

All dates are in ISO 8601 format, i.e. YYYY-MM-DD.

1.5. Related Documents

- G30 Module Hardware Description
- G30 Developer's Kit

1.6. General Safety

1.6.1. Remember!. . . safety depends on you!

The following general safety precautions must be observed during all phases of operation, service, and repair of the equipment described in this manual. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the equipment. Motorola, Inc. assumes no liability for the customer's failure to comply with these requirements. The safety precautions listed below represent warnings of certain dangers of which we are aware. You, as the user of this product, should follow these warnings and all other safety precautions necessary for the safe operation of the equipment in your operating environment.

1.6.2. Ground the instrument

To minimize shock hazard, the equipment chassis and enclosure must be connected to an electrical ground. If the equipment is supplied with a three-conductor AC power cable, the power cable must be either plugged into an approved three-contact electrical outlet or used with a three-contact to two-contact adapter. The three-contact to two-contact adapter must have the grounding wire (green) firmly connected to an electrical ground (safety ground) at the power outlet. The power jack and mating plug of the power cable must meet International Electrotechnical Commission (IEC) safety standards.

1.6.3. Do not operate in an explosive atmosphere

Do not operate the equipment in the presence of flammable gases or fumes. Operation of any electrical equipment in such an environment constitutes a definite safety hazard.

1.6.4. Do not service or adjust alone

Do not attempt internal service or adjustment unless another person, capable of rendering first aid is present.

1.6.5. Keep away from live circuits

Operating personnel must:

- not remove equipment covers. Only Factory Authorized Service Personnel or other qualified maintenance personnel may remove equipment covers for internal subassembly, or component replacement, or any internal adjustment
- not replace components with power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed
- always disconnect power and discharge circuits before touching them

1.6.6. Do not substitute parts or modify equipment

Because of the danger of introducing additional hazards, do not install substitute parts or perform any unauthorized modification of equipment. Contact Motorola Warranty and Repair for service and repair to ensure that safety features are maintained.

1.6.7. Dangerous procedure warnings

Warnings, such as the example below, precede potentially dangerous procedures throughout this manual. Instructions contained in the warnings must be followed. You should also employ all other safety precautions that you deem necessary for the operation of the equipment in your operating environment.

Warning example:

WARNING:

Dangerous voltages, capable of causing death, are present in this equipment. Use extreme caution when handling, testing, and adjusting.

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2. Product Features

2.1. Connectivity Interface

The user can establish one type of connection in order to establish an AT command session with the G30:

- RS232 connection

2.2. GPRS Operation

2.2.1. Overview

The GPRS allows the service subscriber to send and receive data in an end-to-end packet-transfer mode, without utilizing network resources in circuit-switched mode.

2.2.2. Features and Benefits

GPRS enables the cost-effective and efficient use of network resources for packet mode data applications:

- Always connected.
- No setup time before data transmission.
- Cost change based on current data communication (not time based).

2.2.3. Technical Description (GPRS – Class B Operation)

The G30 is attached to both GPRS and other GSM services, but can only operate one set of services at a time (GPRS or CSD).
The G30 can activate a GPRS context and at the same time be alerted for an incoming CSD call.

This functionality is available on the G30 single serial line by either of two procedure options:
Option 1:

1. While in GPRS, listen to the RI signal (RS232) for an incoming CSD call ring.
2. Upon being interrupted by the RI signal, drop the DTR line to switch to command mode (depending on the previous DTR configuration: AT&D).
3. Answer the call (suspending the GPRS session).
4. At the end of the call, pull the DTR to resume the GPRS session.

Option 2:

- Use the MUX protocol for virtual channels support

2.3. CSD Operation

2.3.1. Overview

GSM CSD bearer service, the most widely used data service, provides both a transparent and non-transparent (error correction and flow control) data rate of 9.6 kbit/s.

Data transfer over Circuit Switched Data (CSD) is possible. Once the connection is established, data can be transferred to and from the remote side.
The user should take the CSD call setup time into account.
Network operators charge the user for the call time regardless of data usage.

2.3.2. Features and Benefits

CSD operation enables the terminal to perform a data transfer over a circuit switched link.
It enables the user to:

- Connect to a remote modem without any Internet network involvement.
- Own a real IP address and enable its access by connecting to an external ISP.
  The following are examples of standard CSD call uses:
- Connecting an Internet Service Provider (ISP).
- Remotely accessing corporate Intranet via Remote Access Server (RAS).
- User specific protocol, where the user defines both the remote and local sides.

2.3.3. Technical Description

GSM network operators typically support the non-transparent CSD bearer service through a modem interworking function. This means that a G30 initiates a data call and the network routes the call to the modem interworking function, which is located at the Mobile Switching Center (MSC) of the GSM network. The modem interworking function then dials the number supplied by the mobile station.
This is different from voice calls, where the GSM network itself routes the call, often to another mobile station on the same network. The GSM network does not route data calls - it dials the requested number on behalf of the mobile station and leaves the routing to the external wireline telephone network. The main reason for this is that the GSM network has information about what the user wants to do with the data call. For example, the user may be contacting his or her Internet Service Provider (ISP) to send email or dialing the corporate Intranet to set up a virtual private network (VPN) connection to retrieve confidential customer information from a company database.

2.4. Improved OEM Features

G30 contains the following new and improved features:

- SIM Application Toolkit (STK)
- TCP/IP support
- Audio (digital and analog) - path, gain and algorithm
- User-defined profiles

For a full list of G30 features, refer to the G30 Module Hardware Description manual.

2.4.1. SIM Application Toolkit (STK)

2.4.1.1. Overview

The SIM Toolkit (STK, also known as the SIM Application Toolkit or SAT) is a set of applications operated by the network provider (usually the module's SIM provider). If the STK is supported and enabled on the mobile side, specific data can be obtained via menu browsing.

2.4.1.2. Features and Benefits

The G30 STK enables the terminal to obtain information via menus created by the provider, for example, "local news" or "weather info". These menus are provider dependent. Enabling the STK allows the provider to perform other actions regarding call control, SMS etc.

2.4.1.3. Technical Description

The STK supports the specific mechanism(s) that SIM applications require to interact and operate with the G30. Using this mechanism, the SIM can notify the terminal, via the G30, that a specific action is requested. A full list of supported actions is listed in the Proactive SIM section. For more information regarding the STK mechanism, refer to the GSM 11.11 [20], GSM 11.14 ETSI standards.

2.4.1.4. Profile Download

Profile downloading provides a mechanism for the G30 to transmit information describing its capabilities to the SIM. During the early, profile download phase of the protocol, the G30 negotiates and confirms its ability to support the capabilities requested by the STK.

2.4.1.5. Data Transfer into the SIM

STK data transfer uses the short message service (SMS) as a transfer layer.

2.4.1.6. Set up Idle Mode Text

The proactive SIM mechanism enables the SIM to initiate actions to be handled by the G30. Using this service, the SIM can inform the G30 that it has information pending for action. The SIM can issue a variety of protocol commands through this mechanism, for example:

- Displaying text
- Sending a short message
- Setting up a voice call to a number held by the SIM
- Setting up a data call to a number whose bearer capabilities are held by the SIM
- Sending an SS control or USSD string
- Playing a tone
- Initiating a dialogue with the user (get inkey, get input)
- Providing local information from the G30 to the SIM
- Profile download
- Send DTMF
- Set up idle text mode
- Launch browser
- Set up event list

2.4.1.7. Menu Selection

The SIM supplies a set of possible menu entries via a proactive SIM command. The menu selection mechanism is used to transfer the SIM application menu item selected by the user to the SIM and then via SMS to the provider.

2.4.1.8. Call Control by SIM

When this service is activated by the SIM, all dialed digit strings, supplementary service control strings and USSD strings are first passed to the SIM before the G30 sets up the call, the supplementary service operation or the USSD operation. The SIM has the ability to allow, disable or modify the call. The STK has the ability to replace a call request, a supplementary service operation or a USSD operation with another call, for example, a call request by the G30 can be diverted to a different destination.

2.4.2. STK

2.4.3. TCP/UDP IP Connection

2.4.3.1. Overview

The network capabilities are achieved by using different layers of connections. Every layer of connections provides basic connections to the layer above it. The higher the layer is, the more capabilities it can provide.

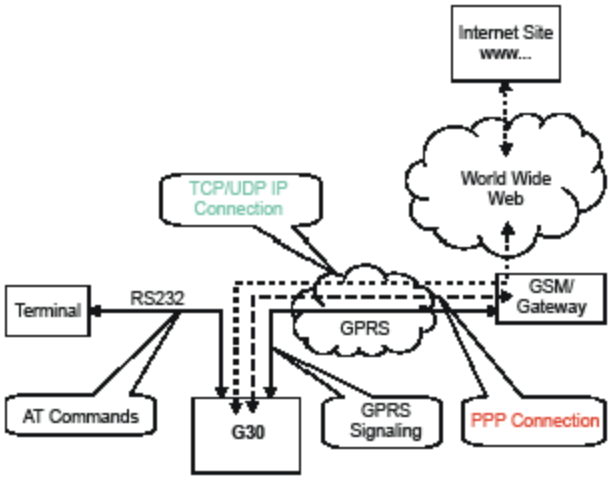


Figure 2-1:System Overview

The three layers of connections are:

- Physical links
- Point-to-point links
- TCP/UDP links

2.4.3.2. TCP/IP

When establishing the TCP/IP connection the G30 can only be the "initiator". The TCP/IP feature enables the G30 to be a wireless end point for a TCP/IP socket.

NOTE:

The TCP protocol use the value TTL (Time to live) = 64.

2.4.3.3. Creating TCP/IP Connections

Connection from the G30 to the Web
The following occurs when creating a TCP/IP connection from the G30 to the Web:

1. The G30 connects to the GPRS network and receives an IP address (using the +MIPCALL command).
2. The G30 opens a TCP/IP stack as one of its "sockets" (it must know the target's IP address and port number).
3. Once the connection is established, data is transferred freely in both directions (upload and download).
   Connection with another G30 using the network connection dialer.
   The following occurs when creating a TCP/IP connection with another G30 using the network connection dialer:

1. The OEM on the target side (server) uses the connection application. When using this application the TCP/IP is external to the OEM. (External TCP stack is used).
2. The target side activates the "server application" (The term "server application" means an application that has the ability to listen on a given IP address and port number).
3. After connecting to the GPRS network, the "server" sends its IP address to the G30 using an alternative connection (for example, CSD, SMS and so on).
4. The server application listens on a known port, waiting for G30 to connect.
5. The G30 connects to the same GPRS network as the server, and receives an IP address (using the +MIPCALL command).
6. The G30 initiates a TCP/IP connection with the listening "server". (It knows the IP address and port number of the server).
7. Once the server is connected, the TCP/IP connection is created and data can be transferred freely in both directions (upload and download).

2.4.3.4. UDP/IP

The set of AT commands created for the TCP/IP connection is used for the UDP/IP connection as well. Therefore, UDP/IP must open a UDP stack using the MIPOPEN AT command. The connection created does not change any concept regarding the UDP/IP known protocol (which is connectionless), this is just an easy way for the terminal to specify to the G30 which of the four possible stacks should be used.
When establishing the UDP/IP connection, the G30 is both the "initiator" and the "listener".

2.4.3.5. Creating UDP/IP Connections

Connection with another G30
The following occurs during a UDP/IP connection with another G30:

1. Side A:
   – The G30 connects to the GPRS network and receives an IP address (using the +MIPCALL command).
   – The G30 opens a UDP/IP stack as one of its "sockets" (using the +MIPOPEN and selecting the protocol UDP).

2. Side B:
   – The G30 connects to the GPRS network and receives an IP address (using the +MIPCALL command).
   – The G30 opens a UDP/IP stack as one of its "sockets" (using the +MIPOPEN and selecting the protocol UDP).
3. Side A and B previously agree on a port number, and exchange their given IP addresses via other means of connection (SMS, CSD, Voice, DB and so on).
4. The G30 sends and receives data to and from the targeted site as it knows the IP address and port number of the target.
5. Sending (accumulating) data is done using the +MIPSEND command.
6. Actual send is done using the +MIPPUSH command, by specifying the IP address and port number of the destination.

NOTE:

Every +MIPPUSH sets the destination IP address and destination port number for the current and future transactions. These values are used for the next push if not explicitly overwritten.

Connection from the G30 (client/server) to WEB (client/server)

The following occurs when creating a UDP/IP connection from the G30 (client/server) to WEB (client/server):

1. Client side:
   – The G30 client connects to the GPRS network and receives an IP address (using the +MIPCALL command).
   – The G30 opens a UDP/IP stack as one of its "sockets" (using the +MIPOPEN and selecting the protocol UDP).
2. The G30 sends data to the Website, as the Web site's IP address is known and is public, and the port number is previously agreed upon.
3. Sending (accumulating) data is done by the +MIPSEND command.
4. Actual send is done by the +MIPPUSH command by specifying the Website IP address and Website port number.
5. Server side:
   – After receiving the first packet from the client, the server knows the IP address and port number of the G30.
   – The IP address and port number for the specific mobile G30 should be saved in the DB.

NOTE:

Every +MIPPUSH sets the destination IP address and destination port number for the current and future transactions. These values are used for the next push if not explicitly overwritten.

2.4.4. Online Data Mode (ODM)

The Online Data Mode (ODM) feature, allows the user to transfer raw data (without using the +MIPSEND and +MIPPUSH commands) between G30 and a Network. The data transfers via established network connection (socket), based on internal TCP or UDP protocol stack. RS232 connection between G30 and terminal with Hardware flow control is required for the feature execution.

A special AT Command +MIPODM (instead of +MIPOPEN) is used to open a socket in Online Data Mode. The command provides a set of parameters for the feature configuration

and corrects performance, see "+MIPODM, Open a Socket (UDP or TCP) in Online Data Mode". When a socket is successfully opened in Online Data Mode, all data, comes from terminal, "as is" is being sent to Network and vice versa: all data, comes from Network, "as is" is being sent to terminal.
Each socket, opened in Online Data Mode, allocates an accumulating buffer whose size is 1372 bytes. When the user sends amount of data, less then the buffer size, the data is being sent to Network after a spooling timeout (200 mS), otherwise the data is being sent to Network immediately.
When ODM feature is executed, pseudo-command mode is enabled in PREMUX state and disabled in MUX state by default (see RS232 Multiplexer Feature). ODM feature allows the user to disable pseudo-command mode, when G30 is in PREMUX state by setting "pseudo-command mode enable/disable" parameter to "1" - see "+MIPODM, Open a Socket (UDP or TCP) in Online Data Mode". Disabled pseudo-command mode provides better data transfer performance.
When G30 is in MUX state and ODM feature executed, a pseudo-command mode is not supported.
The user can suspend an opened in Online Data Mode socket by entering, for example, ESC sequence (by default "+++") from terminal, when pseudo-command mode is enabled. In this case G30 switches to pseudo-command mode, allowing the user to enter AT commands from terminal. The ATO command used to resume Online Data Mode from pseudo-command mode. When a data comes from Network and G30 is in pseudo-command mode, a special unsolicited event (+MIPDATA) is being sent to terminal (see "+MIPDATA, Network Incoming Data Unsolicited Indication in Pseudo-command Mode").
When socket is in Online Data Mode (not in pseudo-command mode), RS232 communication DCD line is enabled.
There are two options to suspend a socket, opened in Online Data Mode, when G30 is in PREMUX state:

- Enter ESC sequence from terminal.
- Disable DTR line on RS232 communication port in case of AT&D1 parameter configuration.
  There are two options for valid closing of a socket, opened in Online Data Mode, when G30 is in PREMUX state:
- Switch G30 to pseudo-command mode and enter +MIPCLOSE command with opened in Online Data Mode Socket ID.
- Disable DTR line on RS232 communication port in case of A&D2 or AT&D3 parameter configuration.
  When G30 is in MUX state, change of DTR or software DTR state on ODM MUX channel closes ODM session in case of A&D1, A&D2 or AT&D3.
  When an error occurred with the socket, opened in Online Data Mode, the socket closes automatically and +MIPSTAT unsolicited response is being sent to terminal (see "+MIPSTAT, Status Report").

2.4.5. SSL

2.4.5.1. General Description

SSL (Secure Socket Layer) and its successor TLS (Transport Layer Security) are cryptographic protocols which provide endpoint authentication and communication privacy over the TCP / IP. There are slight differences between SSL 3.0 and TLS 1.0, but the protocol remains substantially the same. The term "SSL" as used here applies to both protocols unless

clarified by context.

2.4.5.2. Cipher Suite

Cipher Suite is a set of cryptographic algorithms. A cipher suite specifies one algorithm for each of the following tasks: Key exchange, Bulk encryption and Message authentication. For example, Cipher Suite TLS_RSA_WITH_RC4_128_MD5 specifies RSA as key exchange algorithm, RC4 with key length 128 bit as a stream cipher algorithm, to encrypt data transfer after handshake, and MD5 as algorithm for SSL message authentication.
The G30 SSL feature supports the following Cipher Suites (listed in order of the preference):

- TLS_RSA_WITH_3DES_EDE_CBC_SHA

2.4.5.3. Root Certificates

G30 has the following default root certificates:

- Entrust
- Geotrust global
- Globalsign
- Thawte
- Thawte Prem
- VeriSign Class 3 Primary
- VeriSign Trust Network Certification authorities.

G30 Root Certificates can be customized by Flexing new Root Certificates files into G30. For adding other root certificates, contact Telit's Customer Care team.
It is not mandatory to have the proper root certificate in order to perform SSL communication. In case that the G30 SSL client is trying to connect to a server and the server is not trusted, unsolicited SSL alerts will be sent to the terminal, but communication can continue normally.

2.4.5.4. Certificate expiration time

In order to check if SSL Certificate has expired, G30 uses internal clock. Some cellular operators support automatic time synchronization, so the G30 internal clock synchronizes automatically. In case the cellular operator does not support such feature, user should manually set G30 internal clock using +CCLK AT command. Since the clock is reset when the power to G30 is cut, the current time should be updated after G30 is powered up.

2.4.6. FTP Connection

2.4.6.1. Overview

G30 implements FTP connection feature, based on RFC959 standard, and operates as a FTP client. When connected to a remote FTP server, G30 is able to receive information about remote file system, manage it and perform files transfer operations.

2.4.6.2. Manage FTP Connection

AT+FTPOPEN command is used to open a FTP connection with a remote FTP server. When G30 performs FTP connection establish procedure, it allocates two TCP sockets. One of them is used for FTP control channel, the other - for FTP data channel (listen mode). FTP control channel port has default identification number (ID) - 21 for source (client) and destination (server) sides, but the user is able to configure control channel port ID for client as well as for

server by passing new source control port and/or new destination control port id as AT+FTPOPEN command optional parameters. This is applicable when a remote FTP server is able to accept FTP connection over non-standard (other then 21) ports. FTP data channel port has a default identification number (ID) - 20 for source (client) side, but the user is able to configure data channel port id by passing a new source data port id as AT+FTPOPEN command optional parameter. This is applicable when the remote FTP server is unable to establish data connection to some port IDs. The following example shows how to use AT+FTPOPEN command in various situations.

- To open a FTP connection with a remote FTP server, use the following settings:

destination URL	= someftpsite.com	(mandatory)
User	= anonymous	(mandatory)
Password	= string@email.com	(mandatory)
Account	= ""	(optional, default value)
source control port id	= 21	(optional, default value)
destination control port id	= 21	(optional, default value)
source data port id	= 20	(optional, default value)

AT+FTPOPEN = "someftpsite.com","anonymous","qwerty@somemail.com",,,,

- To open a FTP connection with a remote FTP server, use the same mandatory settings, but customize source control and data ports id:

source control port id	= 1300	(optional, custom value)
destination control port id	= 21	(optional, default value)
source data port id	= 1302	(optional, custom value)

AT+FTPOPEN = "someftpsite.com","anonymous","qwerty@somemail.com",,1300,,1302

When FTP connection is establish, G30 remains in command mode. This mode is used for performing most of the FTP AT commands. Only AT+FTPLIST, AT+FTPSTOR and AT+FTPRETR commands switch G30 to online data mode. Generally, G30 returns to command mode after the data mode caused command execution is finished, but the user is able to interrupt online data mode (and close actual FTP connection) by changing the DTR line status from ON to OFF, when AT&D settings = 2 or 3.

The G30 operation modes switching is shown in Figure 2-2:G30 Operation Modes Switching

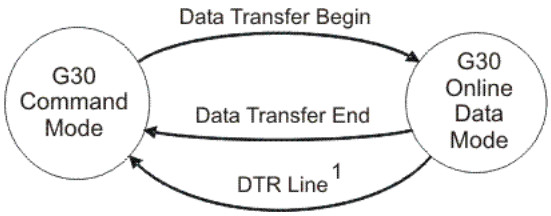


Figure 2-2:G30 Operation Modes Switching

NOTE:

[1]AT&D settings = 2 or 3. The operation closes the actual FTP connection and switches G30 to command mode.
AT&D settings = 1 closes the DATA socket and leave the control FTP socket connected.
Established FTP connection can be closed when G30 is in command mode by AT+FTPCLOSE command or by changing DTR line status from ON to OFF when data transfer operations are performed (G30 is in online data mode).

2.4.6.3. Manage Remote File System

When FTP connection is established, the user is able to manage file system on the remote FTP server, like create, remove, change directory, rename or delete a file. The following FTP commands are used for remote file system management purpose.
+FTPCWD - changes the working directory on a remote server.
+FTPMKD - creates a new directory on a remote server.
+FTPRMD - removes existing directory on a remote server.
+FTPPWD - returns actual working directory name from a remote server.
+FTPCDUP - changes working directory on a remote server, up to parent directory.
+FTPDEL - deletes a file on a remote server.
+FTPREN - renames a file on a remote server.

2.4.6.4. File Transfer Operations

The file transfer operation allows the user to transfer a file over an established FTP connection. To avoid end-of-file detection problem for user in download case and for G30 in upload case, G30 implements a special format of transferred files over FTP connection. The format proposed "escaping" one of the ASCII symbols of a file context and using the "escaped" symbol as end-of-file marker. An escaping algorithm is described below.
The algorithm defines two special characters: EOF (end-of-file character) and ESC (escape character). EOF symbol is a hexadecimal 0x03 (decimal 3) ASCII ETX symbol and ESC symbol is a hexadecimal 0x10 (decimal 16) ASCII DLE symbol - not to be confused with the ASCII ESCape character.
To encode a file to FTP File Transfer Format, the user or G30 will read each data byte from the source file and will perform the following operations:

- When a data byte has the same code as EOF character, a two byte sequence of ESC and EOF characters is sent instead.
- When a data byte has the same code as ESC character, a two byte sequence of ESC and ESC characters is sent instead.
- When end of file is reached, EOF character is sent.

To decode a file from FTP File Transfer Format, the user or G30 will read each data byte from the source file and will perform the following operations:

- When a data byte has the same code as ESC character and next data byte is ESC or EOF character, the first byte should be ignored.
- When a data byte has the same code as EOF character and previous data byte is not ESC character, end of file is reached.

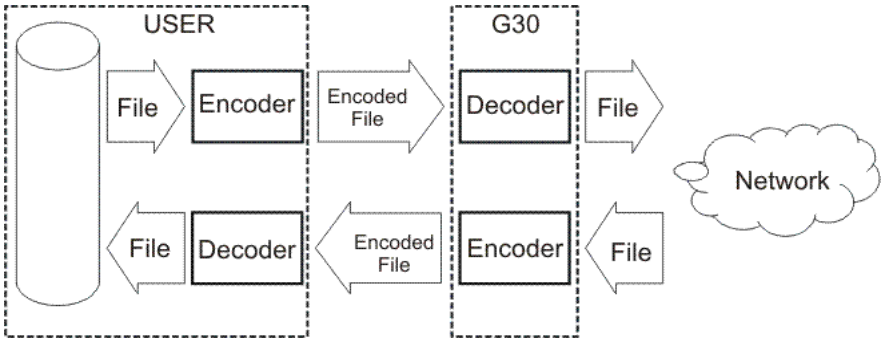


Figure 2-3:Files Transfer Process

2.4.6.5. Other FTP Operations

G30 provides +FTPINFO feature that allows the user to receive more information about FTP connection and FTP commands execution. When the feature is enabled, all FTP commands send by G30 to the remote server and all FTP responses, received by the G30 from the remote server are printed to the user as AT+FTPINFO: <text> unsolicited response. Use the AT+FTPINFO=1 for the feature enabling, and the AT+FTPINFO=0 for the feature disabling in any G30 operation time, when G30 is in command mode.

2.4.6.6. Interaction with Other MIP Commands

2.4.6.6.1. Interaction with +MIPODM Command

The external ODM session is prohibited when FTP feature is executed, because FTP feature data connection is based on socket, opened for ODM (internal ODM session), so, when G30 receives +MIPODM command within FTP connection, the error code: 302 (FTP session is active) is returned to the user.

2.4.6.6.2. Interaction with +MIPOPEN and +MIPCLOSE Commands

The user cannot initiate FTP connection with +MIPOPEN command as well as close FTP connection with +MIPCLOSE command.
When G30 receives +MIPCLOSE command for closing a socket, used within FTP connection, the error code: 302 (FTP session is active) is returned to the user.
When FTP is initiating, the 4 sockets of +MIPOPEN are still available for use. To Read the current status of FTP feature, use the Read format of the command +FTPOPEN?.

2.4.7. Audio

2.4.7.1. Overview

The audio (digital and analog) feature in the G30 module involves three main issues: path

(routes the current input and output devices), gain (volume management) and algorithm. For more information, refer to "Audio".

2.4.7.2. Features and Benefits

The following algorithm related features are provided:

2.4.7.3. Sidetone

Sidetone reduces the microphone audio input that is routed to the selected speaker so that the person speaking can hear himself or herself talking. This creates a slight echo because the speaker sound then gets picked up again by the microphone and is again routed to the speaker, and so on. Echo suppress is designed to take care of this echo.

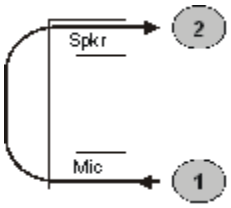


Figure 2-4:Sidetone

2.4.7.4. Echo Suppression

Echo suppression suppresses a large amount of the output sound picked up by the input device (cancels all echoes).

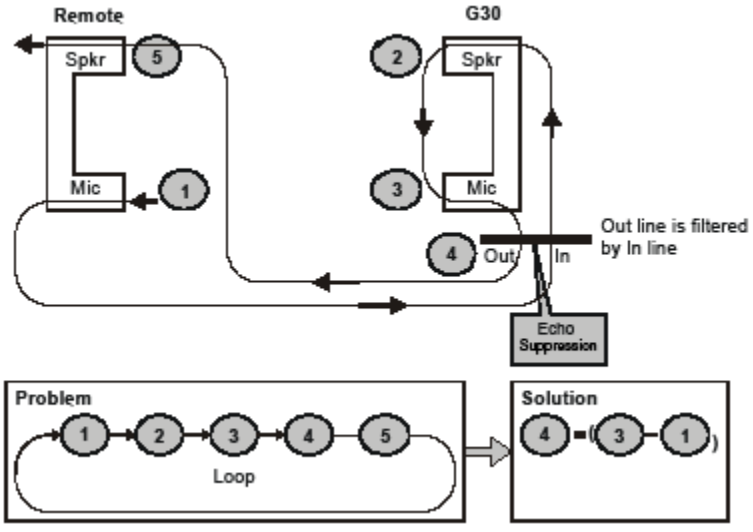


Figure 2-5:Echo Suppression

2.4.7.5. Noise Suppress

Noise suppression improves audio quality in all modes by suppressing environment noise from being picked up by the input device.

2.4.8. Technical Description

The path features provide full control over the navigation of the audio in the product.
The gain features provide full control over the volume levels of the different output accessories and tones.
The algorithm provides full control over activation/deactivation of audio quality features such as echo canceling and noise suppression.
The user can access these features by means of AT commands. These are described later in this document.

2.5. MUX Integration

2.5.1. Overview

The G30 is supplied with an internal GSM 7.10 protocol stack, also referred to as a multiplexer or MUX.
The G30 with multiplexer support utility provides the following capabilities:

- Provides the terminal with up to four virtual channels on one physical RS-232 connection.
- Provides simultaneous data (CSD/GPRS) and command (AT command set) services. In this way, many applications can use a single RS232 line via virtual channels. This enables a user to make network and phone service inquiries and maintain data communication at the same time.

These capabilities are illustrated in the following figure:

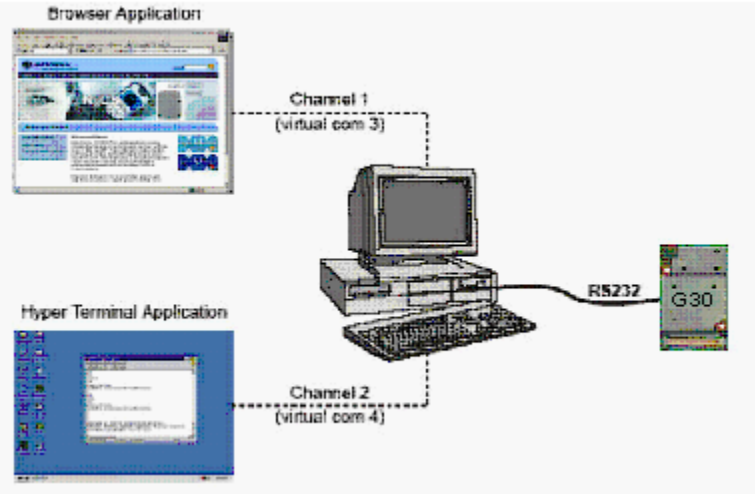


Figure 2-6: G30 with Multiplexer Support Capabilities

2.5.2. Features and Benefits

The G30 with the MUX feature ENABLES multiple channel operation and simultaneous data and control operation. For example, it allows a user to be connected to an Internet website (GPRS session connected), receive a file via CSD Call.
The following actions are enabled during a data session:

- Incoming call alert string RING (while G30 is in GPRS session)
- Answering to incoming call via the ATA command (while G30 is in GPRS session)
- Receive Incoming SMS indication
- Inquiry GSM coverage indication
- Setup a voice call (while G30 is in GPRS session)
- Send & Receive SMS
- Local modem operation
- Network interrogation and settings

2.5.3. Technical Description

The MUX feature adds four virtual channels on a single physical RS232 line:

- Channel #0 - DLC0 for MUX Control
- Channels #1 through #4 are used for Data, GPRS, Voice call and control, and Logger/External modem applications

2.6. Short Message Service (SMS)

2.6.1. Overview

The SMS feature provides means for SMS messages handling and the reporting of SMS reception events.
G30 SMS implementation is based on the GSM27.005 specification.

2.6.2. Features

The SMS, as defined within the GSM 900/1800/1900 digital mobile phone standard:

- A single short message can be up to 160 characters of IRA text in length (7-bit coded). Message text can comprise words, numbers or an alphanumeric combination.
- Short messages can be written and displayed in various coding schemes, including IRA and UCS2.
- Reception of an incoming message can invoke an indication to the terminal. This feature is configurable using the command AT+CNMI. Short messages received during data calls are not indicated.
- Short messages can be sent and received simultaneously with GSM voice and data calls.
- Cell broadcast messages can also be selected and received on the G30. The G30 enables registration to specific broadcast channels.

2.6.3. Technical Description

The G30 memory for incoming short messages is SIM-dependent. A new incoming message is saved in the first free memory location, from index 1, according to the SIM card.
The G30 memory can contain up to 5 CB messages from index 0 up to index 5.

SMS Type	SMS Index	Max Number of SMS
Incoming messages	1	SIM-dependent
	2	
	...	
CB messages	0	6
	1	
	...	
	5	

2.7. Character Sets

The following includes the references to various tables that provide conversions between the different character sets.
For the full content of a specific conversion table, refer to Appendix A, Character Set Tables.

2.7.1. IRA Character Set Management

The IRA character set is a standard seven-bit code that was proposed by ANSI in 1963, and finalized in 1968. IRA was established to achieve compatibility between various types of data processing equipment.

2.7.2. GSM Character Set Management

In G30, the GSM character set is defined as octant stream. This means that text is displayed not as GSM characters but in the hex values of these characters.

2.7.3. UCS2 Character Set Management

UCS2 is the first officially standardized coded character set, eventually to include the characters of all the written languages in the world, as well as all mathematical and other symbols.
Unicode can be characterized as the (restricted) 2-octet form of UCS2 on (the most general) implementation level 3, with the addition of a more precise specification of the bi-directional behavior of characters, as used in the Arabic and Hebrew scripts.
The 65,536 positions in the 2-octet form of UCS2 are divided into 256 rows with 256 cells in each. The first octet of a character representation denotes the row number, the second the cell number. The first 128 characters are thus the IRA characters.

2.8. AT Commands Summary

The following list contains a summary of all the G30 AT commands sorted by functionality.

Table 2-1: AT Commands

AT Command	Description	Page
Modem ID **Subscriber Unit Identity**		
+CGMI	This command displays manufacturer identification.	on page 4-67
+GMI	This command displays manufacturer identification.	on page 4-67
+FMI	This command displays manufacturer identification.	on page 4-67
+CGMM	This command displays the model identification.	on page 4-67
+GMM	This command displays the model identification.	on page 4-67
+FMM	This command displays the model identification.	on page 4-67
+CGMR	This command displays the revision identification.	on page 4-68
+GMR	This command displays the revision identification.	on page 4-68
+FMR	This command displays the revision identification.	on page 4-68
+CGSN	This command displays the product serial number identification.	on page 4-69
+GSN	This command requests the product serial number identification.	on page 4-69
+CSCS	This command selects the G30 character set.	on page 4-69
+CIMI	This command displays the International Mobile Subscriber Identity number.	on page 4-71
+CFSN	This command displays the factory serial number.	on page 4-71

AT Command	Description	Page
I	This command displays various G30 information items.	on page 4-72
+CNUM	This command displays up to five strings of text information that identify the G30.	on page 4-73
+CLAC	This command displays a list of all the AT commands supported by the G30.	on page 4-73
Call Control **Call Control Commands**		
D	This command places a voice call on the current network, when issued from an accessory device.	on page 4-77
DL	This command places a voice call to the last number dialed.	on page 4-78
H	This command hangs up, or terminates a particular call.	on page 4-79
A	This command answers an incoming call, placing the G30 into the appropriate mode, as indicated by the RING message.	on page 4-81
+CRC	This command controls whether to present the extended format of the incoming call indication.	on page 4-82
RING	This unsolicited event is received when an incoming call (voice or data) is indicated by the cellular network.	on page 4-82
+CRING	This unsolicited event indicates the type of incoming call.	on page 4-82
+CLIP	This command controls the Calling Line Identity (CLI) presentation to the terminal when there is an incoming call.	on page 4-83
+CCWA	This command controls the Call Waiting supplementary service, including settings and querying of the network by the G30.	on page 4-85
+CHLD	This command controls the Call Hold and Multiparty Conversation supplementary services.	on page 4-88
+CCFC	This command controls the call-forwarding supplementary service.	on page 4-90

AT Command	Description	Page
+CPUC	This command sets the parameters of the Advice of Charge-related price per unit and currency table found in the SIM file, EFPUCT.	on page 4-114
+CR	This command controls whether or not the extended format of an outgoing call is displayed or not.	on page 4-116
+CCWE	This command allows the sending of an unsolicited report when enabled.	on page 4-117
Supplementary Services		
+CSSN	This command handles the enabling and disabling of supplementary service-related, network-initiated, notifications.	on page 4-118
+CUSD	This command allows control of Unstructured Supplementary Service Data (USSD), according to GSM 02.90.	on page 4-121
+COLP	This command refers to the GSM supplementary service COLP, Connected Line Identification Presentation, which enables a calling subscriber to get the connected line identity (COL) of the called party after setting up a mobile-originated call.	on page 4-127
Voice Mail and Clock **Voice Mail Commands**		
+CSVM	This command handles the selection of the number to the voice mail server.	on page 4-129
System Date and Time Access Commands		
+CCLK	This command reads/sets the G30's current date and time settings.	on page 4-131
+CTZU	This command enables and disables automatic time zone update via NITZ.	on page 4-133
+CTZR	This command enables and disables the time zone change event reporting.	on page 4-133
SMS **SMS Commands**		

AT Command	Description	Page
+CSMS	This command handles the selection of the SMS message service type.	on page 4-135
+CPMS	This command handles the selection of the preferred storage area for messages.	on page 4-138
+CMGF	This command handles the selection of message formats.	on page 4-139
+CSCA	This command handles the selection of the SCA and the TOSCA.	on page 4-140
+CSMP	This command sets the Text Module parameters.	on page 4-144
+CSDH	This command shows the Text Mode parameters.	on page 4-146
+CNMI	This command sends an unsolicited indication when a new SMS message is received by the G30.	on page 4-149
+CNMA	This command acknowledges the receipt of a +CMT response.	on page 4-152
+CMTI	This unsolicited message, including the SMS message index, is sent upon the arrival of an SMS message.	on page 4-154
+CMT	The +CMT unsolicited response is sent to the TE upon receipt of a new SMS-DELIVER SM if the +CNMI parameter <mt> is set to 2.	on page 4-155
+CBM	The +CBM unsolicited response is sent to the TE upon receipt of a new cell broadcast message if +CNMI parameter <bm> is set to 2.	on page 4-157
+CBMI	The +CBMI unsolicited response is sent to the TE upon receipt of a new S Cell Broadcast messages.	on page 4-158
+CDSI	The +CDSI unsolicited response is sent to the TE upon receipt of a new SMS-STATUS-REPORT SM, if the +CNMI parameter <ds> is set to ’2’.	on page 4-159
+CDS	The +CDS unsolicited response is sent to the TE upon receipt of a new mobile-terminated SM if the +CNMI parameter <ds> is set to ’1’.	on page 4-160
+CMGL	This command displays a list of SMS messages stored in the G30 memory.	on page 4-161

AT Command	Description	Page
+MMGL	This command displays a list of SMS messages stored in the G30 memory.	on page 4-161
+CMGR	This command reads selected SMS messages from the G30 memory.	on page 4-166
+MMGR	This command reads selected SMS messages from the G30 memory.	on page 4-166
+CMSS	This command selects and sends pre-stored messages from the message storage.	on page 4-175
+CMGW	This command writes and saves messages in the G30 memory.	on page 4-176
+CMGD	This command deletes messages from the G30 memory.	on page 4-182
+CGSMS	This command handles the selection of the service or service preference used by the G30 to send mobile-originated SMS messages.	on page 4-183
+CMGS	This command sends an SM from the G30 to the network.	on page 4-183
+CSCB	This command handles the selection of cell broadcast message types and data coding schemes received by the G30.	on page 4-185
+MRICS	This command allows configuring the behavior of RI line in a case of SMS arrival.	on page 4-187
Network **Network Commands**		
+CSQ	This command displays the signal strength received by the G30.	on page 4-192
+CRLP	This command displays the Radio Link Protocol parameters.	on page 4-192
+CREG	This command enables/disables the network status registration unsolicited result code.	on page 4-194
+CGREG	This command enables/disables the GPRS network status registration unsolicited result code.	on page 4-196

AT Command	Description	Page
+COPS	This command enables accessing the network registration information, as well as select and register the GSM network operator.	on page 4-199
+CPOL	This command is used to edit the list of preferred operators located in the SIM card.	on page 4-203
+CPLS	This command is used to select PLMN list in the SIM/USIM.	on page 4-207
+MCELL	This command displays information about the Cellular Network.	on page 4-208
+MGAUTH	This command enables Authentication Protocol setting.	on page 4-218
+MCI	This command returns neighbor cell information.	on page 4-219
+MJDC	This command enables/disables the Jamming Detection feature.	on page 4-221
Hardware Information **Hardware Information Commands**		
+CBC	This command queries the battery charger connection.	on page 4-223
+CBAUD	This command sets the baud rate.	on page 4-224
+IPR	This command is responsible for setting and saving the request baud rate.	on page 4-225
+GCAP	This command displays the overall capabilities of the G30.	on page 4-227
&K	This command configures the RTS/CTS flow control.	on page 4-227
&C	This command determines how the state of the DCD line relates to the detection of the received line signal from the distant end.	on page 4-228
&D	This command determines how the G30 responds when the DTR (Data Terminal Ready) status is changed from ON to OFF during the online data state.	on page 4-230
+MCWAKE	This command displays reports on the status of the GPRS/GSM coverage.	on page 4-231

AT Command	Description	Page
+MGGIND	This command configures the service indicator on pin #16 in LGA or 49 of the 70 pin connector to be GPRS or GSM.	on page 4-232
+CFUN	This command shuts down the phone functionality of smart phones and PDAs with phone capabilities.	on page 4-233
+ICF	This command determines the local serial port start/stop (asynchronous) character framing used by the DCE when accepting DTE commands and transmitting information text and result codes.	on page 4-234
+IFC	This command controls the operation of the local flow control between the terminal and the G30.	on page 4-236
\Q	This command controls the operation of local flow control between DTE and DCE used when data are sent or received.	on page 4-238
S97	This command indicates whether an antenna is physically connected to the G30 RF connector.	on page 4-239
+MRST	This command enables customer software to perform a power off to the G30 unit.	on page 4-240
READY	This unsolicited notification indicates UART is ready.	on page 4-240
+MIOC	This command defines the G30 8 GPIO pins data value.	on page 4-241
+MIOD	This command defines the G30 8 GPIO pins configuration.	on page 4-243
+MMAD	This command reads and monitors digital value from a specified ADC.	on page 4-247
+MADCM	This command intends to query and monitor the G30 three ADC's values.	on page 4-248
+MPCMC	This command defines whether the PCM clock is generated continuously or not, when the module is in digital audio mode.	on page 4-252
+MTSM	This command measures the current temperature sensor value in Celsius degrees.	on page 4-253
+MSMPD	This command enables/disables polling for SIM insertion event feature.	on page 4-256

AT Command	Description	Page
Audio **Basic Audio Setup Commands**		
+CRSL	This command handles the selection of the incoming call ringer and alert tone (SMS) sound level on the alert speaker of the G30.	on page 4-261
+CLVL	This command sets the volume of the internal loudspeaker (which also affects the key feedback tone) of the G30.	on page 4-262
+CMUT	This command mutes/unmutes the currently active microphone path by overriding the current mute state.	on page 4-263
S94	This S-parameter represents the Boolean status, On/Off, of the sidetone feature.	on page 4-264
S96	This S-parameter represents the Boolean status, On/Off, of the echo cancelling feature in the handsfree.	on page 4-265
Advanced Audio Setup Commands		
+MAPATH	This command sets/requests the active input accessory, and the output accessory for each feature.	on page 4-266
+MAVOL	This command determines a volume setting for a particular feature in a particular accessory.	on page 4-269
+MAMUT	This command controls the muting/unmuting of all input paths (MIC, HDST_MIC, DIGITAL_RX).	on page 4-271
+MAFEAT	This command controls the algorithm features: Sidetone and Hands free (echo cancel, noise suppression, and agc).	on page 4-272
General Audio Commands		
+MADIGITAL	This command switches between analog and digital audio modes.	on page 4-273
+CALM	This command handles the selection of the G30's alert sound mode.	on page 4-275
+MMICG	This command handles the selection of microphone gain values.	on page 4-276

AT Command	Description	Page
+MMICV	This command handles the selection of microphone voltage values of 1st channel MIC port.	on page 4-277
+CRTT	This command plays one cycle of a ring tone, stops the cycle in the middle, and sets the ring tone to be used.	on page 4-278
+VTD	This command handles the selection of tone duration.	on page 4-281
+VTS	This command transmits a string of DTMF tones when a voice call is active.	on page 4-282
+MATONE	This command starts/stops the tone play.	on page 4-283
+MUBF	This command change the digital audio filters parameters for a specific uplink path.	on page 4-286
+MDBF	This command change the digital audio filters parameters for a specific downlink path.	on page 4-288
+MAHFD	This command controls the algorithm features: Hands free Default (echo cancel, noise suppression, and agc).	on page 4-290
+MAHF	This command controls the algorithm features: Hands free (echo cancel, noise suppression, and agc).	on page 4-291
+MAI2SY	This command switches between PCM and I2S audio modes.	on page 4-294
Access **Access Control Commands**		
A/	This command repeats the last command entered on the terminal.	on page 4-296
AT	This command checks the AT communication and only returns OK.	on page 4-296
+CPIN	This command is only relevant for phones that use SIM cards. It unlocks the SIM card when the proper SIM PIN is provided, and unblocks the SIM card when the proper SIM PUK is provided.	on page 4-297
+TPIN	This command queries the number of remaining SIM PIN/PUK entering attempts.	on page 4-301

AT Command	Description	Page
+CPWD	This command sets a new password for the facility lock.	on page 4-302
+CLCK	This command locks, unlocks or interrogates a G30 or a network facility <fac>.	on page 4-305
+CSIM	This command allows a direct control of the SIM by an distant application on the TE.	on page 4-308
Modem Configuration and Profile **Modem Register Commands**		
V	This command determines the response format of the data adapter and the contents of the header and trailer transmitted with the result codes and information responses.	on page 4-309
Q	This command determines whether to output/suppress the result codes.	on page 4-310
E	This command defines whether the G30 echoes the characters received from the user, (whether input characters are echoed to output).	on page 4-312
X	This command defines the data adaptor response set, and the CONNECT result code format.	on page 4-313
Sn	This command reads/writes values of the S-registers, and includes registers 1-49, 94, 96 (Audio) and 102 (Sleep mode).	on page 4-314
+CBAND	This command allows switching from automatic band selection to selection of one or more (up to four) bands.	on page 4-318
&F	This command restores the factory default configuration profile.	on page 4-319
Z	This command resets the default configuration.	on page 4-320
+MSTART	This command enables/disables the two types of reports during the power on process.	on page 4-321
+MTRACE	This command switches the trace tool On/Off.	on page 4-321
Sleep Mode Commands		

AT Command	Description	Page
S24	This command activates/disables the Sleep mode.	on page 4-326
S102	This command sets the value of the delay before sending data to the terminal.	on page 4-328
S100	ATS100 is a terminal minimum time limit for entering sleep mode.	on page 4-329
+MSCTS	This command defines the behavior of the CTS line when the G30 is in Sleep mode.	on page 4-331
Error Handling Commands		
+CMEE	This command enables/disables the use of result code +CME ERROR: <err> as an indication of an error relating to the functionality of the G30.	on page 4-332
+CEER	This command returns an extended error report containing one or more lines of information text, determined by the manufacturer, providing the reasons for the call-clearing errors.	on page 4-338
User Interface		
+CRSM	This command provides limited access to the Elementary Files on the SIM.	on page 4-341
+CCID	This command returns the SIM card identification number.	on page 4-346
&V	This command displays the current active configuration and stored user profiles.	on page 4-347
&W	This command stores the user profile.	on page 4-348
&Y	This command displays the default user profile.	on page 4-351
+CMER	This command enables display changes and indicator state changes.	on page 4-351
+CLAN	This command handles the selection of language in the ME.	on page 4-353
+CIND	This command is used to query the status of various ME indicators.	on page 4-355

AT Command	Description	Page
+CIEV	An unsolicited indication regarding various phone indications that is sent to the DTE when the <ind> parameter of the +CMER command is set to 1.	on page 4-356
+MDSI	This command enables unsolicited reporting of indications of SIM deactivation and invalidation.	on page 4-357
GPRS/EDGE **GPRS Commands**		
+CGCLASS	This command sets the GPRS mobile station class.	on page 4-360
+CGDCONT	This command specifies the PDP (Packet Data Protocol) context.	on page 4-361
+CGQMIN	This command sets the minimum acceptable quality of service profile.	on page 4-364
+CGQREQ	This command displays the requested quality of service profile.	on page 4-366
+CGATT	This command attaches the G30 to the GPRS network.	on page 4-368
D*99	This command enables the ME to perform the actions necessary for establishing communication between the terminal and the external PDN.	on page 4-370
+CGPRS	This command indicates whether there is GPRS coverage.	4.11.2.7 below
+CGACT	This command activates/deactivates the PDP Context.	on page 4-373
+CGPADDR	This command reads the allocated PDP addresses for the specified context identifiers.	on page 4-375
+CGCMOD	The execution command is used to modify the specified PDP context(s) with respect to QoS profiles and TFTs. After the command has completed, the MT returns to V.250 online data state.	on page 4-376
STK		
+STKPRO	This command displays the list of supported proactive commands.	on page 4-377

AT Command	Description	Page
+STKTR	This action command allows entering the response to a STK proactive command which was displayed by the unsolicited result code +STKPRO.	on page 4-381
+STKENV	This action command allows sending a STK envelope command to the MS.	on page 4-383
+STKPROF	This command allows reading and changing the terminal profile data.	on page 4-384
+STKCC	The SIMAP call control status is displayed using the unsolicited result code +STKCC.	on page 4-385
+STKCNF	The SIMAP proactive session status is displayed using the unsolicited result code +STKCNF.	on page 4-386
TCP/IP		
+MIPCALL	This command creates a wireless PPP connection with the GGSN or CSD service provider and returns a valid dynamic IP for the G30.	on page 4-420
+MIPOPEN	This command causes the G30 module to initialize a new socket and open a connection with a remote side.	on page 4-422
+MIPODM	This command causes the G30 to initialize a new socket in Online Data Mode and open a connection with a remote side.	on page 4-424
+MIPCLOSE	This command causes the G30 module to free the socket accumulating buffer and disconnect the G30 from a remote side.	on page 4-427
+MIPSETS	This command causes the G30 to set a watermark in the accumulating buffer. When the watermark is reached, data is pushed from the accumulating buffer into the protocol stack.	on page 4-429
+MIPSEND	This command causes the G30 to transmit the data that the terminal provides, using an existing protocol stack.	on page 4-431
+MIPPUSH	This command causes the G30 module to push the data accumulated in its accumulating buffers into the protocol stack.	on page 4-433
+MIPFLUSH	This command causes the G30 module to flush (delete) data accumulated in its accumulating buffers.	on page 4-435

AT Command	Description	Page
+MIPRUDP	This unsolicited event is sent to the terminal when data is received from the UDP protocol stack.	on page 4-436
+MIPRTCP	This unsolicited event is sent to the terminal when data is received from the TCP protocol stack.	on page 4-437
+MIPSTAT	This unsolicited event is sent to the terminal indicating a change in link status.	on page 4-438
+MIPDATA	This unsolicited event is sent to the terminal indicating a data comes from Network when G30 is in pseudo-command mode.	on page 4-439
+MIPXOFF	This unsolicited event is sent to the terminal to stop sending data.	on page 4-439
+MIPXON	This unsolicited event is sent to the terminal when the G30 has free memory in the accumulating buffer.	on page 4-440
+MIPCONF	This command allows to configure TCP stack parameters, such as retransmissions number, upper and bottom limits of retransmission timeout, close delay.	on page 4-440
+MPING	This command allows to verify IP connectivity to another remote machine (computer) by sending one or more Internet Control Message Protocol (ICMP) Echo Request messages.	on page 4-441
+MPINGSTAT	This is the unsolicited response that the G30 sends to the terminal to inform of ping execution status update and provides summary statistics of ping request when ping request execution is completed.	on page 4-445
+MSDNS	This command set/read DNS (Domain Name Server) IP address (primary/secondary) for each socket.	on page 4-449
+MIPCSC	This AT command is used to configure the SSL feature behavior in case of non - fatal alerts.	on page 4-452
+MIPSSL	This unsolicited event is sent to the terminal indicating an errors, warnings or alerts that occurred during SSL connection.	on page 4-454
+MIPRTCPGET	This command gets the oldest data received from TCP stack and was stored in the internal buffer in G30.	on page 4-455
+MIPRUDPGET	This command gets the oldest data received from UDP stack and was stored in the internal buffer in G30.	on page 4-457

AT Command	Description	Page
FTP Commands **Session Commands**		
+FTPOPEN	This command causes G30 to open a FTP connection with a remote FTP server.	on page 4-460
+FTPCLOSE	This command causes G30 to close FTP connection.	on page 4-462
+FTPINFO	This command causes the G30 to enable or disable FTP unsolicited indication to the user.	on page 4-462
+FTPCWD	This command causes the G30 to request the remote FTP server to change the working directory.	on page 4-464
+FTPMKD	This command causes the G30 to request the remote FTP server to create a new directory.	on page 4-465
+FTPRMD	This command causes the G30 to request the remote FTP server to remove a directory.	on page 4-466
+FTPPWD	This command causes G30 to request the remote FTP server to return the working directory name.	on page 4-468
+FTPCDUP	This command causes the G30 to request the remote FTP server to change the working directory up.	on page 4-469
+FTPDEL	This command causes the G30 to request the remote FTP server to delete a file.	on page 4-469
+FTPREN	This command causes the G30 to request the remote FTP server to rename a file.	on page 4-470
+FTPLIST	This command causes the G30 to request the remote FTP server to send a list.	on page 4-472
+FTPSTAT	This command causes the G30 to request the remote FTP server to send status.	on page 4-473
+FTPSYST	This command causes the G30 to request the remote FTP server to send the operating system type.	on page 4-476

AT Command	Description	Page
+FTPNOOP	This command causes the G30 to request the remote FTP server to do nothing.	on page 4-477
+FTPSTOR	This command causes the G30 to request the remote FTP server to store a file.	on page 4-478
+FTPRETR	This command causes the G30 to request the remote FTP server to send a file to the G30.	on page 4-479
RS232 Multiplexer Commands		
+CMUX	This command is used to enable/disable the GSM MUX multiplexing protocol stack.	on page 4-486
M2M Command		
+M2M	This command is used to enable/disable the M2M feature.	on page 4-491
FOTA Commands		
+MFOTAWSCFG	This command specify a particular PDP context definition to be used when web session need to be initiated.	on page 4-492
+MFOTACNFG	This command enables to set the FOTA session mode as Automatic/Non-Automatic.	on page 4-493
+MFOTAINSTL	If update package was downloaded prior to execution of this command then the module will start update installation, otherwise the module will reply with CME error: "operation not allowed".	on page 4-494
+MFOTAIND	When set, the module will send all the indications mentioned in	on page 4-495

3. Introduction to AT Commands

3.1. AT Commands Overview

AT commands are sets of commands used for communication with the G30 cellular modem. AT commands are comprised of assemblies of ASCII characters which start with the "AT" prefix (except the commands A/ and +++). The AT prefix is derived from the word Attention, which asks the modem to pay attention to the current request (command).
AT commands are used to request services from the G30 cellular modem, such as:

- Call services: dial, answer and hang up
- Cellular utilities: send/receive SMS
- Modem profiles: Auto Answer
- Cellular Network queries: GSM signal quality

3.2. General Symbols Used in AT Commands Description

The following syntax definitions apply in this chapter:

Syntax	Definition
<CR>	Carriage returns character, specified by the value of the S3-register.
<LF>	Line-feed character, specified by the value of the S4-register.
<...>	Name enclosed in angle brackets is a syntax element. The brackets themselves do not appear in the command line.
[...]	Optional sub-parameter of a command or an optional part of terminal information response, enclosed in square brackets. The brackets themselves do not appear in the command line. When the sub-parameter is not provided in the parameter type commands, the new value equals its previous value. In action type commands, the action should be performed on the basis of the recommended default setting of the sub-parameter.
//	Denotes a comment, and should not be included in the command.

3.2.1. General System Abbreviations

The basic system configuration contains a modem and a terminal.
The G30 is the modem and may be referred to as the DCE, the phone, the mobile or the radio.
The terminal may be referred to as the DTE or the TE.

3.3. AT Commands Protocol

The figure below shows a general messaging sequence of AT commands protocol between the terminal and the G30.

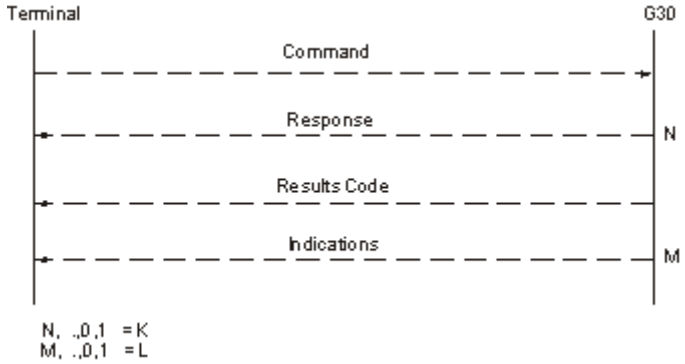


Figure 3-1:AT Commands Protocol

The AT commands interface is basically a Modem Services Upon Request.
Communication (almost) always begins from the terminal side. This means that any service should be requested from the terminal. Thus a request is called a "command".
Each command must be answered by a "results code" from the G30. The results code reports the command status to the terminal.
Some commands may include several "Response" requests (between 0 to K) to send data back to the terminal.
Some commands may initiate a mode in which, when specified events are generated in the G30, "Indicator" messages are sent asynchronously. Indicators can be between 0 to L.
The G30 can echo characters received from the terminal (commands) back to the terminal.

3.4. AT Commands Structure

3.4.1. Command Structure

An AT command line may contain one or more commands. Delimiters are used to separate the commands from each other, according to the following structure:

Prefix	Command1	Delimiter	Command2	Delimiter	…	CommandN	Suffix

Each AT command has the "AT" prefix string.
Each AT command has the suffix <CR>.
The delimiter is either a semicolon ";" or none, meaning space (basic commands).
Each AT command has the following structure:

Token	Mode	Arguments

The following figure outlines the basic structure of an AT command line:

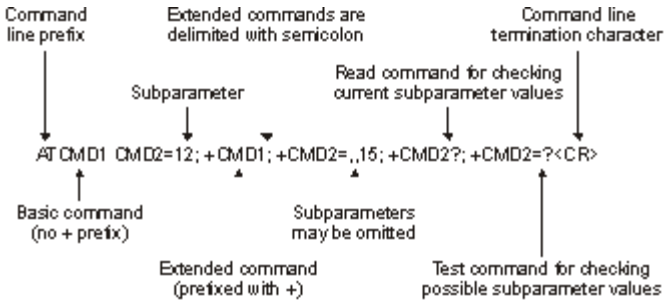


Figure 3-2:Basic Structure of a Command Line

The following rules must be observed when issuing a command line to the modem:

- Every command line must begin with the letters AT.
- Several commands can be concatenated as one line, as long as the total line does not exceed 140 characters with semicolon characters.
- Characters:

Spaces are ignored. You can leave spaces between each command and between characters of a command. You can also include punctuation in telephone numbers, and type commands in either UPPERCASE or lowercase. For example, the following commands are identical:
ATDT8005551234 < Enter > or
atdt (800) 555-1234 < Enter >

Backspace **<S5>** character is allowed.

- To cancel a dialing command in progress, send any ASCII character to the modem.
- To execute the command line, send the <CR> ASCII character.

3.4.2. Results Code Structure

When a command is issued, the G30 responds with a message, called a "Result Code", which tells the terminal the result of the command that was requested. Result codes can indicate, for example, the execution status of the command or the remote modem connection status.
Result codes can be represented either as numerical codes or as verbose responses. By default, the G30 responds with verbose response codes.
The result code has the following structure:

Prefix	Code	Suffix

where:
The results code prefix is **<CR><LF>**.
The results code suffix is **<CR><LF>**.

3.4.3. Response and Indications Structure

The following is the information response and indications structure:

Token	Separator	Arguments

where:
The separator is ":".
The following is an example of Response and Results code:

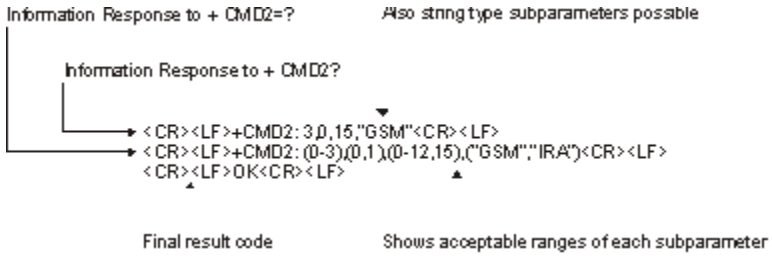


Figure 3-3:Response to a Command Line

If verbose responses are enabled (using the command V1) and all the commands in a command line have been performed successfully, the result code <CR><LF>OK<CR><LF> is sent from the G30 to the terminal. If numeric responses are enabled (using the command V0), the result code 0<CR> is sent instead.

If verbose responses are enabled (using the command V1) and sub-parameter values of a command are not accepted by the G30 (or if the command itself is invalid or cannot be performed for any reason), the result code <CR><LF>ERROR<CR><LF> is sent to the terminal and no subsequent commands in the command line are processed. If the numeric responses are enabled (using the command V0), the result code 4<CR> is sent instead. The ERROR (or 4) response may be replaced by +CME ERROR: <err> when the command was not processed due to an error related to G30 operation.

3.5. AT Commands Protocol & Structure Configuration

The AT commands message flow and structure may be configured by the terminal.
The G30 can be configured not to follow a command with an echo and/or results code. It can be configured to transmit the results code in either of two ways: Verbose or Numeric. This (and other) configurations can be set using the following commands:

Command	Description
S3=[<value>]	Command line termination character (default setting 0x13).
S4=[<value>]	Response formatting character (default 0x10).
S5=[<value>]	Command line editing character (default 0x 8).
E[<value>]	Command echo (default 0, meaning the G30 does not echo commands).
Q[<value>]	Result code suppression (default 0, meaning the G30 transmits result codes).
V[<value>]	G30 response format (default 1, meaning verbose format).
X[<value>]	Defines CONNECT result code format.

The figure below shows the flow and structure configuration commands:

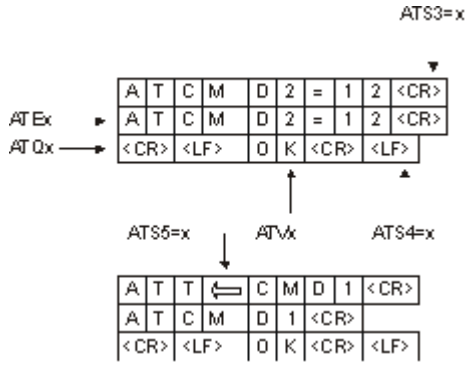


Figure 3-4:Flow and Structure Configuration Commands

3.6. Command Token Types

3.6.1. Basic Syntax Command Format

The format of Basic Syntax commands (except for the D and S commands) is: **<command>[<number>]**
where:
<command> is either a single character, or the "&" character (IA5 2/6) followed by a single character.
Characters used in **<command>** are taken from the set of alphabetic characters.
<number> may be a string of one or more characters from "0" through "9" representing a decimal integer value.

3.6.2. S-parameters

Commands that begin with the letter S constitute a special group of parameters known as "S-parameters". These differ from other commands in important respects:

- The number following the S indicates the "parameter number" being referenced. If the number is not recognized as a valid parameter number, an ERROR result code is issued.
- Immediately following this number, either a "?" or "=" character (IA5 3/15 or 3/13, respectively) appears:
  - "?" is used to read the current value of the indicated S-parameter.
  - "=" is used to set the S-parameter to a new value. "<parameter_number>" "<parameter_number" =[<value>]

If the "=" is used, the new value to be stored in the S-parameter is specified in decimal form following the "=".

3.6.3. Extended Syntax Command Format

Both actions and parameters have names, which are used in the related commands. Names always begin with the character "+" (IA5 2/11). Following the "+", from one to sixteen (16) additional characters appear in the command name.
All (GSM) cellular commands have the prefix "+C".
All General modem commands have the prefix "+G".
Most Motorola propriety commands have the prefix "+M".

3.7. Command Argument Types

<value> consists of either a numeric constant or a string constant.
<compound_value> consist of several <value> parameters separated by commas.
Example of compound_value: **<value1>,<value2>,…,<valueN>**

3.7.1. Numeric Constants

Numeric constants are expressed in decimal, hexadecimal, or binary form. In the G30, the definition of each command specifies which form is used for values associated with that command.

3.7.2. String Constants

String constants consist of a sequence of characters, bounded at the beginning and end by the double-quote character (").

3.8. Command Mode Types

3.8.1. Parameter Set Command Syntax

The terminal may store a value or values in a parameter by using the SET command.
The parameter definition indicates, for each value, whether the specification of that value is mandatory or optional. For optional values, the definition indicates the assumed (default) value if none is specified. The assumed value may be either a previous value (that is, the value of an omitted sub-parameter retains its previous value), or a fixed value (for example, the value of an omitted sub-parameter is assumed to be zero). Generally, the default value for numeric parameters is 0, and the default value for string parameters is "" (empty string).
The following syntax are used for:

- Actions that have no sub-parameters: **+<name>**
- Parameters that accept a single value: **+<name>=<value>**
- Parameters that accept more than one value: **+<name>=<compound_value>**

3.8.2. Parameter Read Command Syntax

The terminal can determine the current value or values stored in a parameter by using the following syntax: **+<name>?**

3.8.3. Parameter Test Command Syntax

The terminal can test whether a parameter is implemented in the G30, and determine the supported values, by using the following syntax: **+<name>=?**

3.9. Values

3.9.1. Range of Values

When the action accepts a single numeric sub-parameter, or the parameter accepts only one numeric value, the set of supported values may be presented in the information text as an ordered list of values.
The following are some examples of value range indications:

Value Range	Description
(0)	Only the value 0 is supported.
(1,2,3)	The values 1, 2, and 3 are supported.
(1-3)	The values 1 through 3 are supported.
(0,4,5,6,9,11,12)	The several listed values are supported.
(0,4-6,9,11-12)	An alternative expression of the above list.

3.9.2. Compound Range of Values

When the action accepts more than one sub-parameter, or the parameter accepts more than one value, the set of supported values may be presented as a list of the parenthetically enclosed value range strings (described above), separated by commas.
For example, the information text in response to testing an action that accepts three sub-parameters, and supports various ranges for each of them, could appear as follows: **(0),(1-3),(0,4-6,9,11-12)**

3.10. Aborting Commands

Some action commands that require time to execute may be aborted while in progress. This is explicitly noted in the description of the command. Aborting a command is accomplished by transmitting any character from the terminal to the G30. A single character is sufficient to abort the command in progress. To ensure that the aborting character is recognized by the G30, it should be sent at the same rate as the preceding command line. The G30 may ignore characters sent at other rates. When an aborting event is recognized by the G30, it terminates the command in progress and returns an appropriate result code to the terminal, as specified for the particular command.
When a command is aborted, this does not mean that its operation is reversed. In the case of some network commands, when the abort signal is detected by the G30, although the command is aborted following G30-network negotiation, the operation might be fully completed, partially completed or not executed at all.

3.11. Core AT Commands

The G30 responds to a limited commands set when the SIM card is not functioning, or not present. These commands are referred to as the "Core AT commands".
In previous products, the Core AT commands were called "Basic AT commands". The name "Core" differentiates between the basic AT commands format and the limited service AT commands.
The following table lists the Core AT commands.

Table 3-1: Core AT Commands

AT Command	Description	Page
&C	This command determines how the state of the DCD line relates to the detection of the received line signal from the distant end.	on page 4-228
&D	This command determines how the G30 responds when the DTR (Data Terminal Ready) status is changed from ON to OFF during the online data state.	on page 4-230
&F	This command restores the factory default configuration profile.	on page 4-319
&K	This command configures the RTS/CTS flow control.	on page 4-227
&V	This command displays the current active configuration and stored user profiles.	on page 4-347
&W	This command stores the user profile.	on page 4-348
&Y	This command displays the default user profile.	on page 4-351

+CBAND	This command allows switching from automatic band selection to selection of one or more (up to four) bands.	on page 4-318
+CBST	This command handles the selection of the bearer service and the connection element to be used when data calls are originated.	on page 4-95
+CCLK	This command reads/sets the G30's current date and time settings.	on page 4-131
+CBAUD	This command sets the baud rate.	on page 4-224
+CEER	This command returns an extended error report containing one or more lines of information text, determined by the manufacturer, providing the reasons for the call- clearing errors.	on page 4-338
+CFSN	This command displays the factory serial number.	on page 4-71
+CFUN	This command shuts down the phone functionality of smart phones and PDAs with phone capabilities.	on page 4-233
+CGMI	This command displays manufacturer identification.	on page 4-67
+CGMM	This command requests the model identification.	on page 4-67
+CGMR	This command requests the revision identification.	on page 4-68
+CGPRS	This command indicates whether there is GPRS coverage.	on page 4-372
+CGREG	This command enables/disables the GPRS network status registration unsolicited result code.	on page 4-196
+CGSN	This command requests the product serial number identification.	on page 4-69
+CHUP	This command causes the G30 to hang up the current GSM call.	on page 4-97
+CLAC	This command displays a list of all the AT commands supported by the G30.	on page 4-73
+CLCC	This command displays a list of all current G30 calls and their statuses, and also enables/disables the unsolicited indication of the call list.	on page 4-103
+CLVL	This command sets the volume of the internal loudspeaker of the G30.	on page 4-262

+CMEE	This command enables/disables the use of result code +CME ERROR: <err> as an indication of an error relating to the functionality of the G30.	on page 4-332
+CMUT	This command mutes/unmutes the currently active microphone path by overriding the current mute state.	on page 4-263
+CMUX	This command is used to enable/disable the GSM MUX multiplexing protocol stack.	on page 4-486
+CPAS	This command displays the current activity status of the G30, for example, call in progress, or ringing.	on page 4-102
+CPIN	This command is only relevant for phones that use SIM cards. It unlocks the SIM card when the proper SIM PIN is provided, and unblocks the SIM card when the proper SIM PUK is provided.	on page 4-297
+CR	This command controls whether or not the extended format of an outgoing call is displayed or not.	on page 4-116
+CRC	This command controls whether to present the extended format of the incoming call indication.	on page 4-82
+CREG	This command enables/disables the network status registration unsolicited result code.	on page 4-194
+CRLP	This command displays the Radio Link Protocol parameters.	on page 4-192
+CRSL	This command handles the selection of the incoming call ringer and alert tone (SMS) sound level on the alert speaker of the G30.	on page 4-261
+CRTT	This command plays one cycle of a ring tone, stops the cycle in the middle, and sets the ring tone to be used.	on page 4-278
+CSCS	This command selects the G30 character set.	on page 4-69
+CSQ	This command returns the signal strength received by the G30.	on page 4-192
+CSSN	This command handles the enabling and disabling of supplementary service-related, network-initiated, notifications.	on page 4-118
+FMI	This command displays manufacturer identification.	on page 4-67
+FMM	This command displays the model identification.	on page 4-67

+FMR	This command displays the revision identification.	on page 4-68
+GCAP	This command requests the overall capabilities of the G30.	on page 4-227
+GMI	This command requests manufacturer identification. The command is not supported when the SIM is missing.	on page 4-67
+GMM	This command requests the model identification.	on page 4-67
+GMR	This command requests the revision identification.	on page 4-68
+GSN	This command requests the product serial number identification.	on page 4-69
+ICF	This command determines the local serial port start/stop (asynchronous) character framing used by the DCE when accepting DTE commands and transmitting information text and result codes.	on page 4-234
+IFC	This command controls the operation of the local flow control between the terminal and the G30.	on page 4-236
+IPR	This command is responsible for setting and saving the request baud rate.	on page 4-225
+M2M	This command is used to enable/disable the M2M feature.	on page 4-491
+MADCM	This command intends to query and monitor the G30 three ADC's values.	on page 4-248
+MADIGITAL	This command switches between analog and digital audio modes.	on page 4-273
+MAFEAT	This command controls the algorithm features: Sidetone and Hands free (echo cancel, noise suppression, and agc).	on page 4-272
+MAHF	This command controls the algorithm features: Hands free (echo cancel, noise suppression, and agc).	on page 4-291
+MAHFD	This command controls the algorithm features: Hands free Default (echo cancel, noise suppression, and agc).	on page 4-290
+MAI2SY	This command switches between PCM and I2S audio modes.	on page 1-17
+MAMUT	This command controls the muting/unmuting of all input paths (MIC, HDST_MIC, DIGITAL_RX).	on page 4-271

+MAPATH	This command sets/requests the active input accessory, and the output accessory for each feature.	on page 4-266
+MAVOL	This command enables you to determine a volume setting for a particular feature in a particular accessory.	on page 4-269
+MCELL	This command displays information about the Cellular Network.	on page 4-208
+MCST	This command displays the current state of the call processing, and also enables/disables the unsolicited indication of any change in the call processing state.	on page 4-106
+MCWAKE	This command displays reports on the status of the GPRS/GSM coverage.	on page 4-231
+MSCTS	This command defines the behavior of the CTS line when the G30 is in Sleep mode.	on page 4-331
+MDC	This command enables you to select the desired messages to be displayed upon connection of a voice call with a remote party.	on page 4-98
+MGGIND	This command configures the service indicator on pin #16 in LGA or 49 of the 70 pin connector to be GPRS or GSM.	on page 4-232
+MIOC	This command defines the G30 8 GPIO pins data value.	on page 4-241
+MIOD	This command defines the G30 8 GPIO pins configuration.	on page 4-243
+MMAD	This command reads and monitors digital value from a specified ADC.	on page 4-247
+MMICG	This command handles the selection of microphone gain values.	on page 4-276
+MRST	This command enables customer software to perform a power off to the G30 unit.	on page 4-240
+MTTY	This command is used to enable/disable the TTY (Tele Typewriter) support in the G30.	on page 4-100
+TPIN	This command queries the number of remaining SIM PIN/PUK entering attempts	on page 4-301
+VTD	This command handles the selection of tone duration.	on page 4-281

+VTS	This command transmits a string of DTMF tones when a voice call is active.	on page 4-282
A	This command answers an incoming call, placing the G30 into the appropriate mode, as indicated by the RING message.	on page 4-81
A/	This command repeats the last command entered on the terminal.	on page 4-296
D	This command places a voice call on the current network, when issued from an accessory device.	on page 4-77
E	This command defines whether the G30 echoes the characters received from the user, (whether input characters are echoed to output).	on page 4-312
H	This command hangs up, or terminates a particular call.	on page 4-79
I	This command requests various G30 information items.	on page 4-72
O	This command returns a phone to the Online Data mode and issues a CONNECT or CONNECT <text> result code.	on page 4-96
Q	This command determines whether to output/suppress the result codes.	on page 4-310
READY	This unsolicited notification indicates UART is ready.	on page 4-240
Sn	This command reads/writes values of the S-registers, and includes registers 1-49, 94, 96 (Audio) and 102 (Sleep mode).	on page 4-314
V	This command determines the response format of the data adapter and the contents of the header and trailer transmitted with the result codes and information responses.	on page 4-309
X	This command defines the data adaptor response set, and the CONNECT result code format.	on page 4-313
Z	This command resets the default configuration.	on page 4-320

4. AT Commands Reference

4.1. Modem ID

4.1.1. Subscriber Unit Identity

These commands allow the user to query the type of device that is attached, the technology used in the device, as well as basic operating information about the device.

4.1.2. +CGMI, +GMI, +FMI, Request Manufacturer ID

These commands display manufacturer identification. The G30 outputs a string containing manufacturer identification information, indicating that this is a Motorola device.

Command	Response/Action
AT+CGMI AT+CGMI?	+CGMI: "Motorola"
AT+GMI AT+GMI?	+GMI: "Motorola"
AT+FMI AT+FMI?	+FMI: "Motorola"

Example
AT+CGMI
+CGMI: "Motorola"
OK
AT+GMI
+GMI: "Motorola"
OK
AT+FMI
+FMI: "Motorola"

4.1.3. +CGMM, +GMM, +FMM, Request Model ID

These commands request the model identification. The G30 outputs a string containing information about the specific model, including a list of the supported technology used, and the particular model number.

Command	Response/Action
AT+CGMM AT+CGMM?	**+CGMM**: <list of supported technologies>,<model>

AT+GMM AT+GMM?	**+GMM**: <list of supported technologies>,<model>
AT+FMM AT+FMM?	**+FMM**: <list of supported technologies>,<model>

Example
AT+CGMM?
+CGMM: "GSM900","GSM1800","GSM1900","GSM850","MODEL=G30"
OK
AT+FMM?
+FMM: "GSM900","GSM1800","GSM1900","GSM850","MODEL=G30"
OK

AT+GMM?
+GMM: "GSM900","GSM1800","GSM1900","GSM850","MODEL=G30"
OK
The following table shows the +CGMM string parameters.

String	Description
"GSM900"	GSM at 900 MHz
"GSM1800"	GSM at 1800 MHz
"GSM1900"	GSM at 1900 MHz (North American PCS)
"GSM850"	GSM at 850 MHz

4.1.4. +CGMR, +GMR, +FMR, Request Revision

These commands request the revision identification. The G30 outputs a string containing the revision identification information of the software version contained within the device.

Command	Response/Action
AT+CGMR AT+CGMR?	+CGMR: <revision>
AT+GMR AT+GMR?	+GMR: <revision>
AT+FMR AT+FMR?	+FMR: <revision>

Example
AT+CGMR

+CGMR: "G30_G_05.02.02R"
AT+GMR
+GMR: "G30_G_05.02.02R"
AT+FMR
+FMR: "G30_G_05.02.02R"

4.1.5. +CGSN, +GSN, Request Product Serial Number Identification

This command displays the product serial number identification IMEI (International Mobile Equipment Identification). It can be used even when the SIM card is not inserted.

Command	Response/Action
AT+CGSN **AT+CGSN?**	**+CGSN: <sn>**
+GSN **+GSN?**	**+GSN: <sn>**

The following table shows the +CGSN, +GSN parameters.

Table 4-1: +CGSN, +GSN Parameters

<Parameter>	Description
<sn>	The IMEI (International Mobile Station Equipment Identity) number is comprised of 15 digits, as specified by GSM 03.03 [3]. IMEI numbers are composed of the following elements, all in decimal digits: Type Approval Code (TAC) - 6 digits Serial Number (SNR) - 6 digits Spare digit - 1 digit The TAC and SNR are protected against unauthorized changes.

Example
AT+CGSN?
+CGSN: "004400013805666"
OK
AT+GSN
+GSN: "004400013805666"
OK

4.1.6. +CSCS, Select Terminal Character Set

This command selects the G30 character set. The G30 supports the following character sets: GSM, UCS2, HEX and IRA.
The default value, set upon system initialization or when omitting <chset> in set command, is IRA.

NOTE:

G30 does not support any DCS-character set conversion.

Command Type	Syntax	Response/Action
Set	**+CSCS=<chset>**	**OK** **or:** **+CMS ERROR: <err>**
Read	**AT+CSCS?**	**+CSCS: <selected character set>**
Test	**AT+CSCS=?**	**+CSCS: (<supported character sets>)**

NOTE:
The following table shows the +CSCS parameters optional values.

Table 4-2: +CSCS Parameters

<chset>	Character Set	Input/Output Format
"IRA"	IRA (0x00 - 0x7F)	Quoted string. (For example, "AB" equals two 8-bit characters with decimal values 65, 66.)
"GSM"	GSM default alphabet (GSM23.038 subclause 6.2.1)	HEX representation.
"UCS2"	Unicode (ISO/IEC 10646 [32])	HEX representation. (For example, 00410042 equals two 16-bit characters with decimal values 65, 66.)
"HEX"	Hexadecimal format presentation.	Character strings consist only of hexadecimal numbers from 00 to FF; e.g. "032FE6" equals three 8-bit characters with decimal values 3, 47 and 230; no conversions to the original ME character set will be done. Used for +CUSD AT command only. Can be defining by the second parameter of the command.

NOTE:

HEX character set is treated as GSM.

Example
AT+CSCS=?
+CSCS: ("IRA","GSM","UCS2",”Hex”)
OK

AT+CSCS?
+CSCS: "IRA"
OK
AT+CPBS = "ME"
AT+CPBW=1,"8475763000",129,"Lin Zhao"
OK
AT+CSCS="UCS2"
OK
AT+CPBR=1
+CPBR: 1,"8475763000",129,004C006E006E0020005A00680061006F
OK
AT+CSCS="IRA"
OK
AT+CPBR=1
+CPBR: 1,"8475763000",129,"Lin Zhao"
OK

4.1.7. +CIMI, Request IMSI

This command displays the International Mobile Subscriber Identity number.

Command	Response/Action
AT+CIMI **AT+CIMI?**	**+CIMI: <imsi>** **or:** **+CME ERROR: <err>**

Example
AT+CIMI
+CIMI: 314566320021400

4.1.8. +CFSN, Read Factory Serial Number

This command is used to query the factory serial number.

Command	Response/Action
AT+CFSN?	**+CFSN: <fsn>**

Example
AT+CFSN?
+CFSN: "074SFX5854"
OK

4.1.9. I, Request Identification Information

This command displays various G30 information items.

Command	Response/Action
ATIn	**<information item n>** **or:** **+CMS ERROR: <err>**

The following table shows the information items that are supported by the G30.

ATIn	Description	Output
0		144
1		000
2		OK
3	Reports Product Title	Motorola Mobile Phone
4		000000 2001
5	Reports Software Architecture	ULC2+6416Mb
6		RFPATQE4028E
7	Reports Product Description	G30 OEM Module
8	Reports Software Version	<current software revision>
9	Reports Flex Version	<current flex version>

Example
ATI7
G30 OEM Module
OK
ATI8
G30_G_05.02.02R
OK
ATI9
G30_F_xxxxxxxxx

OK

4.1.10. +CNUM, Request MSISDN(s)

This command displays strings of text information that identify the G30. The output string contains double quotes.
On SIM cards that have EFmsisdn file, the string(s) returned are the MSISDN numbers and their associated data.
On SIM cards that don't have EFmsisdn file, the strings returned are the MSISDN numbers and their associated data stored in G30 NVM.
Read Command

Command	Response/Action
+CNUM (MSISDN supported)	+CNUM: [<MSISDN1 string>],<MSISDN1>,<MSISDN1 type> [+CNUM: [<MSISDN2 string>],<MSISDN2>,<MSISDN2 type>]
+CNUM (MSISDN not supported)	+CNUM: <phone_number>

The following table shows the +CNUM parameters.

Table 4-3: +CNUM Parameters

<Parameter>	Description
<MSISDN type>	Phone number type 129 Use for local call 145 Use "+" for international access code 128 Unknown

Example
AT+CNUM?
+CNUM: "David","035558278",129
AT+CNUM //MSISDNs supported
+CNUM: "PHONENUM1","2173848500",129
+CNUM: "PHONENUM2","2173848501",129
AT+CNUM //MSISDNs not supported
+CNUM: "Motomix","2233445",129
+CNUM:"","",0

4.1.11. +CLAC, List of All Available AT Commands

Command	Syntax	Response/Action	Remarks
Execute	+CLAC	List of available AT commands	The Execute command displays a list of all the AT commands supported by the G30.

Example
AT+CLAC
%C
&C
&D
&F
&G
&K
&L
&M
&P
&R
&T
*D
+CACM
+CALC
+CALM
+CAMM
+CAOC
+CBAND
+CBAUD
+CBC
+CBST
+CCFC
+CCLK
+CCWA
+CEER
:
:
:
:
?
A
D
DL
E
F
H
I
L
M
N
O
P
Q
S
T
V
X
Y
Z
\A
\S
OK

Note: The above response is not full

4.1.12. Capability Reporting

This set of commands enables a user to determine G30's protocol level. It also enables other support provided by the G30, such as information about the currently implemented protocol version (used to detect older G30s that may not support all commands), as well as determining which optional commands are implemented in a particular G30 software load.

4.2. Call Control

4.2.1. Managing a CSD (Data) Call

The G30 working modes can be divided into two modes of operation.

- Data Mode: In this mode, once the G30 has established a link with the remote modem, it does not respond to any data passing through it (except for the Escape Sequence search). The G30 becomes a transparent link, connecting the terminal with the remote side.
- Command Mode: In this mode, the G30 responds to the AT commands issued by the terminal. This is the default working mode.

NOTE:

It is possible to switch between the operating modes.

The operating modes can operate simultaneously using the Mux.

The Terminal mode allows you to instruct the modem to dial a remote modem by issuing the Dial command followed by the phone number. You can also include dial string modifiers in your command line to give the modem additional instructions. The following dial modifiers are available on most modems:

- ","- Pause

4.2.1.1. Simple Dialing

In order to instruct the modem to dial a remote modem from an ordinary tone-dialing telephone line, enter the Dial command followed by the phone number. For example, type the following command:

ATD 876-5555 <Enter>

NOTE:

If you receive characters which were sent, you can disable this with using the Echo command (ATE0 <Enter>).

After issuing the Dial command, and if the remote modem answers the call, the two modems send high-pitched carrier tones to one another which establish the transmission speed and other parameters for the data connection. This process is called negotiation.
After the negotiation process, the message, "OK" followed by the connection speed, is received.
If the other phone line is busy, the message "NO CARRIER" is received.
If the other modem does not answer, the message "NO CARRIER" is received.
Once a connection has been established, the modem is ready to immediately begin

transmitting and receiving data. This may vary from sending messages to each other, sending or receiving files, logging on to an information service, or any other data communication task you wish to perform.

4.2.1.2. Switching From Data Mode to Command Mode

To switch the connection from Data mode to Command mode, send the Escape Sequence command (+++).
If the modem responds with "OK" to the Escape command, the modem is in Command mode and the dial connection is still active, and you can use the AT command set.

NOTE:
The character '+' in the Escape Sequence pattern can be changed using the S2 S-register.
S, Bit Map Registers

Escape is detected only by the G30 and not by the remote side. The remote side stays in the Data mode.

4.2.1.3. Hanging Up

If you are using a communications program, use the "Hang up" or "Disconnect" AT command in the program to disconnect the call.
When using computers in the "Dumb Terminal mode", return to the Command mode by typing the Escape Sequence, +++, and then hang up by typing the Hang up command as follows:
ATH <Enter>
If the G30 responds with "OK", the dial connection is closed.

4.2.1.4. Dialing to an Electronic Telephone Service

When you dial to an electronic telephone service such as telephone banking, you must typically instruct the modem to dial a number, then to wait for call establishment, and then send the password for entering the banking account. A typical command line might look like this:
ATD876-5555,123456; <Enter>
The modem dials the number, then pauses to wait for the call connection (the comma in the command line causes the pause).
You can also create a longer pause by including several commas in a row in the command line, and then send the password to the service.

4.2.2. Receiving a Data Call

ATA <Enter>
This command instructs the modem to be the "answering modem". Either party may be the answering or the originating modem, but both parties cannot be the same modem at the same time.
You hear the modem handshake and see the result code "CONNECT".

NOTE:

Outgoing Voice Call during CSD Call, when switching to Command mode.

If using Dial Command to make Outgoing Voice Call, currently active CSD Call is dropped and the new Voice Call is generated.

4.2.3. Call Control AT Commands

4.2.3.1. D, Dial Command

This command places a DATA/VOICE call on the current network.
The default call type is a data call (CSD).
There must be an explicit request in order to make a VOICE call.
If a DATA call was originated and answered by the remote side, a "OK" notification is sent to the terminal from the G30, and it moves to the online Data state.
For more information about call failure, use the AT+CEER command, described in +CEER, Extended Error Report
.
The maximum number of digits that can be set in ATD command is 54 digits. Trying to set more than the maximum limit causes the following error message "dial string too long" to be displayed.

NOTE:

If there is an active voice call and the terminal sends another ATD voice call command to the G30, the active call is put on hold and the new number is called.

Command	Response/Action
ATD<number>[;]	VOICE CALL: 1st response - Voice call place begins OK 2nd response - Voice call connected: OK DATA: 2nd response only - Data call connected CONNECT When MO call fails: 1. Connection Failure - NO CARRIER or BUSY or NO ANSWER 2. General Failure - ERROR 3. Security reason (such as SIM not present) - OPERATION NOT ALLOWED 4. Unknown reason - UNKNOWN CALLING ERROR

The following table shows the D parameters.

Table 4-4: D Parameters

<Parameter>	Description
<number>	Valid phone digits are: 0 1 2 3 4 5 6 7 8 9 * # + and, The following characters are ignored: A B C D - () / and <space>. The comma <,> digit: When dialing a voice call, digits until the comma are considered addressing information (phone number). Any digits after the comma are sent as DTMF tones after the voice call is connected. More than one comma causes a pause in sending the tones. When dialing a data call, the comma digit is ignored, and all other digits before and after the comma are considered addressing information (phone number). The plus <+> digit: Indicates that the international access code exists in the number.
semicolon (;)	When given after <number string>, a voice call is originated to the given address, otherwise a data call is originated.

Note: ATDP, ATDT, AT*D, <T>, <P> and <*> are ignored. The command is handled as ATD.

The control of supplementary services through the Dial command is not supported as these are controlled through the specific supplementary service commands (CCFC, CLCK, and so on.)

Initiating a GPRS connection is done through ATD*99#, as described in D*9.

Example
atd44345678; //VOICE call (with semicolon)
OK
OK
atd44345678 //DATA call (without semicolon)
..
CONNECT //Move to online Data state

4.2.3.2. **DL, Dial Last Number** The DL command places a data/voice call to the last number dialed. The call progress information (success/failure) is reported in the same way as for the Dial command. (**D, Dial Command**

Command	Detailed Description
ATDL[;]	Initial Response - Last Number retrieved: ATDL: "DIAL DIGITS" 2nd response - Data call connected CONNECT 1st response - Voice call placement begins OK 2nd response - Voice call connected OK

The following table shows the DL parameters.

Table 4-5: DL Parameters

<Parameter>	Description
semicolon (;)	If the semicolon (;) is given, a voice call is originated to the last dialed number. If the semicolon (;) is not given, a Data call is originated. **Note:** The last dialed call type is irrelevant to the DL command.

Note: When ATDL is issued after a dialed number with comma digit:

•ATDL; (Voice) dials the exact number that was last dialed, including the DTMF tones sent.

•ATDL (Data) dials the addressing information only (comma and tones are discarded).

•If ATDL is sent before any Dial command was issued (mainly after Power On, when the last number is an empty field), the G30 will return NO CARRIER, as mentioned in the ITU V.25-ter standard.

Example
atdl //Last called number is "035658278"
ATDL: "035658278"
OK //DATA call
atdl;
ATDL: "035658278"
OK
OK //VOICE call
atdl //Last called number is "035658278,123,78;"
ATDL: "035658278"
CONNECT //DATA call
atdl; //Last called number is "035658278,123,78"
ATDL: "035658278,123,78"
OK
OK //VOICE call
1 2 3 //Sent as DTMF tones
... //Pause
7 8 //Sent as DTMF tones

4.2.3.3. H, Hang-up Call

This command hangs up a call. The G30 terminates the call whether it is a data or voice call, and whether it is an incoming, originating, waiting, or connected call.
A NO CARRIER message is returned to the terminal before the regular OK approval.

Note: To terminate (hang-up) a MO data call while call is placed: Any character sent from the terminal to the G30 causes the Data call termination, and NO CARRIER is sent from the G30 to the terminal.To terminate a held Voice call or to terminate a call out of a MTPY call, refer to:
+CHLD, Call Related Supplementary Services Command

The following table shows the call states of the H command.

Call State	Response/Action
IDLE	Error 3 ("operation not allowed") or OK, depending on a FLEX bit
Single Active	Call released
MTPY Active	Call released (all calls)
Incoming call (RING)	Call released
Single Active and Waiting Call	Single Active released (waiting not affected)
MTPY Active and Waiting Call	MTPY Active released (waiting not affected)
Single Held or MTPY Held	Error 3
Single (or MTPY) Active and Single (or MTPY) Held	Single (or MTPY) Active released
Held (Single or MTPY) and Waiting Call	Waiting call released
Single (or MTPY) Active and Single (or MTPY) Held & Waiting call	Single (or MTPY) Active released

Example
RING //Incoming call
RING //Incoming call
ath //Hang-up incoming call
NO CARRIER
OK //Incoming call has been terminated - user determined user busy
RING
ata
OK //Voice call connected
ath //Hang-up connected call
NO CARRIER
OK //Active call has been hung-up - terminated
(... Active multi party call, with 3 numbers …)
ath
NO CARRIER
NO CARRIER
NO CARRIER
OK
atd035659260;
OK


```
ath                 //Terminate MO voice call while placed
NO CARRIER
OK
Example - Hanging up a data call:
atd035659260
CONNECT             //Data call connected - Online Data mode
…
+++                 //ESC Sequence is sent from the terminal to the G30
OK                  //The G30 is in Command mode
ath                 //Terminate Data call
NO CARRIER
OK
```

4.2.3.4. A, Answer Incoming Call

This command answers an incoming VOICE/DATA call after a RING/+CRING indication is sent to the terminal.
If the incoming call is answered (connected), the G30 sends a CONNECT notification to the terminal.
If the MT call fails, the possible notifications are:

- NO CARRIER - Connection Failure
- ERROR - General Failure

Note: A waiting call (an incoming call while a call is in progress) is announced by +CCWA rather than RING. A waiting call can be answered only if it is a voice call. The waiting voice call should be answered using the ATA command, which will put the active call on hold and will connect the waiting call, making it the active call. This ATA action is the same action as AT+CHLD=2.

Example

```
Example - Answering a voice call:
AT+CRC=1
+CRING: VOICE
+CRING: VOICE
ata
OK                  //VOICE call connected - G30 is in Command mode
ath
NO CARRIER
OK
Example - Answering a data call:
+CRING: REL ASYNC
+CRING: REL ASYNC
ata
...                 //Connecting (dots are not displayed)
OK                  //DATA call connected - G30 is in Online Data mode
```

Note: In a CSD call, call release is not valid during the phase of call negotiation (from OK until connect call).

4.2.3.5. +CRC, Cellular Result Codes and RING, +CRING - Incoming Call Indication

This command controls whether or not to present the extended format of an incoming call indication. The RING/+CRING indication is sent from the G30 to the terminal when the G30 is alerted by an incoming call from the network. Once this indication is sent, information is available on the calling line via +CLIP. When +CRC is disabled, the indication is RING, and when +CRC is enabled, the indication is +CRING.

Command Type	Syntax	Response/Action	Remarks
Set	+CRC=<n>	OK	The Set command enables/disables the extended format of an incoming call indication. When enabled, an incoming call is indicated to the terminal with an unsolicited result code +CRING:<type> instead of the normal RING.
Read	+CRC?	+CRC: <n> OK	The Read command queries the current settings for the cellular result code.
Test	+CRC=?	+CRC: (list of supported <n>s)	The Test command returns the possible <n> values.

RING/+CRING Indication
+CRING: <type>
or:
RING

The following table shows the +CRC parameters.

Table 4-6: +CRC Parameters

<Parameter>	Description
<n>	0 Extended format disabled 1 Extended format enabled The default value is 0.
<type> ASYNC CSD REL ASYNC CSD VOICE ALT	Type of incoming call: asynchronous transparent asynchronous non-transparent Normal voice voice

Example
AT+CRC?
+CRC: 0


```
OK
AT+CRC=?
+CRC: (0,1)OK
Example - RING/+CRING indication
(..Incoming Data Call..)
RING
RING
RING
AT+CRC=1                    //Enable extended ring format
OK
+CRING: REL ASYNC
+CRING: REL ASYNC
ath
AT+CRC=1
OK
+CRING: ALT Voice
NO CARRIER
OK
```

4.2.3.6. +CLIP, Calling Line Identification

This command controls the Calling Line Identity (CLI) presentation indication to the terminal when an incoming call is detected by the G30.
This command allows the user to query the provisioning status of the CLI by the network and by the G30. The command also allows the user to enable/disable the CLI presentation by the G30 to the terminal.
The +CLIP indication information varies depending on what is provided by the network.

Command Type	Syntax	Response/Action	Remarks
Set	AT+CLIP=[<n>]	OK +CME ERROR: <err>	The Set command enables or disables the presentation of the CLI indication from the G30 to the terminal. **Note:** The Set command does not address the network.
Read	AT+CLIP?	+CLIP: <n>, <m> OK	The Read command returns the +CLIP enable/disable state in the G30 as well as in the network provisioning state of the CLI presentation.
Test			The Test command returns the Set command options (0,1).

+CLIP Indication

When the CLI presentation indication is enabled by the G30 (<n>=1), this unsolicited indication is sent to the terminal after the RING indication.
+CLIP:<number>,<type>[,<subaddr>,<satype>[,[<alpha>][,<CLI validity>]]]
The following table shows the +CLIP parameters.

Table 4-7: +CLIP Parameters

<Parameter>	Description
<n>	Enables/disables the CLI presentation indication after the ring indication: 0 Disable CLI presentation 1 Enable CLI presentation The default is 0.
<m>	Shows the subscriber CLIP service status in the network: 0 CLIP not provisioned 1 CLIP provisioned 2 Unknown (for example, no network and so on)
<"number">	Calling line number. The number format is specified by <type>.
<type>	Type of address octet in integer format: 145 Default when the dialing string includes the international access code character "+". 129 Default when making a local call. 128 Type of number is unknown (usually the output when the number itself is unknown).
<subaddr>	NULL, field not used (String type subaddress of format specified by <satype>)
<"alpha">	Name of the calling party (if provided by the network).
<CLI validity>	The Validity of the Calling Line Identity presentation: 0 CLI valid. 1 CLI has been withheld by the originator. 2 CLI is not available due to networking problems or limitations of the originating network.

Example
AT+CLIP=?
+CLIP: (000,001) //CLI presentation is disabled by the G30 (0) and is enabled by the network (1)
OK
AT+CLIP=1
OK
Example +CLIP indication:
(…incoming call…)
RING
+CLIP: "2173845400",129,,,"Doe John",0
Example +CLIP indication with restricted CLI:
AT+CRC=1
OK
(…incoming call…, caller restricted the CLI presentation (used AT+CLIR)…)
+CRING: VOICE
+CLIP: "",128,,,"",1

4.2.3.7. +CCWA, Call Waiting Command

This command controls the Call Waiting supplementary service, including the settings and the queries of the G30 and the network. When the Call Waiting indication is enabled by the G30 and there is a waiting call, a +CCWA: indication is sent from the G30 to the terminal. The indication appears one time.

Note: The G30 supports only one of the services at a time: Voice or Data. Multiparty is a voice-only functionality.

A CCWA indication is sent to the terminal only during a voice call-waiting event. A CCWA indication is not sent for a data call during in a voice session.

Action	Syntax	Response	Remarks
Set	+CCWA=[<n>[,<mode>[,<class>]]]	OK If <mode>=2 and the command succeeds: +CCWA: <status>,<class1> [<CR><LF>+CCWA: <status>,<class2> [...]] OK	The Set command enables/disables the Call-Waiting indication in the G30 and in the network. Activation, deactivation and status query are supported. **Note:** When the <mode> parameter is set to 2 (network query), the <n> parameter is ignored. This means that no enable/disable action is performed while querying the network.
Read	+CCWA?	+CCWA: <n> OK	The Read command returns the enable/disable status of the call waiting indication in the G30 (<n>).
Test	+CCWA=?	+CCWA: (list of supported <n>s)	The Test command returns <n> values supported by the G30 as a compound value.

+CCWA Indication

When a call-waiting indication is enabled by the G30 (<n>=1), the following unsolicited indication is sent to the terminal from the G30:

+CCWA:<number>,<type>,<class>,[<alpha>][,<CLI validity>]

The following table shows the +CCWA parameters.

Table 4-8T: +CCWA Parameters

<Parameter>	Description
<n>	Enables/disables the call waiting indication to the terminal by the G30. 0 - Disable 1 - Enable The default is 0.
<mode>	Call waiting service request to the network. When the <mode> parameter is not given, the network is not interrogated. 0 - Disable 1 - Enable 2 - Query status
<class>	Sum of integers each representing a class of information. 1 - Voice (telephony) 2 - Data (data calls) The default value is 1.
<"number">	Calling line number. The number format is specified by <type>.
<type>	Type of address octet in integer format: 145 - Default when the dialing string includes the international access code character "+". 129 - Default when making a local call. 128 - Type of number is unknown (usually the output when the number itself is unknown)
<status>	Call waiting support by the network (output for <mode>=2). 0 - Not active 1 - Active
<"alpha">	Name of the calling party (if provided by the network).
<CLI validity>	The Validity of the Calling Line Identity presentation: 0 - CLI valid. 1 - CLI has been withheld by the originator. 2 - CLI is not available due to networking problems or limitations of the originating network.

Note: When the parameter <mode> is 2 (Query status), the first parameter is ignored and the third parameter is always treated as class = 1 unless it was set in Set Mode.

Example
AT+CCWA=1 //Enable call waiting on G30

OK
AT+CCWA=?
+CCWA: (0,1)
OK
AT+CCWA?
+CCWA: 1
OK
Examples of +CCWA set command - network interrogation
AT+CCWA=1,2 //Class parameter is considered as 7
+CCWA: 1,1 //Call waiting is active for class 1, voice
OK
AT+CCWA=1,2,2 //Class parameter is 2
+CCWA: 0,2 //Call waiting is not active for class 2, data
OK
AT+CCWA=1,1
OK //Enable the call waiting feature in the network, and in the G30
Example +CCWA indication
atd9311234567; //Originate a voice call
OK
OK //Voice call connected
(...conversation...)
(… call waiting indication received by the G30 …)
+CCWA: "+358317654321",145,1,"Bob"
AT+CHLD=0 //Release the waiting call
OK
NO CARRIER
AT+CRC=1 //RING indication is not relevant to CCWA indication
OK
(…waiting call…, caller restricted to its CLI presentation (used AT+CLIR)…)
+CCWA: "",128,1,"",1 //CLI is restricted, but call type recognized as voice

4.2.3.8. +CHLD, Call Related Supplementary Services Command

This command controls the Call Hold and Multiparty Conversation services. This command manipulates voice calls only.

Set Command

The Set command allows the control of the following call related services:

- Call HOLD: A call can be temporarily disconnected from the G30, but the connection is retained by the network.
- MTPY (Multi party) Conversation: Conference calls.
  The network does not reserve more than one traffic channel for a mobile station, therefore the G30 can have only one call on hold at a time.

Note: Only voice calls can be put on HOLD.

A precondition for the multi-party service is that the G30 is in control of one active call and one call on hold. In this situation, the G30 can request the network to begin the MTPY (Multi Party) service. Once a MTPY call is active, remote parties may be added, disconnected or separated (removed from the MTPY call, but remain connected to the served mobile subscriber).The maximum number of remote parties is 5.

In this command, the term CALL refers to a single or MTPY call.

A single Active call is considered a MTPY call with one call index numbered as 1.

Command	Response/Action
+CHLD=<n>	If the call is terminated: OK (approve request was submitted) NO CARRIER If the call state is changed (link, split, from active to hold, and so on): OK (approve request was done) If the call is terminated and another call is answered: OK (approve request was submitted) NO CARRIER OK (call answered and is now connected)

Command Type	Syntax	Response/Action	Remarks
Test	+CHLD=?	+CHLD: (list of supported <n>s) OK	The Test command returns <n> values supported by the G30 to the terminal

The following table shows the +CHLD parameters.

Table 4-9: +CHLD Parameters

<Parameter>	Description
<n>	Call hold operation: 0 - Releases all held calls OR Sets User Determined User Busy for a waiting call 1 - Releases all active calls and accepts the held or waiting call 1x - Release specific call x, where x is the serial number of a call participating in an active MTPY call. 2 - Places all active calls on hold and accepts the held or waiting call 2x - In the case of an active MTPY call, places all active calls on hold, except for call x. Call x remains active. 3 - Adds a held call to the conversation - MTPY. **Note:** "Held calls" or "active calls" means a held or active single or MTPY call. There cannot be two or more different held/active single/MTPY calls.

Example
AT+CHLD=?
+CHLD: (0,1,1x,2,2x,3)
OK
AT+CCWA=1 //Enable call waiting
OK
atd9311234567; //Originate a voice call
OK
OK
(...conversation...)
+CCWA: "+358317654321",145,1,"Bob" //Awaiting call alerts
AT+CHLD=2 //Put first call on hold and answer the second call
OK
(...conversation...)
AT+CHLD=3 //Add the held call to the conversation
OK
(...MTPY conversation...)
AT+CHLD=22 //Split: Place the MO active call on hold, MT call remains active
OK
AT+CHLD=0 //Release the held call
OK
NO CARRIER
ath //Release the active call
NO CARRIER
OK
atd9311234567; //Originate a voice call
OK
OK
+CCWA: "055728386",129,1,"",0 //Waiting call alerts
AT+CHLD=1 //Release the active call, accept the waiting call
OK
NO CARRIER //Active 9311234567 was released
OK //Waiting 055728386 was answered

4.2.3.9. +CCFC, Call Forwarding Number and Conditions

This command enables control of the call-forwarding supplementary service. Registration, erasure, activation, deactivation, and status query are supported.

Command Type	Syntax	Response/Action	Remarks
Set	+CCFC=<reason>,<mode>[,<number>[,<type>[,<class>[,<subaddr>[,<satype>[,<time>]]]]]]	If the command succeeds: +CCFC: <status>,<class1>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]]][<CR><LF> OK +CCFC: <status>,<class2>[,<number>,<type>[,<subaddr>,<satype>[,<time>]]][...]] +CCFC: (list of supported <reason>s) OK	The Set command instructs the G30 which call forwarding settings to request from network. The Set command, in query mode, interrogates the network about the subscriber current call forwarding status.
Test	+CCFC=?	+CCFC:<reason> OK	The Test command returns <reason> values supported by the G30 to the terminal.

The following table shows the +CCFC parameters.

Table 4-10: +CHLD Parameters

<Parameter>	Description
<reason>	0 - Unconditional 1 - Mobile busy 2 - No reply 3 - Not reachable 4 - All call forwarding 5 - All conditional call forwarding
<mode>	0 - Disable 1 - Enable 2 - Query status 3 - Registration 4 - Erasure
<"number">	Calling line number. The number format is specified by <type>.
<type>	Type of address octet in integer format-. 145 Default when dialing string includes international access code character "+". 129 Default when making a local call.
<subaddr>	NULL, field not used (String type subaddress of format specified by <satype>).
<satype>	Field not used. Value is always 128 (unknown) - type of sub address octet in integer format.
<classx>	The sum of integers each representing a class of information. 1 - Voice 2 - Data - refers to all bearer services. The default value is 1.
<time>	1-30 - The number of seconds to wait before calls are forwarded, when "no reply" is enabled or queried. The default value is 20. **Note:** The parameter must be a multiple of 5, for example, 5, 10, 15 and so on. If not, the modulo of 5 will be ignored.
<status>	0 - Not active 1 - Active

Note: A forward-to phone <number> (and the optional fields <type>, <subaddr> and <satype>) are tied to a <reason> and a <class>. This means that there can be a different <number> for the same <reason> because of a different <class>. When registering without mentioning a <class>, <class>=7 is selected.

A <number> field is mandatory when registering (<mode>=3) and it is irrelevant (ignored) in all other <mode>s.

Example
AT+CCFC=?
+CCFC: (0,1,2,3,4,5)
OK
AT+CCFC=0,3,"01256316830",129,1
OK
AT+CCFC=1,3,"0545658278",129,1 //Register UC forward-to of all classes.
OK
AT+CCFC=1,1 //Activate UC forward-to of all classes.
OK
AT+CCFC=1,2 //Interrogate reason not-reachable of all classes.
+CCFC: 1,1,"+97254151200",145
+CCFC: 0,2,"",0
+CCFC: 0,4,"",0
OK //For <reason>=3, forward only voice calls is activated.
AT+CCFC=4,2 //Interrogate reason all-call-forwarding for all classes.
+CME ERROR: no network service //Interrogation of <reason>=30 is not supported by network.
AT+CCFC=2,3,"+972545658278"
OK
AT+CCFC=2,0 //Disable call-forwarding for reason no-reply of all classes.
OK
AT+CCFC=2,2
+CCFC: 0,1,"+972545658278",145,,25
+CCFC: 0,2,"+972545658278",145,,25
+CCFC: 0,4,"+972545658278",145,,25
OK

4.2.3.10. +CLIR, Calling Line Identification Restriction

This command instructs the G30 to query, enable or disable the presentation of the CLI (calling line ID) of a MO call to the called party. The restriction of the CLI (disable presentation) is dependent both on the G30 and on the network.
The network enables three possible provisions of CLIR:

- Not provisioned (CLIR Off - presentation allowed)
- Provisioned permanently
- Provisioned with Temporary mode
  The provision is fixed and cannot be changed by an AT command.
  Temporary Mode:
  Temporary mode can be in one of two states:
- A - Presentation restricted (CLIR On) as default.
- B - Presentation allowed (CLIR Off) as default. A subscriber to Temporary mode always has a default subscription to state A or B. Temporary-mode provisioning means that the terminal can request the G30 to switch the default mode from A to B, and vice versa.

Note: When a service is in state A, and the terminal wants to enable the CLI presentation (turn CLIR off) for a single call, it can do so using the ATD command. This does not change the Temporary mode state. This can also be done when the service is in state B and the terminal wants to disable the CLI presentation (turn CLIR on) for a single call.

Command Type	Syntax	Response/Action	Remarks
Set	+CLIR=[<n>]	OK	The Set command instructs the G30 to enable/disable CLI restriction for all MO calls.
Read	+CLIR?	+CLIR:<n>,<m> OK	The Read command returns the current setting of CLIR on the network <m> and on the G30 <n>.
Test	+CLIR=?	+CLIR: (list of supported <n>s)	The Test command returns <n> values supported by the G30.

The following table shows the +CLIR parameters.

Table 4-11: +CLIR Parameters

<Parameter>	Description
<n>	Adjustment for outgoing calls 0 - Presentation indicator is used according to the subscription of the CLIR service 1 - CLIR invocation 2 - CLIR suppression The default is 2.
<m>	Subscriber CLIR service status in the network 0 - CLIR not provisioned 1 - CLIR provisioned in permanent mode 2 - Unknown (for example, no network and so on) 3 - CLIR Temporary mode presentation restricted (can be the default) 4 - CLIR Temporary mode presentation allowed (can be the default)

Example
AT+CLIR=?
+CLIR: (0,1,2)
OK
AT+CLIR?
+CLIR: 1,4
AT+CLIR=2
OK
atd054565195; //MO voice call
OK
(… calling …)
(… a G30 that has 054565195 SIM and is CLIP enabled will receive the following on the terminal:
RING
+CLIP: "",128,,128,"",1
RING
+CLIP: "",128,,128,"",1)
ath
NO CARRIER
OK
AT+CLIR=0
OK
atd054565195; //MO voice call
OK
(… calling …)
(… a G30 that has 054565195 SIM and is CLIP enabled will receive the following on the terminal:
RING
+CLIP: "054565006",129,,128,"",0
RING
+CLIP: "054565006",129,,128,"",0 …)
ath
NO CARRIER
OK

4.2.3.11. +CBST, Select Bearer Service Type

This command sets the GSM bearer service (data circuit duplex asynchronous and synchronous). It chooses one of the bearer services, the data rate of the service (actually the modulation when modem IWFs are used), and enables or disables the Radio Link Protocol.

Command Type	Syntax	Response/Action	Remarks
Set	AT+CBST=[<speed>[,<name>[,<ce>]]]	OK +CME ERROR: <err>	The Set command selects the bearer service <name> with data rate <speed> and the connection element <ce> to be used when data calls are originated (refer to GSM 02.02). Values may also be used during mobile terminated data call setup, especially in the case of single numbering scheme calls. **Note:** For incoming calls, the bearer service will be taken automatically from incoming parameters and not according to the CBST Set command. The G30 does not change the output, but for incoming calls, the phone works in automatic mode.
Read	AT+CBST?	+CBST: <speed>,<name>,<ce> OK	
Test	AT+CBST=?	+CBST: (list of supported <speed>s),(list of supported <name>s),(list of supported <ce>s) OK	The Test command returns values supported by the MA as compound values.

The following table shows the +CBST parameters.

Table 4-12: +CBST Parameters

<Parameter>	Description
<speed>	0 - Auto-bauding (automatic selection of the speed; this setting is possible in case of 3.1 kHz modem and non-transparent service) 6 - 4800 bps (V.32) 7 - 9600 bps (V.32) 70 - 4800 bps (V.110 or X.31 flag stuffing) 71 - 9600 bps (V.110 or X.31 flag stuffing) The default value is 7. **Note:** Currently the G30 supports: 2 baud rates: 4800 and 9600 bps 2 protocols: V.110 and V.32
<name>	0 - Data circuit asynchronous (UDI or 3.1 kHz modem) The default value is 0.
<ce>	0 - Transparent 1 - Non-transparent (default)

Example

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

4.2.3.12. O, Return to Online Data State

This command returns the G30 from the Command mode to the Online Data mode and issues a CONNECT or CONNECT <text> result code.
After dialing or answering (atd/ata commands and connect), the phone enters the Online Data mode where it is able to transfer data, but not to enter AT commands.
The ESC command +++, transfers the phone to the Command mode (able to input AT commands, while preserving the Data call). The O command returns the phone to the fully Online Data mode (as it was before using the ESC command).

Note: The escape character '+' can be changed using the S2-register.
The time delay between consecutive escape characters is configured using the S12-register.

Command Type	Syntax	Response/Action
Execute	ATO	CONNECT +CME ERROR: <err> If phone is not in Data Call NO CARRIER: If connection is not successfully resumed.

Example
ATD035684072 //Calling a remote modem - data call
CONNECT //G30 is in Data mode
//Escaping back to Command mode using the +++ sequence
OK
AT //G30 is in Command mode
OK
ATO //Returning to Data mode
CONNECT

4.2.3.13. +CHUP, Hang Up Call

This command causes the G30 to hang up the current GSM call.

Command Type	Syntax	Response/Action	Remarks
Set	+CHUP	OK +CME ERROR <err>	The Set command hangs up the current GSM call.

4.2.3.14. +MDC, Selection of Desired Message to Be Displayed Upon Connection of a Voice Call

This AT command enables you to select the desired messages to be displayed upon connection of a voice call with a remote party. The OK and CONNECT messages are available.

Command Type	Syntax	Response/Action	Remarks
Set	+MDC=<mode>	OK or: ERROR	The Set command selects which of the supported messages will be displayed upon connection of a voice call. <mode> Command Parameters: 0 - Display OK on voice call connection 1 - Display CONNECT on voice call connection Default Values: Power Up - As previously saved in NVM FLEX bit 0 - Before Set command is first used
Read	+MDC?	++MDC: <mode> OK	The Read command should return the current selection of <mode>.
Test	+MDC=?	+MDC: (list of supported <mode>s) OK	The Test command returns the possible <mode> values.

Example
AT+MDC=?
+MDC: (0-1)
OK
AT+MDC=1
OK
ATD<number>;
OK
CONNECT
AT+MDC?
+MDC: 1
OK
AT+MDC=0
OK
ATD<number>;
OK
OK
AT+MDC?
+MDC: 0
OK

4.2.3.15. +MHUP, Motorola Hung UP call

This command hung up specific call or all calls, and report a specific disconnect cause to the NW.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MHUP=<cause> [,<call_id>]	OK or: +CME ERROR: <err>	
Test	AT+MHUP=?	+MHUP:(1,16,17,18,27,31),(0-7) OK	Show list of supported <cause>'s and list of supported <call_id>'s.

The following table shows the +MHUP parameters.

Table 4-13: +MHUP Parameters

<Parameter>	Description
<cause>	Cause description, send to the NW in the "disconnect" message. 1 "Unassigned (unallocated) number" 16 "Normal call clearing" 17 "User busy" 18 "No user responding" 27 "Destination out of order" 31 "Normal, unspecified"
<call_id>	Index of the call id (same as <idx> in +CLCC command) 0 All calls (default). 1-7 Specific call id.

Note: In case of idle mode, the Set Mode returns OK.

Example
AT+MHUP=?
+MHUP: (1,16,17,18,27,31),(0-7)
OK
AT+MHUP = 16,3 //Hung up call #3, and send cause "Normal call clearing"
OK
AT+MHUP = 17 //Hung up all calls, and send cause "User busy"
OK
AT+MHUP = 17,0 //Hung up all calls, and send cause "User busy"
OK

4.2.3.16. +MTTY, Motorola TTY Configuration

This AT command is used to enable or disable TTY (Tele Typewriter) support in G30 modules.

Note: Tele-typewriter or Teletype, a typewriter with an electronic communication. TTY is an electronic device for text communication via a telephone line, used when one or more of the parties have hearing or speech difficulties.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MTTY=<n>	OK or: +CME ERROR: <err>	The SET command is used for setting the current TTY mode.
Read	AT+MTTY?	+ MTTY : <n> OK or: +CME ERROR: <err>	The READ command returns the current TTY mode <n>.
Test	AT+MTTY=?	+MTTY : (0-3) OK or: +CME ERROR: <err>	The Test command returns the possible value's range.

The following table shows the +MTTY parameters.

Table 4-14: +MTTY Parameters

<Parameter>	
<n>	0 Normal voice mode. 1 Full TTY mode (both uplink and downlink support TTY data; used when both side parties are deaf). 2 VCO mode (Voice Carry Over- uplink is voice active downlink is TTY). 3 HCO mode (Hearing Carry Over-downlink is voice active uplink is TTY). **The default value:** • On Power Up - as previously saved in FLEX bytes. • Before set command is first used, mode is set to Normal voice mode.

Notes:

VCO: Voice Carry Over is intended for people who cannot hear but are able to speak clearly. During a VCO relay call, the Deaf or Hard-of-Hearing caller speaks directly to the person they are conversing with. When that person responds, a Communication Assistant (CA) will type back exactly what is said and it will appear on the screen of your TTY or VCO phone.

HCO: Hearing Carry Over allows Speech Disabled callers who can hear well on the telephone to listen directly to the person they are talking with. The Speech Disabled Relay user types his or her part of the conversation on a TTY. A Communication Assistant (CA) then speaks the typed conversation, word for word, to the standard telephone user.

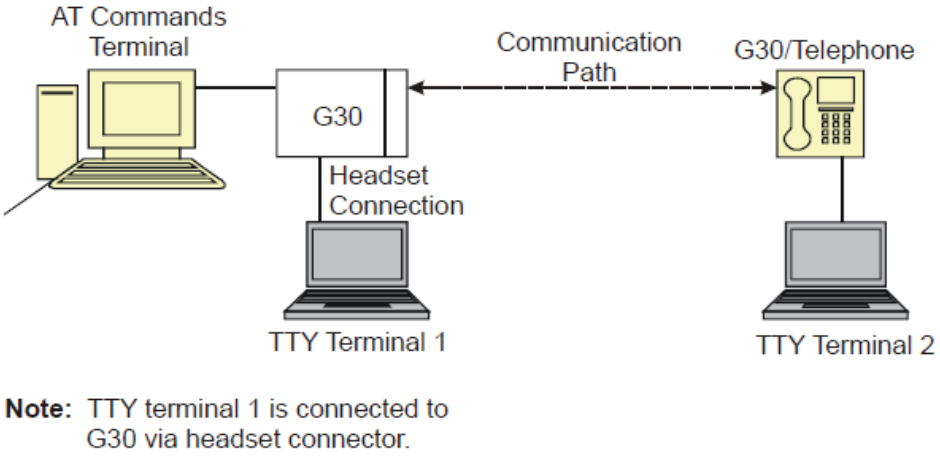


Figure 4-1:TTY Hardware Configuration

Example
AT+MTTY=?
+MTTY: (0-3)
OK

AT+MTTY=1
OK

AT+MTTY?
+MTTY: 1
OK

4.2.4. Call Status Messages

4.2.4.1. +CPAS, Phone Activity Status

This command displays the current activity status of the G30, for example, call in progress, or ringing.

Command Type	Syntax	Response/Action	Remarks
Execute/Read	AT+CPAS AT+CPAS?	+CPAS: <pas> OK or: +CME ERROR: <err>	The Execute and Read commands return the activity status <pas> of the G30. They can be used to interrogate the G30.
Test	AT+CPAS=?	+CPAS: (list of supported <pas>s) OK or: +CME ERROR: <err>	

The following table shows the +CPAS parameters.

Table 4-15: +CPAS Parameters

<Parameter>	Description
<pas>	0 - Ready - The G30 allows commands from the terminal 1 - Unavailable (MT does not allow commands from TA/TE) 2 - Unknown - The G30 is not guaranteed to respond to instructions 3 - Ringing (MT calls) - The G30 is ready for commands from the terminal, but the ringer is active 4 - Call in progress - The G30 is ready for commands from the terminal, but a call is in progress 5 - Sleep (MT is unable to process commands from TA/TE because it is in a low functionality state)

Example
AT+CPAS
+CPAS: 0
OK
AT+CPAS=?
+CPAS: (0-5)
OK
AT+CPAS?
+CPAS: 4
OK
AT+CPAS //Voice call active state
+CPAS: 4
OK

4.2.4.2. +CLCC, List Current Calls

This command displays a list of all current G30 calls and their statuses, and also enables/disables the unsolicited indication of the call list. (If no calls are received, no information response is sent to the terminal.)
If the command succeeds but no calls are available, no information response is sent to the terminal.
The maximum number of simultaneous multiparty calls is 5+1 (5 in active group and 1 on hold).

Command Type	Syntax	Response/Action	Remarks
Set	AT+CLCC=<state>	OK or: +CME ERROR: <err>	The Set command enables/disables unsolicited indications.
Execute	AT+CLCC	+CLCC: <idx>,<dir>,<call state>, <mode>, <mpty>[,<number>,<type>,<alpha>] [<CR><LF>+ CLCC: <idx>,<dir>,<call state>, <mode>,<mpty>[,<number>, <type>,<alpha>] […]] OK	The Execute command enables the receiving of data about current calls.
Read	AT+CLCC?	+CLCC: <state> OK or: +CME ERROR <err>	The Read command returns the call status.
Test	AT+CLCC=?	+CLCC: (List of supported <state>s) OK or: +CME ERROR <err>	

The following table shows the +CLCC parameters.

Table 4-16: +CLCC Parameters

<Parameter>	Description
<state>	0 Disable CLCC unsolicited indication 1 Enable CLCC unsolicited indication The default value is 0.
<idx>	Integer type, call identification number
<dir>	0 Mobile originated call (MO) 1 Mobile terminated call (MT)
<call state>	The state of the call 0 Active 1 Held 2 Dialing (MO call) 3 Alerting (MO call) 4 Incoming (MT call) 5 Waiting (MT call) 6 Released
<mode>	Bearer/Teleservice 0 Voice Call 1 Data
<mpty>	Multiparty status 0 Call is not part of a multiparty call 1 Call is one of multiparty call parties
<number>	Phone number in the format specified by <type>. Contains a string of up to 32 characters.
<type>	Phone number display format. Type of address octet in integer format (refer to GSM 04.08 [8] subclause 10.5.4.7) 129 Local number 145 International number with access character +
<alpha>	Text representation of the phone book entry. String type alphanumeric representation of <number> corresponding to the entry found in the phone book. Contains a string of up to 20 characters.

Note: When a mobile-originated call is routed to PSTN (PABX), no ALERT indication is prompted.

Example

```
AT+CLCC=?
+CLCC: (0,1)
OK
AT+CLCC
+CLCC: 1,0,0,0,0,"01256316830",129,"Shmuel"
OK
AT+CLCC?
+CLCC: 0
OK
AT+CLCC=1                    //Example with unsolicited indication
OK
ATD055490698;
OK
+CLCC: 1,0,2,0,0,"055490698",129,"Alpha"
+CLCC: 1,0,3,0,0,"055490698",129," Alpha "
OK
+CLCC: 1,0,0,0,0,"055490698",129," Alpha "
ATH
NO CARRIER
OK
+CLCC: 1,0,6,0,0,"055490698",129," Alpha
```

4.2.4.3. +MCST, Call Status Messages

This command displays the current state of the call processing, and also enables/disables the unsolicited indication of any change in the call processing state.

Command Type	Syntax	Response/Action		Remarks
Set	+MCST=<n>	OK or: +CME ERROR: <err>		The Set command Enables/disables the unsolicited call status messages.
Read	+MCST?	+MCST: <state> OK		The Read command returns the current call processing state.
Test	+MCST=?	**+MSELINT = 0** (list of supported <n>s) OK or; +CME ERROR: <err>	**+MSELINT = 1** +CME ERROR: <err>	The Test command returns a list of supported <n> s.

+MCST Indication

When a change in call state occurs and the +MCST is set to n=1 the G30 will give the following indication:

+MCST: <state>

+MCST Parameters

The following table shows the +MCST parameters.

Table 4-17: +MCST Parameters

<Parameter>	Description
<n>	0 - Disable MCST unsolicited indication 1 - Enable MCST unsolicited indication
<state>	1 - Idle call state 2 - Single incoming call 3 - Single call active 4 - Multi-party call active 5 - Single call held 6 - Multi-party call held 7 - Dual call (fully connected active call and held call) 8 - Dual multi-party call active 9 - Dual multi-party call held 10 - Single active call plus call waiting 11 - Multi-party call active plus call waiting 12 - Single call held plus call waiting 13 - Multi-party call held plus call waiting 14 - Dual calls plus call waiting 15 - Dual multi-party calls active plus call waiting 16 - Dual multi-party calls held plus call waiting 17 - Call control busy 64 - Calling 68 - No Service 69 - No Redial 72 - Security Fail
<alpha>	Text representation of the phone book entry. String type alphanumeric representation of <number> corresponding to the entry found in the phone book. Contains a string of up to 20 characters.

Example
AT+MCST?
+MCST: // <idle>
AT+MCST=1

OK

atd035684423;
+MCST: 17

OK

+MCST: 17
+MCST: 255

OK

+MCST: 3
+MCST: 17

NO CARRIER
+MCST: 1

AT+MSELINT=1

OK

AT+MCST=?
+CME ERROR: operation not supported

OK

AT+MSELINT=0

OK

AT+MCST=?
+MCST: (0-1)

4.2.5. Call Advice of Charge Commands

This set of commands enables GSM operators to offer Advice of Charge (AoC) services that calculate call charges. These charges are expressed in terms of home units.

4.2.5.1. +CAOC, Advice of Charge

This command displays information about the cost of calls. If supported, this command also activates/deactivates unsolicited event reporting of the CCM (Current Call Meter) information.
The unsolicited report +CCCM:<ccm> is sent when the CCM value changes, but not more than once every 10 seconds.

Note: The CCM value depends on the network properties (charge for MO or/and MT calls).

There are two states in which the command can be activated:

- In IDLE state - returns the last call cost.
- In a voice/data state - returns the accumulated cost, including the current call.

Command Type	Syntax	Response/Action	Remarks
Set	+CAOC[=<mode>]	OK or: [+CAOC:<ccm>] or: +CME ERROR:<err>	The Set command returns the CCM value from the G30, or activates/deactivates unsolicited reports.
Read	+CAOC? +CAOC	+CAOC: <mode> OK OK or: [+CAOC: <ccm>] or: +CME ERROR: <err>	The Read command returns the current CAOC mode.
Test	+CAOC=?	+CAOC: (list of supported <mode>s) OK	The Test command returns the supported mode values.

The following table shows the +CAOC parameters.

Table 4-18: +CAOC Parameters

<Parameter>	Description
<mode>	0 Queries the CCM value 1 Deactivates unsolicited reporting of the CCM value 2 Activates unsolicited reporting of the CCM value

Note: <CCM>: String type value representing three bytes of the current call meter value in hexadecimal format (for example, "00001E" indicates decimal value 30).

Example

Example with prepaid SIM card with 56700.00L prepaid before the test.

```
AT
OK
AT+CAOC=2
OK
atd+97254565190;
OK
OK
+CCCM: "000000"
+CCCM: "000006"
AT+CAOC
+CAOC: "000009"
OK
+CCCM: "00000e"
+CCCM: "000016"
AT+CAOC
+CAOC: "00001d"
OK
+CCCM: "00001e"
+CCCM: "000027"
AT+CAOC=0
+CAOC: "00002d"
OK
AT+CAOC=2
OK
+CCCM: "00003d"
AT+CAOC
+CAOC: "00003f"
OK
+CCCM: "000046"
AT
+CCCM: "00004e"
+CAOC
+CAOC: "00004f"
OK
+CCCM: "000056"
AT+CAOC
+CAOC: "00005d"
OK
+CCCM: "00005e"
NO CARRIER
AT+CAOC
```


```
+CAOC: "000066"
OK
//567 (prepaid SIM value) - 102 (price per call unit by provider) x 66 (call units) = 465 left in prepaid SIM
OK
```

There is now 46500.00L prepaid remaining on the SIM card.

Note: The above example shows first time activation of the AOC feature using the G30. Therefore, the accumulated cost is equal to the current call cost.

4.2.5.2. +CACM, Accumulated Call Meter

This command resets the Advice of Charge accumulated call meter value in the SIM file, EFACM. ACM contains the total number of home units for both the current call and preceding calls.
Refer to "+CAMM, Accumulated Call Meter Maximum",

Command Type	Syntax	Response/Action	Remarks
Set	+CACM=<passwd>	OK +CME ERROR: <err>	The Set command resets the accumulated call meter value. SIM PIN2 is required.
Read	+CACM?	+CACM: <acm> +CME ERROR: <err>	The Read command displays the current value of ACM.
Test	+CACM=?	OK	The Test command indicates whether the +CACM command is functioning.

The following table shows the +CACM parameters.

Table 4-19: +CACM Parameters

<Parameter>	Description
<passwd>	SIM PIN2 password Maximum string length is 8 characters. If this value is exceeded, the command terminates in an error. If PIN2 is incorrect, "+CME ERROR: incorrect password" is displayed.
<**acm**>	Accumulated call meter maximum value (similar **to CCM;**+CAOC, Advice of Charge <ccm> String type; three bytes of the current call meter value in hexadecimal format (for example, 00001E indicates a decimal value of 30). Value is given in home units; bytes are similarly coded as the ACMmax value in the SIM.

Example
AT+CACM=?
OK
AT+CACM?
+CACM:"000000"
OK
AT+CACM="2222"
OK

4.2.5.3. +CAMM, Accumulated Call Meter Maximum

This command sets the Advice of Charge accumulated call meter maximum value in the SIM file, EFACMmax. ACMmax contains the maximum number of home units the subscriber is able to consume. When the ACM reaches ACMmax, additional calls (mobile-originated and mobile-terminated calls that incur charges) are prohibited, except for emergency calls. Refer to GSM 02.24.

Command Type	Syntax	Response/Action	Remarks
Set	+CAMM=[<acmmax> ,<passwd>]	OK +CME ERROR: <err>	The Set command sets the accumulated call meter maximum value. SIM PIN2 is required. The value that is set remains after a power cycle. **Note:** This command is activated if Advice of Charge is supported by the network.
Read	+CAMM?	+CAMM: <acmmax> +CME ERROR: <err>	The Read command displays the current value of ACMmax.
Test	+CAMM=?	OK	The Test command indicates whether the +CAMM command is functioning.

The following table shows the +CAMM parameters.

Table 4-20: +CAMM Parameters

<Parameter>	Description
<acmmax>	Accumulated call meter maximum value (similar to CCM; +CAOC, Advice of Charge ccm> String type; three bytes of the current call meter value in hexadecimal format (for example, 00001E indicates a decimal value of 30). Value is given in home units; bytes are similarly coded as the ACMmax value in the SIM. Range is from 00001 to FFFFFF. 0 Disables ACMmax (default)
<passwd>	SIM PIN2 password Maximum string length is 8 characters. If this value is exceeded, the command terminates in an error. If PIN2 is incorrect, "+CME ERROR: incorrect password" is displayed.

Example
AT+CAMM=?
OK
AT+CAMM="FFFFFF","2222"
OK
AT+CAMM?
+CAMM: "FFFFFF"

OK

4.2.5.4. +CPUC, Price per Unit and Currency Table

This command sets the parameters of the Advice of Charge-related price per unit and currency table found in the SIM file, EFPUCT. PUCT information is used to convert the home units (used in +CAOC, +CACM and +CAMM) into currency units.

Command Type	Syntax	Response/Action	Remarks
Set	+CPUC=<currency>,<ppu>,<passwd>	OK +CME ERROR: <err>	The Set command sets the price per unit and the currency table. SIM PIN2 is required. The new value is retained after a power cycle.
Read	+CPUC?	+CPUC: <currency>,<ppu> +CME ERROR: <err>	The Read command displays the current price per unit and currency table.
Test	+CPUC=?	OK	The Test command indicates whether the +CPUC command is functioning.

The following table shows the +CPUC parameters.

Table 4-21: +CPUC Parameters

<Parameter>	Description
<currency>	Currency code character set (3 characters) defined by +CSCS command. If the string begins with an alphanumeric character, it may be entered with or without quotation marks, for example, "GBP", "DEM".
<ppu>	Price per unit A dot is used as a decimal separator (precision of 1/1000; 15 digit maximum), for example,"2.667". [See notes below]
<passwd>	SIM PIN2 password Maximum string length is 8 characters. If this value is exceeded, the command terminates in an error. If PIN2 is incorrect, "+CME ERROR: incorrect password" is displayed.

Example

AT+MSELINT = 0
OK

AT+CPUC=?


```
OK
AT+CPUC?
+CPUC: "",""

AT+CPUC="GBP","0.125","2222"
OK
AT+CPUC?
+CPUC: "GBP","0.125"
OK

AT+MSELINT = 1
AT+CPUC?
+CPUC: "","0.000"

OK
AT+CPUC=?
OK
AT+CPUC?
+CPUC: "","0.000"

OK
OK
AT+CPUC="GBP","0.125","2222"
OK
AT+CPUC?
+CPUC: "GBP","0.125"
```

Note: If <ppu> contains a dot, a maximum of three digits may appear after the dot, otherwise an error is generated. For example, if <ppu>=0.61, the Read command displays 0.610. <ppu>=1.2345 terminates in an error.

If <ppu> does not contain a dot, the number is divided by 1000. For example, if <ppu>=1, the Read command displays 0.001.

Due to storage constraints, the <ppu> value is limited to a range of 0 to 4095. Values beyond this range may result in rounding errors. For example, if <ppu>=4095, the Read command displays 4.095. However, if <ppu>=4096, the Read command displays 4.090 (the last digit is replaced by 0). If <ppu>=456789, the Read command displays 456.000.

4.2.5.5. +CR, Service Reporting Control

This command controls whether or not the extended format of an outgoing call is displayed or not. The +CR indication is sent from the G30 to the terminal whenever a data call is initiated by the G30.

Command Type	Syntax	Response/Action	Remarks
Set	**+CR=[<mode>]**	OK	The Set command enables/disables the extended format of an outgoing data call. When enabled, the outgoing data call is indicated to the terminal through the unsolicited result code +CR:<serv>. When the command is disabled, no +CR is sent to the terminal.
Read	+CR?	+CR:<mode>	The Read command displays the current service reporting control setting.
Test	+CR=?	+CR:list of supported <mode>	The Test command displays the list of supported CR modes.

The following table shows the +CR parameters.

Table 4-22: +CR Parameters

<Parameter>	Description
<mode>	0 Extended format disabled (default) 1 Extended format enabled
<serv>	Type of outgoing data calls: ASYNC - Asynchronous transparent SYNC - Synchronous transparent REL ASYNC - Asynchronous non-transparent REL SYNC - Synchronous non-transparent

Example
AT+CR=1 //Enable reporting
OK


```
ATD1234567890
+CR: REL ASYNC

AT+CR=?
+CR: (0-1)

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

4.2.5.6. +CCWE, Call Meter Maximum Event

This command allows the sending of an unsolicited report 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 sec call time remains.

Command Type	Syntax	Response/Action	Remarks
Set	+CCWE=<mode>	OK Or: CME ERROR:<error>	
Read	+CCWE?	+CCWE:<mode>	
Test	+CCWE=?	+CCWE:list of supported <mode>s	

The following table shows the +CCWE parameters.

Table 4-23: +CCWE Parameters

<Parameter>	Description
<mode>	0 Disable the call meter warning event. 1 Enable the call meter warning event.

4.2.6. Supplementary Services

This set of commands enables control over supplementary service notifications, including Structured and Unstructured Supplementary Service Data (USSD) data.

4.2.6.1. +CSSN, Supplementary Service Notifications

This command handles the enabling and disabling of supplementary service-related, network-initiated, notifications.

Command Type	Syntax	Response/Action	Remarks
Set	+CSSN=[<n>[,<m>]]	OK +CME ERROR: <err>	The Set command enables/disables the display of notification result codes to the TE. When <n>=1 and a supplementary service notification is received after a mobile-originated call setup, the +CSSI: notification is sent to the TE. When several different notifications are received from the network, each of them receives its own +CSSI result code. When <m>=1 and a supplementary service notification is received during a mobile-terminated call setup or during a call, or when a forward check supplementary service notification is received, the unsolicited result code +CSSU: is sent to the TE. When several different events are received from the network, each of them receives its own +CSSU result code. **Note:** The values for <n> and <m> are not saved after power cycle.
Read	+CSSN?	+CSSN: <n>,<m>	The Read command displays the current supplementary service notification setting.
Test	+CSSN=?	+CSSN: (0-1), (0-1)	The Test command displays the list of supported CSSN values.

The following table shows the +CSSN parameters.

Table 4-24: +CSSN Parameters

<Parameter>	Description
<n>	Sets/displays the +CSSI result code presentation status. This value must be specified. 0 Disable (default) 1 Enable
<m>	Sets/displays the +CSSU result code presentation status. This value is optional, but cannot be specified without <n>. 0 Disable (default) 1 Enable

Table 4-25: +CSSI Notification Values

Value	Description	G30 Support
0	Unconditional call forwarding is active	Yes
1	Some conditional call forwarding is active	Yes
2	Call has been forwarded	Yes
3	Call is waiting	Yes (GSM only)
4	CUG call (<index> is present)	Yes
5	Outgoing calls are barred	Yes
6	Incoming calls are barred	Yes
7	CLIR suppression rejected	Yes
8	Call has been deflected	No

Table 4-26: +CSSU Notification Values

Value	Description	G30 Support
0	This is a forwarded call (mobile-terminated call setup).	Yes
1	CUG call (<index> is present; mobile-terminated call setup).	Yes
2	Call has been put on hold (during a voice call)	Yes
3	Call has been retrieved (during a voice call)	Yes
4	Multiparty call has been entered (during a voice call)	Yes
5	Call on hold has been released (during a voice call; not a supplementary service notification)	Yes
6	Forward check supplementary service message received (can be received at any time)	Yes
7	Call is being connected with the remote party in an alerted state using an explicit call transfer operation (during a voice call).	Yes
8	Call has been connected with the other remote party using an explicit call transfer operation (during a voice call or during mobile-terminated call setup). Number and subaddress parameters may be present: <number> String type phone number of format defined by <type> <type>Type of address octet in integer format (refer to GSM 04.08 [8], subclause 10.5.4.7) <subaddr> String type subaddress of format defined by <satype> <satype> Type of subaddress octet in integer format (refer to GSM 04.08 [8], subclause 10.5.4.8)	Yes
9	Deflected call (mobile-terminated call setup)	No

Example
AT+CSSN=? // test command
+CSSN: (0-1),(0-1)
OK
AT+CSSN=0,0 // disable both options
OK
AT+CSSN=1,0 // set n value as enabled, m disabled
OK
AT+CSSN?
+CSSN: 1,0 // display the current n & m values

OK
+CSSI: 1 // displayed after mobile originated call setup of call forward and n enable
+CSSU: 2 //displayed when a call has been placed on hold (during the call) using the +CHLD AT command and m enable

4.2.6.2. +CUSD, Unstructured Supplementary Service Data

This command allows control of Unstructured Supplementary Service Data (USSD), according to GSM 02.90.
Both network and mobile initiated operations are supported. Parameter <n> is used to disable/enable the presentation of an unsolicited result code (USSD response from the network, or network initiated operation) +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.

Command Type	Syntax	Response/Action	Remarks
Set	AT+CUSD=[<n>[,<str>[,<dcs>]]]	OK or: +CME ERROR: <err>	The Set command enables/disables the display of the unsolicited result code.
UnsolicitedReport		+CUSD: <m>[,<str>[,<dsc>]]]	The USSD response from the network.
Read	+CUSD?	+CUSD: <n> or: +CME ERROR: <err>	The Read command displays the current value of <n>.
Test	+CUSD=?	+CUSD: (list of supported <n>s) or: +CME ERROR: <err>	The Test command displays the supported values of <n>.

The following table shows the +CUSD parameters.

Table 4-27: +CUSD Parameters

<Parameter>	Description
<n>	0 Disable the result code presentation in the TA. 1 Enable the result code presentation in the TA. 2 Cancel session (not applicable to read command response).
<str>	String type USSD-string (when <str> parameter is not given, network is not interrogated): If <dcs> indicates that GSM23.038 [25] default alphabet is used: • If TE character set other than "HEX" (refer command Select TE Character Set +CSCS): ME/TA converts GSM alphabet into current TE character set according to rules of GSM27.005 [24] Annex A. • If TE character set is "HEX": ME/TA converts each 7-bit character of GSM alphabet into two IRA character long hexadecimal number (e.g. character ? (GSM 23) is presented as 17 (IRA 49 and 55)). If <dcs> indicates that 8-bit data coding scheme is used: 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)).
<dcs>	GSM23.038 - Cell Broadcast Data Coding Scheme in integer format. The supported value are: 17 - USC2 Language Indicator. (The first character in a USC2 Lang IND has the language ID in it. This situation is not defined by the GSM 7.07 or the 3GPP 27.007 so the assuming that the first character should have the correctly formatted and packed language ID already in it). 72 - USC2 (16 bit). 68 - 8 bit. Each other value except of 96, 80, and 240 are 7 bit. Not supported values are: 96, 80, 240 The default value is 15 (7 bit).
<m>	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. the reason for the termination is indicated by the index, as described in Table 4-28. 3 Other local client has responded. 4 Operation not supported. 5 Network time out.

Example
AT+CUSD=1,"*00*0549598743#"
+CUSD: 0,"Connecting...",15
+CUSD: 0,"Connected",15
+CLCC: 1,1,4,0,0,"0545550099",129,"" >Call from USSD server
RING
ATA > answer to the server (when answered, the server call to 0549598743)
OK
+CLCC: 1,1,0,0,0,"0545550099",129,""
NO CARRIER
+CLCC: 1,1,6,0,0,"0545550099",129,""

Table 4-28: CUSD Termination Cause Table Index

Termination Cause	Index
NO_CAUSE	0
CC_BUSY	1
PARAMETER_ERROR	2
INVALID_NUMBER	3
OUTGOING_CALL_BARRED	4
TOO_MANY_CALLS_ON_HOLD	5
NORMAL	6
DROPPED	10
NETWORK	12
INVALID_CALL_ID	13
NORMAL_CLEARING	14
TOO_MANY_ACTIVE_CALLS	16
UNASSIGNED_NUMBER	17

NO_ROUTE_TO_DEST	18
RESOURCE_UNAVAILABLE	19
CALL_BARRED	20
USER_BUSY	21
NO_ANSWER	22
CALL_REJECTED	23
NUMBER_CHANGED	24
DEST_OUT_OF_ORDER	25
SIGNALING_ERROR	26
NETWORK_ERROR	27
NETWORK_BUSY	28
NOT_SUBSCRIBED	29
SERVICE_UNAVAILABLE	31
SERVICE_NOT_SUPPORTED	32
PREPAY_LIMIT_REACHED	33
INCOMPATIBLE_DEST	35
ACCESS_DENIED	43
FEATURE_NOT_AVAILABLE	45
WRONG_CALL_STATE	46
SIGNALING_TIMEOUT	47

MAX_MPTY_PARTICIPANTS_EXCEEDED	48
SYSTEM_FAILURE	49
DATA_MISSING	50
BASIC_SERVICE_NOT_PROVISIONED	51
ILLEGAL_SS_OPERATION	52
SS_INCOMPATIBILITY	53
SS_NOT_AVAILABLE	54
SS_SUBSCRIPTION_VIOLATION	55
INCORRECT_PASSWORD	56
TOO_MANY_PASSWORD_ATTEMPTS	57
PASSWORD_REGISTRATION_FAILURE	58
ILLEGAL_EQUIPMENT	59
UNKNOWN_SUBSCRIBER	60
ILLEGAL_SUBSCRIBER	61
ABSENT_SUBSCRIBER	62
USSD_BUSY	63
CANNOT_TRANSFER_MPTY_CALL	65
BUSY_WITH_UNANSWERED_CALL	66
UNANSWERED_CALL_PENDING	68
USSD_CANCELED	69

PRE_EMPTION	70
OPERATION_NOT_ALLOWED	71
NO_FREE_BEARER_AVAILABLE	72
NBR_SN_EXCEEDED	73
NBR_USER_EXCEEDED	74
Call Control by SIM Causes	
NOT_ALLOWED_BY_CC	75
MODIFIED_TO_SS_BY_CC	76
MODIFIED_TO_CALL_BY_CC	77
CALL_MODIFIED_BY_CC	78
App. Cause	
FDN_FAILURE	90

4.2.6.3. +COLP, Connected Line Identification Presentation

This command relates to the GSM supplementary service called COLP (Connected Line Identification Presentation), which enables a calling subscriber to obtain the connected line identity (COL) of the called party after setting up a mobile-originated call with the G30. For example, after setting up a mobile-originated call to one number that is forwarded to another number, the calling party will see the number of that third party.
When this command is enabled (and the called subscriber permits it), the following intermediate result code is returned:

+COLP: <number>,<type>[,<subaddr>,<satype>[,<alpha>]].

Note: This command is activated when COLP is supported by the network.

Command Type	Syntax	Response/Action	Remarks
Set	+COLP=<n>	OK +CME ERROR: <err>	The Set command enables/disables the display of the COL at the TE on the G30. The value set by this command is not retained after a power cycle.
Read	+COLP?	+COLP: <n>,<m> +CME ERROR: <err>	The Read command displays the status of <n>. It also initiates a query of the COLP service provision status and displays <m>.
Test	+COLP=?	+COLP: (list of supported <n>s) +CME ERROR: <err>	The Test command displays the supported values of <n>.

The following table shows the +COLP parameters.

Table 4-29: +COLP Parameters

<Parameter>	Description
<n>	Sets/displays the result code presentation status of the G30. 0 Disable (default) 1 Enable
<m>	Displays the subscriber's COLP service status in the network. 0 COLP not provisioned 1 COLP provisioned 2 Unknown (for example, no network, and so on)
<number>	Sets the phone number, using the format specified by <type>.
<type>	Sets the address octet type in integer format (refer to GSM 04.08 [8] subclause 10.5.4.7). 129 Unknown 145 International (used when dialing string includes "+" international access code character)
<subaddr>	Sets the subaddress, using the format specified by <satype>.
<satype>	Sets the address octet type in integer format (refer to GSM 04.08 [8] subclause 10.5.4.8).
<alpha>	An optional, string-type, alphanumeric representation of <number> corresponding to the entry found in the phonebook. The character set is defined by +CSCS (**+CSCS, Select Terminal Character Set**

Example
AT+COLP=0
OK
AT+COLP=2
+CME ERROR: Numeric parameter out of bounds

4.3. Voice Mail and Clock

4.3.1. Voice Mail Commands

4.3.1.1. +CSVM, Set Voice Mail Server

This command handles the selection of the number to the voice mail server. The new value should also remain after power cycle.

Command Type	Syntax	Response/Action		Remarks
Set	+CSVM=<mode>[,<number>[,<type>]]	OK +CME ERROR: <err>		The Set command sets the number to the voice mail server.
Read	+CSVM?	+CSVM:<mode>,<number>,<type> +CME ERROR: <err>		The Read command displays the currently selected voice mail number and status (enabled or disabled).
Test	+CSVM=?	+MSELINT = 0 +CSVM: (list of supported <mode>s), (list of supported <type>s) +CME ERROR: <err>	+MSELINT = 1 +CSVM: (list of supported <mode>s), (list of supported <type>s) +CME ERROR: <err>	+CSVM=?

The following table shows the +CSVM parameters.

Table 4-30: +CSVM Parameters

<Parameter>	Description
<mode>	0 Disables the voice mail number (default) 1 Enables the voice mail number
<number>	Voice mail number in string. String can be of up to 32 characters long, starting with a digit, or "+". Other allowed characters are digits (0..9), * and #.
<type>	Address octet type. 129 ISDN/telephony marketing plan; national/international number unknown 145 ISDN/telephony numbering plan; international number When the dialing string includes the international access code character (+), the default is 145. Otherwise, the default <type> is 129.

Note: **If <mode> is set to 0, <number> and <type> are ignored. If <mode> is set to** 1, <number> is mandatory.

Example

```
AT+CSVM=1,"+972555123456","145"
OK

AT+CSVM?
+CSVM: 1,"+972555123456",145
OK

at+mselint=0
OK

at+csvm=?
+CSVM: (0-1),(128-255)
OK

at+mselint=1
OK
at+csvm=?
+CSVM: (0,1),(129,145)
OK
```

4.3.2. System Date and Time Access Commands

4.3.2.1. +CCLK, Read/Set System Date and Time

This command reads and sets the G30 current date, time and time zone.

Command Type	Syntax	Response/Action	Remarks
Set	+CCLK=<time>	OK or: +CME ERROR: <err>	The Set command sets the date, time and time zone of the system clock. **Note:** Set Command sets user defined system clock values and saves them in the NVM memory. These saved values are kept after power-cycle as well.
Read	+CCLK?	+CCLK: <time> OK or: +CME ERROR: <err>	The Read command returns the current date, time and time zone setting. By default, <time> will represent the network updated time. If the user has used the Set command once, then <time> will represent the Set command setting. **Note:** If network operator does not support System Clock Update Message, the initial date, time and time zone, displayed by CCLK Read Command could be invalid (user's responsibility to set date, time and time zone by CCLK Set Command). **Note:** See Execute Command for how-to enable back network update time.
Test	+CCLK=?	+CCLK (list of supported <time>s) OK or: +CME ERROR: <err>	The Test command returns valid parameters for the +CCLK Set command.
Execute	+CCLK	OK or: +CME ERROR: <err>	The Execute command causes system clock to be overridden by network System Clock value immediately. **Note:** CCLK Read command will represent the network update time after CCLK Execute command. This value will be represented after power-cycle as well.

The following table shows the +CCLK parameters.

Table 4-31: +CCLK Parameters

<Parameter>	Description
<time>	ASCII string of format: yy/MM/dd,hh:mm:ss±zz or yy/MM/dd,hh:mm:ss yy - 2-digit year [2000-2069] MM - 2-digit month [01-12] dd - 2-digit day of month [00-31] hh - 2-digit hour [00-23] mm - 2-digit minute [00-59] ss - 2-digit seconds [00-59] zz - (optional) time zone offset from GMT, in quarter-hours [-47...+48]. If this value is not specified, the time zone offset will be 0.

Example
AT+CCLK=?
+CCLK: "88/12/31, 23:59:59, (-47-+48)"
OK
AT+CCLK="01/01/01, 01:01:01-08"
OK
AT+CCLK?
+CCLK: "01/01/01, 01:01:01-08"
OK
AT+CCLK="02/02/02, 02:02:02"
OK
Power cycling…
AT+CCLK?
+CCLK: "02/02/02, 02:02:02+00"
OK
AT+CCLK="03/03/03, 03:03:03+50"
+CME ERROR: Numeric parameter out of bounds
AT+CCLK
OK
AT+CCLK?
+CCLK: "05/10/27,16:52:31+08"
Power cycling…
AT+CCLK?
+CCLK: "05/10/27,16:52:50+08"
OK

4.3.2.2. +CTZU, Automatic Time Zone Update

This command enables and disables automatic time zone update via NITZ.

Command Type	Syntax	Response/Action	Remarks
Set	+CTZU=<state>	OK or: +CME ERROR: <err>	The Set command enable/disable automatic time zone update via NITZ.
Read	+CTZU?	+CTZU: <state> OK or: +CME ERROR: <err>	
Test	+CTZU=?	+CTZU (list of supported <state>s) OK or: +CME ERROR: <err>	

The following table shows the +CTZU parameters.

Table 4-32: +CTZU Parameters

<Parameter>	Description
<state>	0 - Disable automatic time zone update via NITZ (default). 1 - Enable automatic time zone update via NITZ.

Example
AT+CTZU=?
+CTZU: (0-1)

OK
AT+CTZU=1
OK
AT+CTZU?
+CTZU: 1

OK

4.3.2.3. +CTZR, Time Zone Reporting

This command enables and disables the time zone change event reporting.

Command Type	Syntax	Response/Action	Remarks
Set	+CTZR=<state>	OK or: +CME ERROR: <err>	
Read	+CTZR?	+CTZR: <state> OK or: +CME ERROR: <err>	
Test	+CTZR=?	+CTZR (list of supported <state>s) OK or: +CME ERROR: <err>	

The following table shows the +CTZR parameters.

Table 4-33: +CTZR Parameters

<Parameter>	Description
<state>	0 - disable time zone change event reporting (default). 1 - Enable time zone change event reporting.

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

4.4. SMS

4.4.1. SMS Commands

G30 supports SMS PDU and SMS TEXT mode according to ETSI specifications GSM27.005 & GSM23.040.

4.4.1.1. +CSMS, Select Message Service

This command handles the selection of messaging <service>. It returns the types of messaging services supported by G30.

Command Type	Syntax	Response/Action		Remarks
Set	+CSMS=<service>	+CSMS: <mt>,<mo>,<bm> or: +CMS ERROR: <err>		The Set command sets the type of service and returns the types of messages supported by the G30.
Read	+CSMS?	+MSELINT = 0 +CSMS: <service>,<mt>,<mo>, <bm>	+MSELINT = 1 +CSMS: <service>,<mt>,<mo>, <bm>	+CSMS?
Test	+CSMS=?	+MSELINT = 0 +CSMS: <service>	+MSELINT = 1 +CSMS: (128)	+CSMS=?

The following table shows the +CSMS parameters.

Table 4-34: +CSMS Parameters

<Parameter>	Description
<service>	• +MSELINT = 0 • 0 - Acknowledge (RP-ACK) for incoming SMS-Deliver and SMS-Status-Report is • sent immediately when those messages arrives G30 and +CNMI parameter <mt>=2 • or/and <ds>=1. <Service>=0 is default value. • 1 - • • Acknowledge (RP-ACK) for incoming SMS-Deliver or SMS-Status-Report may be sent via acknowledge command +CNMA when SMS-Deliver or SMS-Status-Report messages arrives G30 and +CNMI parameter <mt>=2 or/and <ds>=1. In case acknowledge command +CNMA is not given within required time an error (RP-ERROR) is sent to network. • • In case network support & text mode: service center time stamp is added to +CMGC, +CMSS and +CMGS commands report. • • In case network support & pdu mode: ackpdu (network SUBMIT-Report without SC address) will be added to +CMGC, +CMSS and +CMGS commands report. • • <service> value 128 is used for G24 backward compatibility.
	+MSELINT = 1 Integer that defines the type of service 1-127 Not supported 128 Supported (manufacturer-specific)
<mt>	Mobile terminated messages 0 Not supported by the G30 1 Supported by the G30
<mo>	Mobile originated messages 0 Not supported by the G30 1 Supported by the G30
<bm>	Broadcast type messages 0 Not supported by the G30 1 Supported by the G30

Note: G30 supports the services of: Mobile originated messages, Mobile terminated messages and Broadcast messages

Example

at+mselint=0
OK

at+csms =128
+CSMS: 001,001,001

OK


```
at+csms=?
+CSMS: (0-1,128)

OK
at+csms?
+CSMS: 0,1,1,1

OK
at+mselint=1
OK
at+csms=?
+CSMS: (128)

OK
at+csms?
+CSMS: 128,1,1,1

OK
```

4.4.1.2. +CPMS, Preferred Message Storage

This command handles the selection of the preferred message storage area. The message storage area is divided into three parts, mem1, mem2 and mem3.

Command Type	Syntax	Response/Action	Remarks
Set	+CPMS=<mem1> [,<mem2>[,<mem3>]]	+CPMS: <used1>,<total1>,<used2>,<total2>, <used3>,<total3> OK or: +CMS ERROR: <err>	The Set command sets the memory storage.
Read	+CPMS?	+CPMS: <mem1>,<used1>,<total1>, <mem2>,<used2>,<total2>,<mem3>, <used3>,<total3> OK or: +CMS ERROR: <err>	The Read command displays the selected memory storage type for the three memory areas.
Test	+CPMS=?	+CPMS: (list of supported <mem1>s), (list of supported <mem2>s), (list of supported <mem3>s) OK +CMS ERROR: <err>	The Test command lists the supported memory storage for <mem1>, <mem2> and <mem3>.

The following table shows the +CPMS parameters.

Table 4-35: +CPMS Parameters

<Parameter>	Description
<mem1>	memory from which messages are read and deleted. Supported values are: "SM", "BM". The default value at power-up is "SM".
<mem2>	memory to which writing operation is made. Supported value is: "SM". The default value at power-up is "SM".
<mem3>	memory to which received SMS are stored (unless forwarded directly to TE). Supported value is: "SM". The default value at power-up is "SM".
"BM"	broadcast message storage
"SM"	SIM message storage

Example
AT+CPMS="SM"
+CPMS: 5,20,5,59,5,20
OK

4.4.1.3. +CMGF, Message Format

This command is a basic command. The Set command handles the selection of the message format used with send, list, read and write commands, as well as the format of unsolicited result codes resulting from message receipts. The G30 supports both PDU mode (where entire TP data units are used) and text mode (where the body of the message and its headers are given as separate parameters).

Command Type	Syntax	Response/Action	Remarks
Set	+CMGF=<mode>	OK or: +CMS ERROR: <err>	The Set command sets the message format to use.
Read	+CMGF?	+CMGF:<mode>	The Read command displays the current message format.
Test	+CMGF=?	+CMGF:(list of supported <mode>s)	The Test command lists all the supported message formats.

The following table shows the +CMGF parameters.

Table 4-36: +CMGF Parameters

<Parameter>	Description
<mode>	Message format: 0 PDU mode (default) 1 Text mode

Example
AT+CMGF=1

OK

AT+CMGF?
+CMGF: 1

OK

AT+CMGF=?
+CMGF: (0-1)

OK

4.4.1.4. +CSCA, Service Center Address

This command enables to write/read SCA to/from SIM.
In SMS text mode, SCA stored in SIM is added to any stored and sent SMS.
In SMS pdu mode, SCA stored in SIM is added to stored SMS and send SMS only when SCA address length coded in PDU equals zero.

Command Type	Syntax	Response/Action	Remarks
Set	+CSCA=<sca>[,<tosca>]	OK or: +CMS ERROR: <err>	Sets service center address stored in SIM (EF-SMSp -Short message service parameters). <tosca> is optional parameter, default value is 129 (local number). When <sca> is prefixed with '+' it indicates that <tosca> is set to 145(International number).
Read	+CSCA?	+CSCA: <sca>,<tosca>	Read command displays <sca> and <tosca> stored in SIM*EF-SMSp).
Test			Test command for +CSCA is not defined exactly by ETSI.

Table 4-37: +CSCA Parameters

<Parameter>	Description
<sca>	**Service Center Address" ""+" character prefix of <sca> indicates <tosca> of 145.** Minimum 1 and up to 20 characters, where each character is represented by semi octets (excluding '+' character). If <sca> contains an odd number of digits, bits 4 to 7 of the last octet shall be filled with an end mark coded "s "1"11".
<tosca>	**Type of service center address.** **<tosca> of 129 is mostly use for local number and 145 for International.** **<tosca> of 129 is default value.** <tosca> values are in range of 0-255. Valid values are defined according to: GSM23.040 v7.4.0 section 9.1.2.5 as follow: Bit 7 is 1 Bits 6,5-4 - Present Type of number as follow: Bits 6 5 4 0 0 0 Unknown 0 0 1 International number 0 1 0 National number 0 1 1 Network specific number 1 0 0 Subscriber number 1 0 1 Alphanumeric, (coded according to GSM23.038 7-bit default alphabet) 1 1 0 Abbreviated number 1 1 1 Reserved for extension Numbering-plan-identification (applies for Type-of-number = 000,001,010) Bits 3 2 1 0 0 0 0 0 Unknown 0 0 0 1 ISDN/telephone numbering plan (E.164/E.163) 0 0 1 1 Data numbering plan (X.121) 0 1 0 0 Telex numbering plan 1 0 0 0 National numbering plan 1 0 0 1 Private numbering plan 1 0 1 0 ERMES numbering plan (ETSI DE/PS 3 01-3) 1 1 1 1 Reserved for extension. All other values are reserved.

The following table shows the +CSCA parameters.

The following table describes +CSCA <SCA> valid parameters including the conversion when using stored <SCA> in SMS PDU mode (editing SMS via +CMGW or +CMGS without SCA). This is according to 24.008V031000P Table 10.5.118/GSM 24.008V031000P: Called party BCD number:

<SCA> Character in SMS (Text mode)	Mapped character for SMS
Digits: 0-9	Digits: 0-9
'+'	0x91
'*'	'A'
'#'	'B'
'A'	'C'
'B'	'D'
'C'	'E'

Example
AT+CSCA?
+CSC": "+972123"56",145 // Read SCA address and TOSCA stored in SIM (EF-smsp)

OK

AT+CS"A="972123"56"
OK
AT+CSCA?
+CSC": "972123"56",129

OK

AT+CSCA?
+CSC": "*A"C#",129

OK

AT+CMGW=13
> 0481ABCD1211640A8150224902450000A700 // '*'->'A', 'A'->B', 'B'->C', '#'->'D'

+CMGW: 15

OK

AT+CMGR=15
+CMGR: 2,,13
0481ABCD1211640A8150224902450000A700 // SCA read as stored for current SMS

OK
AT+CSCA?
+CSC": "*A"C#",129 // Read command remained // SCA settings didn't change

OK

AT+CSCA?

+CSC": "*A"C#",129

OK

AT+CMGW=
65 > 0011640A8150224902450000A700

+CMGW: 16

OK
AT+CMGR=16
+CMGR: 2,,13
0481CAEDFB11640A8150224902450000A700 // SCA is: ACDEB in pdu, mapped to *ABC#
OK

AT+CMGW=13
> 0381AB1211640A8150224902450000A700 / Set SCA to BA21

+CMGW: 17

OK
AT+CMGR=17
+CMGR: 2,,13
0381AB1211640A8150224902450000A700 / SCA is set correctly only for current SMS but +CSCA setting didn't changed

OK
AT+CSCA?
+CSC": "*A"C#",129 /SCA didn't change in storage

OK

4.4.1.5. +CSMP, Set Text Mode Parameters

This command is a basic command and is used to select values for additional parameters needed when SM is sent to the network or placed in storage when TEXT mode is selected.

Note: G30 does not support any DCS-character set conversion.

Command Type	Syntax	Response/Action	Remarks
Set	+CSMP=[<fo>[,<vp>[,<pid>[,<dcs>]]]]	OK or: +CMS ERROR: <err>	The set command selects values for additional parameters needed when SM is sent to the network or placed in storage when text format message mode is selected.
Read	AT+CSMP?	+CSMP: <fo>,<vp>,<pid>,<dcs> OK or: +CMS ERROR: <err>	The read command returns the current parameters value.
Test	AT+ CSMP =?	OK or: +CMS ERROR: <err>	The test command just returns OK.

Table 4-38: +CSMP Parameters

<Parameter>	Description
<fo>	first octet of GSM23.040. in integer format. For details see +CMGW definitions. The default value at power-up is 17 (Message type is: SMS-SUBMIT and relative VP format).
<vp>	Validity Period. depending on SMS-SUBMIT <fo>, TP-Validity-Period-Format bits setting. Either in integer format (see Table 4-39) or in time-string format ("yy/MM/dd,hh:mm:ss±zz"). If there is no correlation between the VPF and the VP value. an error message will be returned.
<pid>	Protocol-Identifier. The one octet information element by which the SM-TL either refers to the higher layer protocol being used, or indicates interworking with a certain type of telematic device. "0 - no interworking, SME-to-SME protocol (default) "Any value between 0-255 will be accepted. The SC may reject messages with a TP-Protocol-Identifier containing a reserved value or one, which is not supported.
<dcs>	One octet of Data Coding Scheme, indicates the data coding scheme of the DATA, and may indicate a message class. NOTE: For DCS expanded information, see section DCS Handling . default alphabet: 00xx00xx, 111100xx, 1101xxxx 8 bit data: 00xx01xx, 111101xx UCS2: 00xx10xx, 1110xxxx reserved: 00xx11xx, 0100xxxx-1011xxxx The default value at power-up is 0 - Default alphabet.

The following table shows the +CSMP parameters.

Table 4-39: VP Relative Format (In Integer Frmat)

<Parameter>	Description
0 to 143	(TP-VP + 1) x 5 minutes (i.e. 5 minutes intervals up to 12 hours)
144 to 167	12 hours + ((TP-VP - 143) x 30 minutes)
168 to 196	(TP-VP - 166) x 1 day
197 to 255	(TP-VP - 192) x 1 week

Example


```
AT+CSMP?
+CSMP: 17,167,0,0            (default values for SMS-SUBMIT)
OK
AT+CSMP= 1,256,0,0
+CMS ERROR: numeric parameter out of bounds
AT+CSMP=29,"04/11/04,09:48:36+08"
OK
AT+CSMP=?
OK
AT+CSDH=1
OK
AT+CMGF=1
OK
AT+CMGW="0544565034"
> ABC (^Z)
+CMGW: 160
OK
AT+CMGR=160
+CMGR: "STO UNSENT","0544565034",,81,29,0,0,"04/11/04,09:48:36+08","+97254120032",145,3
ABC
OK
```

4.4.1.6. +CSDH, Show Text Mode Parameters

This command controls whether detailed header information is shown in text mode result codes.

Command Type	Syntax	Response/Action	Remarks
Set	+CSDH=[<show>]	OK or: +CMS ERROR: <err>	The set command controls whether detailed header information is shown in text mode result codes.
Read	AT+CSDH?	+CSDH: (list of supported <show>s) OK or: +CMS ERROR: <err>	The read command returns the current <show> parameter value.
Test	**AT+CSDH=?**	**+CSDH: (0-1)** **OK**	The Test command lists all the supported text modes.

The following table shows the +CSDH parameters.

Table 4-40: +CSDH Parameters

<Parameter>	Description
<show>	0 - Means do not show header values defined in commands +CSCA and +CSMP (<sca>, <tosca>, <fo>, <vp>, <pid> and <dcs>) nor <length>, <toda> or <tooa> in +CMT, +CMGL, +CMGR result codes for SMS- DELIVERs and SMS-SUBMITs in text mode; for SMS-COMMANDs in +CMGR result code, do not show <pid>, <mn>, <da>, <toda>, <length> or <cdata> (default). 1 - Means show the values in result codes.

Example

```
AT+CSDH=?
+CSDH: (0-1)
OK
AT+CSDH?
+CSDH: 0
OK
AT+CMGR=160                // SMS-SUBMIT
+CMGR: "STO UNSENT","0544565034",
ABC
OK
AT+CSDH=1
OK
AT+CMGR=160
+CMGR: "STO UNSENT","0544565034",,81,29,0,0,"04/11/04,09:48:36+08","+97254120032",145,3
ABC
OK
```

Command	Response/Action
+CSDH=[<show>]	OK or: +CMS ERROR: <err>

Command	Response/Action
AT+CSDH?	+CSDH: <show> OK or: +CMS ERROR: <err>

Command	Response/Action
AT+CSDH =?	+CSDH: (list of supported <show>s) OK or: +CMS ERROR: <err>

4.4.1.7. +CNMI, New Message Indications to Terminal

This command selects the procedure of how a message reception from network is being indicated.

Command Type	Syntax	Response/Action
Set	+CNMI=[<mode>[,<mt>[,<bm>[,<ds>[,<bfr>]]]]]	OK or: +CMS ERROR: <err>
Read	+CNMI?	+CNMI:<mode>,<mt>,<bm>,<ds>,<bfr>
Test	+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)

The following table shows the +CNMI parameters.

Table 4-41: +CNMI Parameters

<Parameter>	Description
<mode>	Determines incoming SMS unsolicited result code indication processing: 0 - 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 (default). 1 - Discard indication and reject new received message unsolicited result codes when TA-TE link is reserved. Otherwise forward them directly to the TE. 2 - Buffer unsolicited result codes in the TA when TA-TE link is reserved and flush them to the TE after reservation. Otherwise forward them directly to the TE. 3 - Forward unsolicited result codes directly to the TE.

<mt>	Determine SMS-Deliver indication report: 0 - No SMS-DELIVER indications are routed to TE (default). 1 - If SMS-DELIVER is stored into ME/TA, indication of the memory location is routed to the TE using the following unsolicited result code (+CMTI parameters are described in Table 4-43): +CMTI: <mem>,<index> 2 - SMS-DELIVERs are routed directly to the TE using the unsolicited result code (+CMT parameters are described in Table 4-44). • Class 2 messages result in indication as defined in <mt>=1. • Message waiting indication group (discard message): route message to TE and do not try to store it in memory. • Message waiting indication group: (store message): as <mt>=1. **PDU Mode**: +CMT: [<alpha>],<length><CR><LF><pdu> **TEXT Mode**: **When +CSDH=0**: +CMT:<da>,,<scts> <CR><LF><data> **When +CSDH=1**: +CMT:<da>,[<alpha>],<scts>,<toda>,<fo>,<pid>,<dcs>, <sca>,<tosca>,<length><CR><LF><data> 3 - 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.

<bm>	Determine Cell broadcast indication report: 0 - No CBM indications are routed to the TE (default). 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- Received CBMs are routed directly to the TE using unsolicited result code (+CBM parameters are described in Table 4-45): **PDU Mode**: +CBM : <length><CR><LF><pdu> **Text Mode**: +CBM :<sn>,<mid>,<dcs>,<page>,<pages><CR><LF> <data> 3 - Class 3 CBMs are routed directly to TE using unsolicited result codes defined in <bm>=2. Messages of other classes result in indication as defined in <bm>=1.
<ds>	Determine SMS-STATUS-REPORTs indication report: 0 - No SMS-STATUS-REPORTs are routed to the TE (default). 1 - SMS-STATUS-REPORTs are routed directly to the TE using the following unsolicited result code: (+CDS parameters are described in Table 4-48). **PDU Mode**: +CDS: <length><CR><LF><PDU> **Text Mode**: +CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> 2 - If SMS-STATUS-REPORT is stored into ME/TA, indication of the memory location is routed to the TE using unsolicited result code (+CDSI parameters are described in Table 4-47): +CDSI: <mem>,<index>

<bfr>	Handle buffering result codes: 0 - TA buffer of unsolicited result codes defined within this command is flushed to the TE when <mode> 1…3 is Entered (default). 1- TA buffer of unsolicited result codes defined within this command is cleared when <mode> 1…3 is entered.
<mem>	Memory storage where the new message is stored according to +CPMS <mem3> settings.
<index>	Index where short message as been stored in <mem>.

Example
See +CMT, +CMTI, +CDS and +CDSI examples.

4.4.1.8. +CNMA, New Message Acknowledgment

This command allows acknowledge of receipted incoming SMS-DELIVER (+CMT) or SMS-STATUS-REPORT (+CDS) routed directly to TE when +CSMS command <service>=1.
In case acknowledge is not send within required time, an RP-ERROR is send to network, +CNMI parameters <mt> and <ds> are clear and next incoming SMS indication is disabled.
In TEXT mode, only positive acknowledgement to the network (RP-ACK) is possible.
In PDU mode, either positive (RP-ACK) or negative (RP-ERROR) acknowledgement to the Network is possible.

Command Type	Syntax	Response/Action	Remarks
Set	Text Mode: AT+CNMA PDU Mode: 1) AT+CNMA= [<n> [, <length> [<CR> <PDU> <ctrl-Z / ESC>]]]	OK or: +CMS ERROR: <err>	Text Mode: Command enable sending positive acknowledgement to network - RP-ACK PDU Mode: Command enables sending both positive and negative acknowledgement to network (RP-ACK or RP-ERROR) together with PDU message.
Test	+CNMA=?	Text Mode: AT+CNMA=? OK PDU Mode: AT+CNMA=? +CNMA: (0-2) OK	

The following table shows the +CNMA parameters.

Table 4-42: +CNMA Parameters

<Parameter>	Description
<n>	Acknowledge type (applicable in PDU mode). 0- RP-ACK is sent as in TEXT mode. 1- RP-ACK is sent with/without PDU message. 2- send RP-ERROR with/without PDU message.
<length>	Size of message in PDU mode format, in octets, excluding SMSC data.
<PDU>	Message header and contents in PDU mode format.

Example
AT+CSMS=0
+CSMS: 1,1,1
OK
AT+CNMI=1,2
OK
AT+CMGS="1234"
> TEST SMS DELIVER CMT
+CMGS: 104
OK
// Since +CSMS <service>=0, next +CMT report for deliver SM don't require +CNMA, acknowledge is sent Immediately when message received.
+CMT: 1234",,"09/03/09,09:40:33+08"
TEST SMS DELIVER CMT
AT+CSMS=1
+CSMS: 1,1,1
OK
AT+CMGS="0544565034"
> TEST SMS DELIVER CMT ACK REQ
+CMGS: 108
OK
// Since +CSMS <service>=1, next +CMT report for deliver SM require +CNMA, acknowledge is sent by +CNMA. In case +CNMA is not given +CNMI parameters are cleared and no additional report for incoming SMS will be routed to TE.

+CMT: "+972544565034",,"09/03/09,09:46:42+08"
TEST SMS DELIVER CMT ACK REQ
AT+CNMA
OK

4.4.1.9. **+CMTI, Unsolicited Response (New SMS-DELIVER Receipt Indication)** The +CMTI unsolicited response is sent to the TE upon receipt of a new SMS-DELIVER SM. Refer to +CNMI, New Message Indications to Terminal

This unsolicited message indicates that a new SMS-DELIVER message was received, and is stored in location <index>:
+CMTI: <mem>,<index>
The following table shows the +CMTI parameters.

Table 4-43: +CMTI Parameters

<Parameter>	Description
<mem>	Memory Storage according to +CPMS <mem3> settings: "SM".
<index>	Location of the new message in <mem>.

Example
AT+CPMS?
+CPMS: "SM",3,20,"SM",3,23,"SM",3,20 // <MEM3>="SM"

OK
AT+CNMI=1,1 // Set <mt> to '1'
OK
AT+CMGS="0123456"
> TEST

+CMGS: 81

OK

+CMTI: "SM",4 // SMS-Deliver stored in index 4 in "SM" memory

AT+CPMS?
+CPMS: "SM",4,20,"SM",4,20,"SM",4,20

OK

4.4.1.10. +CMT, Unsolicited Response (New SMS-DELIVER Receipt)

The +CMT unsolicited response is sent to the TE upon reception of a new SMS-DELIVER SM if +CNMI parameter <mt> is set to '2'.
This unsolicited message displays the received SMS-DELIVER message.
Acknowledge for the received SMS-DELIVER SM is sent to network immediately when +CSMS <service> is set to '0' or when +CSMS <service> is set to '1', acknowledge is sent via +CNMA command during predefine timeout, an error is sent to network in case timeout expire.
Next +CMT response depends on acknowledge of the current received +CMT response in case +CSMS <service> parameter set to '1'.
For more information refer to: +CNMI, New Message Indications to Terminal , +CNMA, and +CSMS, Select Message Service commands.
This unsolicited message displays the received SMS-DELIVER message:
In text mode: (+CMGF=1):
+CMT: <oa>,<scts>[,<tooa>,<fo>,<pid>,<dcs>,<sca>,<tosca>,<length>] <CR><LF><data>
(about parameters in italics, refer command Show Text Mode Parameters +CSDH).
In PDU mode: (+CMGF=0):
+CMT: [<alpha>],<length><CR><LF><pdu>

The following table shows the +CMT parameters.

Table 4-44: +CMT Parameters

<Parameter>	Description
<oa>	Message origination address.
<scts>	Service center time stamp.
<toda>	Type of origination address
<fo>	First octet of the SM
<pid>	Protocol Identifier
<dcs>	Data Coding Scheme
<sca>	Service Center Address
<tosca>	Type of Service Center Address
<data>	Message contents.

<alpha>	Alpha ID of message.
<length>	In PDU mode: Size of message, in octets, excluding SMSC data. In TEXT mode: number of characters included in the <data>
<pdu>	Message header and contents in PDU mode format. See description in +CMGR, +MMGR,.

Example
AT+CMGF=1
OK
AT+CSMS=1
+CSMS: 1,1,1

OK
AT+CNMI=1,2
OK
AT+CMGS="1234" // Send message to myself
> Test

+CMGS: 87

OK

+CMT: "1234",,"09/03/09,08:28:54+08"
Test

4.4.1.11. +CBM, Unsolicited Response (New CB Message Receipt)

The +CBM unsolicited response is sent to the TE upon reception of a new Cell Broadcast messages. This unsolicited message displays the received Cell Broadcast messages. For more information refer to: +CNMI, New Message Indications to Terminal

Unsolicited Response

In text mode: (+CMGF=1):

+CBM: <sn>,<mid>,<dcs>,<page>,<page><CR><LF><data>

In PDU mode: (+CMGF=0):

+CBM: <length><CR><LF><pdu>

The following table shows the +CBM parameters.

Table 4-45: +CBM Parameters

<Parameter>	Description
<sn>	Message serial number.
<mid>	Message ID.
<page>	Current page number.
<pages>	Total number of pages.
<data>	Message contents in text mode.
<length>	Size of message in PDU mode format, in octets.
<pdu>	Message header and contents in PDU mode format. See description in +CMGR, +MMGR,.

4.4.1.12. **+CBMI, Stored Cell Broadcast Message Indication** The +CBMI unsolicited response is sent to the TE upon receipt of a new S Cell Broadcast messages. For further information, refer to, **+CS** and **+CSMS, Select Message Service**

This unsolicited message indicates that a new Cell Broadcast message was received, and is stored in location <index>.

Unsolicited Response
+CBMI: <mem>,<index>

The following table shows the +CBMI parameters.

Table 4-46: +CBMI Parameters

<Parameter>	Description
<mem>	"BM" Memory Storage.
<index>	Location of the new message in <mem> of "BM".

4.4.1.13. **+CDSI, Unsolicited Response (New SMS-STATUS-REPORT Indication)** The +CDSI unsolicited response is sent to the TE upon receipt of a new SMS-STATUS-REPORT SM, if the +CNMI parameter <ds> is set to '2'. For further information, refer to +CNMI, New Message Indications to Terminal

This unsolicited message indicates that a new SMS-STATUS-REPORT message was received, and is stored in location <index>.

Unsolicited Response
+CDSI: <mem>,<index>

The following table shows the +CDSI parameters.

Table 4-47: +CDSI Parameters

<Parameter>	Description
<mem>	Memory Storage according to +CPMS <mem3> settings: "SM".
<index>	Location of the new message in <mem>.

Example
AT+CNMI=1,,,2 // Set <ds> to '2'
AT+CPMS?
+CPMS: "SM",10,20,"SM",10,20,"SM",10,20
OK
AT+CSMP=49
OK
AT+CMGS="1234"
> TEST CDSI

+CMGS: 90

OK

+CDSI: "SM",10 // SMS-Status-Report stored in index 10 in "SM" memory

4.4.1.14. +CDS, Unsolicited Response (New SMS-STATUS-REPORT Receipt)

The +CDS unsolicited response is sent to the TE upon reception of a new SMS-STATUS-REPORT SM if +CNMI parameter <ds> is set to '1'.
This unsolicited message displays the received SMS-STATUS-REPORT message.
Acknowledge for the received SMS-STATUS-REPORT SM is sent to network immediately when +CSMS <service> is set to '0' or when +CSMS <service> is set to '1', acknowledge is sent via +CNMA command during pre-define timeout, an error is sent to network in case timeout expires. Next +CDS response depends on acknowledge of current received +CDS response in case +CSMS <service> parameter set to '1'. **For** more information refer to**:** +CNMI, New Message Indications to Terminal

Unsolicited Response

In text mode: (+CMGF=1):

+CDS: <fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st><CR><LF>

In PDU mode: (+CMGF=0):

+CDS: <length><CR><LF><pdu>

The following table shows the +CDS parameters.

Table 4-48: +CDS Parameters

<Parameter>	Description
<fo>	First octet of the SM
<mr>	Message Reference
<ra>	Message Recipient address
<tora>	Type of Recipient address
<scts>	Service center time stamp
<dt>	Discharge-Time
<st>	Status

After sending a +CDS unsolicited response to the TE, the G30 will expect a +CNMA (new message acknowledgement) from the TE within a predefined timeout of 60 seconds. The G30 will not send another +CDS unsolicited response to the TE before the previous one is acknowledged. If the +CDS is acknowledged within the timeout, the new SM is not saved in the message storage. If the +CDS is not acknowledged and the timeout has expired, the new SM is saved in the message storage and +CNMI parameter <ds> is set to ’0’.

Example

```
AT+CSMP=49              //Set MO SMS for Status - Report
OK
```


```
AT+CNMI=1,2
OK
AT+CMGS="1234"                    // Send message to myself
> TEST CDS
+CMGS: 89
OK
+CMT: "1234",,"09/03/09,08:50:42+08"
TEST CDS
```

4.4.1.15. +CMGL, +MMGL, List Messages

These commands display a list of all SMs with the status value <stat>, from the G30 message storage <mem1> (selected using the +CPMS command). The command returns a series of responses, one per message, each containing the message index, status, and data. If the status of a message is "RECEIVED UNREAD", execution of the +CMGL command changes the status of the message to "RECEIVED READ".

The +MMGL command does not change the message status. In addition, +MMGL includes a <stat> selection that can be used to query the G30 for a list of message headers without attendant message data.

Command Type	Syntax	Response/Action	Remarks
Set	+CMGL [=<stat>] or +MMGL [=<stat>]	If text mode (+CMGF=1) command execution is successful and SMS-SUBMITs and/or SMS-DELIVERs: +CMGL: <index>,<stat>,<oa/da>,,[<scts>] [,<tooa/toda>, <length>]<CR><LF><data>[<CR><LF> +CMGL: <index>,<stat>,<da/oa>,,[<scts>] [,<tooa/toda>,<length>]<CR><LF><data>[...]] The parameters <tooa/toda>,<length> refer command shows the Text Mode Parameters +CSDH and will be shown according to +CSDH settings. If text mode (+CMGF=1) command execution is successful and SMS-COMMANDs: +CMGL: <index>,<stat>,<fo>,<ct>[<CR><LF>+CMGL: <index>,<stat>,<fo>,<ct>[...]] If text mode (+CMGF=1), command execution is 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>[...]] If text mode (+CMGF=1) command execution is successful and SMS-STATUS_REPORTs: +CMGL: <index>,<stat>,<fo>,<mr>, [<ra>],[<tora>],<scts>,<dt>,<st>[<CR><LF> +CMGL: <index>,<stat>,<fo>,<mr>, [<ra>],[<tora>],<scts>,<dt>,<st>[...]] In PDU mode (+CMGF=0): +CMGL: <index>,<stat>,[<alpha>], <length><CR><LF><pdu>[<CR><LF> +CMGL: <index>,<stat>,[<alpha>], <length><CR><LF> <pdu>[…]] Or +CMS ERROR: <err>	
Test	+CMGL=? +MMGL=?	+CMGL: (list of supported <stat>s) +MMGL: (list of supported <stat>s)	The Test command lists all the supported <stats>

The following table shows the +CGML/+MMGL parameters.

Table 4-49: +CMGL/+MMGL Parameters

<Parameter>	Description
<index>	1-352 Index of message in storage.
<stat>	Status of message in memory: **PDU mode** / **Text mode** / **Description** **0** / "REC UNREAD" / Received unread messages (default) **1** / "REC READ" / Received read messages **2** / "STO UNSENT" / Stored unsent messages **3** / "STO SENT" / Stored sent message **4** / "ALL" / All messages **5** / "HEADER ONLY" / Header only (applies to +MMGL only
<oa/da>	Original/destination address.
<data>	Message contents in text mode.
<length>	In PDU mode: Size of message, in octets, excluding SMSC data. In TEXT mode: Number of characters included in <data>.
<pdu>	Message header and contents in PDU mode format. See description in +CMGR, +MMGR,.
<toda/toda>	Type of origination address / destination address
<fo>	First octet of the SM
<mr>	Message reference
<ra>	Recipient-Address

<tora>	Type Of Recipient-Address
<scst>	Service center time stamp
<ct>	Command type
<sn>	Message serial number
<mid>	Message ID
<page>	Current page number
<pages>	Total number of pages
<dt>	Discharge-Time
<st>	Status

Example
AT+CMGL=?
+CMGL: ("REC UNREAD","REC READ","STO UNSENT","STO SENT","ALL")
OK
AT+MMGL=?
+MMGL: ("REC UNREAD","REC READ","STO UNSENT","STO SENT","ALL","HEADER ONLY")
OK
AT+CPMS="SM" // read messages from SIM.
+CPMS: 2,20,11,61,2,20
OK
AT+MMGL // read "rec-unread" messages without changing message stat
+MMGL: 1,"REC UNREAD","+972544565034",,"05/01/01,09:21:22+08"
message text
OK
AT+CMGL // read "rec-unread" messages with changing message stat
+CMGL: 1,"REC UNREAD","+972544565034",,"05/01/01,09:21:22+08"
message text
OK
AT+CMGL
OK // the message stat was changed. No "rec-unread" messages.
AT+CMGL="sto sent"
+CMGL: 142,"STO SENT","054565034",,
message text
OK
AT+CSDH=1
OK
AT+CMGL="STO SENT"
+CMGL: 142,"STO SENT","054565034",,,81,<message length>
message text
OK
AT+CMGS=18 //send to myself
> 07917952120100951100 0c91795244650543 0004AA0441424344
+CMGS: 68
OK
AT+CPMS="sm" // change to SIM to read the incoming messages
+CPMS: 2,20,11,61,2,20
OK
AT+MMGL
+MMGL: 2,0,,23
07917952120100950 40C91795244650543000450203211434080044142 4344
OK

4.4.1.16. +CMGR, +MMGR, Read Message

These commands handle the reading of SMs. The command displays the message in location <index> of the preferred message storage <mem1> (selected using the +CPMS command). If the status of the message is "RECEIVED UNREAD", the +CMGR command changes the status to "RECEIVED READ". The +MMGR command does not change the message status.

Command Type	Syntax	Response/Action	Remarks
Set	or	If text mode (+CMGF=1) command execution is 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 execution is 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 execution is successful and SMS-COMMAND: +CMGR: <stat>,<fo>,<ct>[,<pid>,[<mn>],[<da>],[<toda>],<length><CR><LF><cdata>] If text mode (+CMGF=1) command execution is successful and CBM storage: +CMGR: <stat>,<sn>,<mid>,<dcs>,<page>,<pages><CR><LF><data> If text mode (+CMGF=1) command execution is successful and SMS-STATUS-REPORT: +CMGR: <stat>,<fo>,<mr>,[<ra>],[<tora>],<scts>,<dt>,<st> If PDU mode (+CMGF=0) and command execution is successful: +CMGR: <stat>,[<alpha>],<length><CR><LF><pdu> otherwise: +CMS ERROR: <err>	The Set command reads the SM located at <index> in the G30 message storage and displays it

The following table shows the +CMGR parameters.

Table 4-50: +CMGR/+MMGR Parameters

<Parameter>	Description
<index>	1-352 Index in storage of the message. to be retrieved.
<stat>	Status of message in memory: **PDU mode** / **Text mode** / **Description** **0** / " REC UNREAD" / Received unread messages (default) **1** / " REC READ" / Received read messages **2** / " STO UNSENT" / Stored unsent messages **3** / " STO SENT" / Stored sent message **4** / "ALL" / All messages
<alpha>	Alpha ID of message (not present).
<length>	In PDU mode: Size of message, in octets, excluding SMSC data. In TEXT mode: Number of characters included in <data>.
<pdu>	Message header and contents in PDU mode format. See description in the tables below.
<oa/da>	Original/destination address.
<data>	Message contents in text mode.
<toda/toda>	Type of origination address / destination address
<fo>	First octet of the SM
<pid>	Protocol Identifier
<dcs>	Data Coding Scheme
<sca>	Service Center Address

<tosca>	Type of Service Center Address
<vp>	Validity Period. Either in integer format (see Table 4-38) or in time-string format ("yy/MM/dd,hh:mm:ss±zz").
<mr>	Message reference
<scst>	Service center time stamp
<ct>	Command type
<sn>	Message serial number
<mn>	Message Number
<cdata>	Command-Data
<mid>	Message ID
<page>	Current page number
<pages>	Total number of pages
<mr>	Message Reference
<ra>	Message Recipient address
<tora>	Type of Recipient address
<scts>	Service center time stamp
<dt>	Discharge-Time
<st>	Status

Table 4-51: Layout of SMS-DELIVER in PDU Mode (according to GSM23.040)

Reference	Description	Length
<sca>	Service Center address: 1 BYTE: length (number of followed octets). Mandatory 1 BYTE: <tosca> - value between 128-255	1, 3-12 BYTES (When length is 1, length BYTE = 0)
<fo>	First Octet. SeeTable 4-52.	1 BYTE
<TP-OA>	Originating address formatted according to the formatting rules of address fields.	2-12 BYTES
<TP-PID>	Protocol-Identifier. Values between 0-255.	1 BYTE
<TP-DCS>	Data Coding Scheme. Values between 0-255.	1 BYTE
<TP-SCTS>	The TP-Service-Center-Time-Stamp field is given in semi-octet representation, and represents the local time as described in GSM23.040	7 BYTE
<TP-UDL>	User data length	1 BYTE
<TP-UD>	User data	0-140 BYTES

Note: Any unused bits will be set to zero and shall be ignored by the receiving entity.

Table 4-52: <fo> for SMS-DELIVER Message

Bit/s	Reference	Description
0-1	Message-Type-Indicator	Parameter describing the message type. 0 0 SMS-DELIVER (in the direction SC to MS)
2	TP-More-Message-To-Send	Parameter indicating whether or not more messages are waiting to the MS in the SC. 0 More messages are waiting for the MS in this SC 1 No more messages are waiting for the MS in this SC
5	TP-Status-Report-Indication	Parameter indicating if a status report is requested by the MS 0 A status report is not requested 1 A status report is requested
6	TP-User-Data-Header-Indicator	Parameter indicating whether or not a status report will be returned to the SME. 0 A status report will not be returned to the SME 1 A status report will be returned to the SME
7	TP-Reply-Path	Parameter indicating that Reply Path is set or not. 0 TP-Reply-Path parameter is not set 1 TP-Reply-Path parameter is set

Table 4-53: Layout of SMS-STATUS-REPORT in PDU Mode (according to GSM23.040)

Reference	Description	Length
<sca>	Mandatory: Service Center address: 1 BYTE: length (number of followed octets) Mandatory: 1 BYTE: <tosca> - value between 128-255	1, 3-12 BYTES (When length is 1, length BYTE = 0)
<fo>	Mandatory: First Octet. See Table 4-54.	1 BYTE
<mr>	Mandatory: Message Reference number, which identifying the previously submitted SMS-SUBMIT or SMS-COMMAND	1 BYTE
<TP-RA>	Mandatory: Recipient address formatted according to the formatting rules of address fields.	2-12 BYTES
<TP-SCTS>	Mandatory: The TP-Service-Center-Time-Stamp field is given in semi-octet representation, and represents the local time as described in GSM23.040	7 BYTE
<TP-DT>	Mandatory: Discharge-Time of <TP-ST>, is given in semioctet representation, and represents the local time as described in GSM23.040	7 BYTES
<TP-ST>	Mandatory: Status of the MO message	1 BYTE
<TP-PI>	Optional: Parameter indicating the presence of any of the optional parameters which follow. See Table 4-54.	1 BYTE
<TP-PID>	Optional: Protocol-Identifier. Values between 0-255.	1 BYTE
<TP-DCS>	Optional: Data Coding Scheme. Values between 0-255.	1 BYTE
<TP-UDL>	Optional: User data length	1 BYTE
<TP-UD>	Optional: User data	131 BYTES

Notes:

- Any unused bits will be set to zero by the sending entity and will be ignored by the receiving entity.
- The maximum guaranteed length of TP-UD is 131 octets. In order to achieve the maximum octet of 143, the TP-RA field must have a length of two octets and TP-PID and TP-DCS must not be present.
- TP-PI is Mandatory if any of the optional parameters following TP-PI is present, otherwise optional.

Table 4-54: <fo> for SMS-STATUS-REPORT Message

Bit/s	Reference	Description
0-1	Mandatory: Message-Type-Indicator	Parameter describing the message type. 1 0 SMS-STATUS-REPORT (in the direction SC to MS)
2	Mandatory: TP-More-Message-To-Send	Parameter indicating whether or not more messages are waiting to the MS in the SC. 0 More messages are waiting for the MS in this SC 1 No more messages are waiting for the MS in this SC
5	Mandatory: TP-Status-Report-Qualifier	Parameter indicating whether the previously submitted TPDU was an SMS-SUBMIT or an SMS-COMMAND: 0 The SMS-STATUS-REPORT is the result of a SMS-SUBMIT. 1 The SMS-STATUS-REPORT is the result of an SMS-COMMAND
6	Optional: TP-User-Data-Header-Indicator	Parameter indicating whether or not a status report will be returned to the SME. 0 A status report will not be returned to the SME 1 A status report will be returned to the SME

Table 4-55: <TP-PI> for SMS-STATUS-REPORT Message

Bit/s	Description
0	0 TP-PID not presence 1 TP-PID not presence
1	0 TP-DCS not presence 1 TP-DCS presence
2	0 TP-UDL not presence 1 TP-UDL presence
3-7	Reserved

Note: Resered bits are ignored.

Example
AT+CMGR=1
+CMS ERROR: invalid index
AT+CMGR=142
+CMGR: "STO SENT","054565034",
message text
OK
AT+CSDH=1
OK
AT+CMGR=142
+CMGR: "STO SENT","054565034",,129,25,0,0,"05/04/03,21:22:23+08","+ 97254120032",145,<message length>
message text
OK
AT+CMGW=18
> 07917952120100951100 0c91795242865029000 4AA0441424344
+CMGW: 143
OK
AT+CMGR=143
+CMGR: 2,,23
07917952120100950 40C91795242865029000450203211020180044 1424344
OK
AT+CPMS="SM" // change to SM to read SMS-DELIVER messages.
+CPMS: 2,20,11,61,2,20
OK
AT+CMGR=1
+CMGR: "REC READ","+972544565034",,"05/02/23,11:20:10+08",145,4,0,4,"+97254120032",145,4
41424344
OK
AT+CMGF=0
OK
AT+CMGR=1
+CMGR: 0,,23
0791 07917952140230F2040C91795244650543000450203211020180044 1424344
OK
AT+CMGR=14
+CMGR: 0,,25
07917952120100950 6BC0B917952428600F0508030807512805080308075128046
// SMS-STATUS-REPORT message in PDU mode
OK
AT+CMGF=1
OK
AT+CMGR=14 // SMS-STATUS-REPORT message in Text mode
+CMGR: "REC READ",6,188,"+97252468000",145,"05/08/03,08:57:21+08","05/08/03,08:5
7:21+08",70
OK

4.4.1.17. +CMSS, Send Message From Storage

This command sends a pre-stored message, written previously using the +CMGW command. The <da>, <toda> parameters are optional. If a DA is given, the message is sent to that address. Otherwise the message is sent to the DA it was stored with (if any was entered). If no DA is found, an error occurs.

When the given index is an incoming message index the header settings will be as follows:

- <first-octet> will be SMS-SUBMIT and VPF - relative.
- The TP-RP and TP-UDHI settings will be taken from the incoming message's first octet.
- <vp> - will be set to the default value -167 - as defined in GSM23.040.
- <sca>,<tosca>, <pid> and <dcs> will be set according the incoming message parameters.
- If <da> and/or <toda> are not given by the command, the <oa> and <tooa> will be set instead.

Command Type	Syntax	Response/Action	Remarks
Set	+CMSS=<index>[,<da>[,<toda>]]	+CMSS: <mr> **or:** +CMS ERROR: <err>	The Set command sends a message from storage to the network.

The following table shows the +CMSS parameters.

Table 4-56: +CMSS Parameters

<Parameter>	Description
<index>	Index in storage of the message to be sent.
<da>	Destination address in quoted string. This field contains a single phone number.
<toda>	Type of DA. Value between 128-255 (according to GSM23.040, 9.1.2.5). If this field is not given and first character of <da> is '+' , <toda> will be 145, otherwise 129.
<mr>	Sent message reference number.

Example
AT+CMSS=7
+CMSS: 12
OK
AT+CMSS=7,"054565132",129
+CMSS: 13
OK

Note: Any character sent by TE to G30 before G30 has reported a result of AT+CMSS operation, will abort AT+CMSS command execution. However, if SMS was already sent to network and sending operation was successful, the result of operation "+CMSS <mr>" will be reported by G30. If after aborting AT+CMSS command execution and before result of operation was reported by G30, a second AT+CMSS command is executed, then the result of the second AT+CMSS operation only will be reported by G30.

4.4.1.18. +CMGW, Write Message to Memory

This command is used to write and save a message to <mem2>. The message is saved in memory, and the message index is displayed to the user.
By default, messages are saved with the status of "STO UNSENT", but status "STO SENT" can be applied using the <stat> parameter.
In TEXT mode, the header parameters will be set according to CSMP settings.

Command Type	Syntax	Response/Action	Remarks
Set	If text mode (+CMGF=1): +CMGW[=<da>[,<toda>[,<stat>]]]<CR>text is entered<ctrl-Z/ESC> if PDU mode (+CMGF=0): +CMGW=<length>[,<stat>]<CR> PDU is given<ctrl-Z/ESC>	+CMGW: <index> or: +CMS ERROR: <err>	The Set command writes a message and stores it.

The following table shows the +CMGW parameters.

Table 4-57: +CMGW Parameters

<Parameter>	Description
<da>	Destination address in quoted string. This field contains a single phone number.
<toda>	Type of DA. Value between 128-255 (according to GSM23.040, 9.1.2.5). If this field is not given and first character of <da> is '+' , <toda> will be 145, otherwise 129.
<stat>	Status of new message In text mode: “STO UNSENT” (default) or “STO SENT” In PDU mode: 2 (default) or 3
<length>	Size of message in PDU mode format, in octets, excluding SMSC data.
<index>	Index in storage of the stored message.
<PDU>	Message header and contents in PDU mode format. See description in the tables below.

Table 4-58: Layout of SMS-SUBMIT in PDU Mode: (according to GSM23.040)

Reference	Description	Length
<sca>	Service Center address: 1 BYTE: length (number of followed octets). Mandatory 1 BYTE: <tosca> - value between 128-255	1, 3-12 BYTES (When length is 1, length BYTE = 0)
<fo>	First Octet. See the table below.	1 BYTE
<TP-MR>	Message Reference. An integer representation of a reference number of the SM submitted to the SC by the MS. Values between 0-255.	1 BYTE
<TP-DA>	Destination address formatted according to the formatting rules of address fields.	2-12 BYTES
<TP-PID>	Protocol-Identifier. Values between 0-255.	1 BYTE
<TP-DCS>	Data Coding Scheme. Values between 0-255.	1 BYTE
<TP-VP>	Validity Period. depending on <fo>, TP-Validity-Period-Format bits setting.	0, 1, 7 BYTE
<TP-UDL>	User data length	1 BYTE
<TP-UD>	User data	0-140 BYTES

Table 4-59: Layout of SMS-COMMAND in PDU Mode: (according to GSM23.040)

Reference	Description	Length
<sca>	Service Center address: 1 BYTE: length (number of followed octets). Mandatory 1 BYTE: <tosca> - value between 128-255	1, 3-12 BYTES (When length is 1, length BYTE = 0)
<fo>	First Octet. See Table 4-60 .	1 BYTE
<TP-MR>	Message Reference. An integer representation of a reference number of the SM submitted to the SC by the MS. Values between 0-255.	1 BYTE
<TP-PID>	Protocol-Identifier. Values between 0-255.	1 BYTE
<TP-CT>	Command Type	1 BYTE
<TP-MN>	Message Number	1 BYTE
<TP-DA>	Destination address formatted according to the formatting rules of address fields.	2-12 BYTES
<TP-CDL>	Command data length	1 BYTE
<TP-CD>	Command data	0-156 BYTES

Table 4-60: <fo> for SMS-SUBMIT Message

Bit/s	Reference	Description
0-1	Message-Type-Indicator	Parameter describing the message type. 0 1 SMS-SUBMIT (in the direction MS to SC)
2	TP-Reject-Duplicates	Parameter indicating whether or not the SC shall accept an SMS-SUBMIT for an SM still held in the SC which has the same MR and the same DA as a previously submitted SM from the same OA. 0 Instruct the SC to accept an SMS-SUBMIT as mention above 1 Instruct the SC to reject an SMS-SUBMIT as mention above. In this case an appropriate TP-FCS value will be returned in the SMS-SUBMIT-REPORT.
3-4	TP-Validity-Period-Format	Parameter indicating whether the TP-VP field is present and in which format. 0 0 TP-VP field not present 1 0 TP-VP field present - relative format 0 1 TP-VP field present - enhanced format - valid only in PDU mode 1 1 TP-VP field present - absolute format
5	TP-Status-Report-Request	Parameter indicating if a status report is requested by the MS 0 A status report is not requested 1 A status report is requested
6	TP-User-Data-Header-Indicator	Parameter indicating whether the beginning of the User Data field contains a Header in addition to the short message or contains only the short message 0 The TP-UD field contains only the short message 1 The beginning of the TP-UD field contains a Header in addition to the short message
7	TP-Reply-Path	Parameter indicating that Reply Path is set or not. 0 TP-Reply-Path parameter is not set 1 TP-Reply-Path parameter is set

Table 4-61: <fo> for SMS-COMMAND Message

Bit/s	Reference	Description
0-1	Message-Type-Indicator	Parameter describing the message type. 1 0 SMS-COMMAND (in the direction MS to SC)
5	TP-Status-Report-Request	Parameter indicating if a status report is requested by the MS 0 A status report is not requested 1 A status report is requested
6	TP-User-Data-Header-Indicator	Parameter indicating whether the beginning of the User Data field contains a Header in addition to the short message or contains only the short message 0 The TP-UD field contains only the short message 1 The beginning of the TP-UD field contains a Header in addition to the short message

Note: Any unused bits will be set to 0.

Example

```
AT+CMGF=1
OK
AT+CMGW="5124335432"
>This is the message body <CTRL+Z>              //<CTRL+Z> ends the prompt text mode and returns to
          regular AT command mode
+CMGW: 126
OK
AT+CMGW
> TEST  <CTRL+Z>
+CMGW: 195
OK
AT+CMGF=0
OK
AT+CMGW=24
>07917952120100951 1FF0B917962543940F20008001400410042004300440045 <CTRL+Z>
+CMGW: 128
OK
AT+CMGR=128
+CMGR: 2,,24
07917952120100951 1FF0B917962543940F20008001400410042004300440045
OK
AT+CMGF=1
OK
AT+CSDH=1
OK
```


```
AT+CMGR=128
+CMGR: "STO UNSENT", "+97264593042",,145,17,0,8,0,"+972521100059",145,5
00410042004300440045
OK
AT+CSMP=25,"05/03/15,21:22:23+08",0,0
OK
AT+CMGW="0544565034"
A<CTRL+Z>
+CMGW: 129
OK
AT+CMGR=129
+CMGR: "STO UNSENT", "0544565034",,129,25,0,0,"05/03/15,21:22:23+08","+972521100059",145,1
A
OK
AT+CMGF=0
OK
AT+CMGR=129
+CMGR: 2,,20
07917952120100951 9FF0A8150446505430000503051122232800141
AT+CMGW=18
> 0011000c917952428650290004AA0441424344                    // SCA is not given
+CMGW: 130
OK
AT+CMGR=130
+CMGR: 2,,18
07917952120100951 1000C917952428650290004AA0441424344
OK
AT+CMGW=19
> 07917952120100951 1000c917952428650290004AA0441424344  //Invalid length (19)
+CMS ERROR: invalid PDU mode parameter
AT+CMGW=19
> 07917952120100951 1000c917952428650290004AA044142434477 //UDL is not equal to UD length
+CMS ERROR: invalid PDU mode parameter
AT+CMGW=17
> 07917952120100950 1000c9179524286502900040441424344 //No VP in PDU message
+CMGW: 131
OK
AT+CMGR=131
+CMGR: 2,,17
07917952120100950 1000C9179524286502900040441424344
OK
AT+CMGW=14
> 07917952140230F212000000000c9179524286502900  //SMS Command
+CMGW: 132
OK
AT+CMGR=132
+CMGR: 2,,14
07917952140230F212000000000C9179524286502900
OK
AT+CMGF=1
OK
AT+CMGR=132
+CMGR: "STO UNSENT",18,0,0,0,"+972524680592",145,0
OK
```

4.4.1.19. +CMGD, Delete Message

This command handles deletion of a single message from memory location <index>, or multiple messages according to <delflag>. If the optional parameter <delflag> is entered, and is greater than 0, the <index> parameter is practically ignored. If deletion fails, result code +CMS ERROR: <err> is returned.

Note: The deletion of multiple SMS is a time-consuming process that may require more than 60 seconds to complete.

Command Type	Syntax	Response/Action	Remarks
Set	+CMGD=<index> [,<delflag>]	OK or: +CMS ERROR: <err>	
Read			The Read command for +CMGD is not defined by ETSI, and therefore is not supported by the G30. The G30 returns an error.
Test	+CMGD=?	+CMGD: (list of valid <index>s), (list of valid <deflag>s)	The Test command displays the supported values of <n>.

Note:

The following table shows the +CMGD parameters.

Table 4-62: +CMGD Parameters

<Parameter>	Description
<index>	Index in the SMS memory of the message to be deleted.
<delflag>	0 Deletes the message specified in <index> 1 Deletes all read messages 2 Deletes all read messages and sent MO messages 3 Deletes all read messages, sent and unsent MO messages 4 Deletes all messages

Example
AT+CMGD=4
OK
AT+CMGD=1,3
OK

4.4.1.20. +CGSMS, Select Service for MO SMS Messages

This command handles the selection of the service or service preference used by the G30 to send mobile-originated SMS messages.

Note: This command is network dependent, which means that the network must support SMS over GPRS.

Command Type	Syntax	Response/Action	Remarks
Set	+CGSMS=[<service>]	OK +CME ERROR: <err>	The Set command selects the service or service preference used to send SMS messages. The value that is set is not retained after a power cycle.
Read	+CGSMS?	+CGSMS: <service> +CME ERROR: <err>	The Read command displays the current SMS service preference setting.
Test	+CGSMS=?	+CGSMS: (list of currently available <service>s) +CME ERROR: <err>	The Test command displays a list of currently available <service>s on the network.

The following table shows the +CGSMS parameters.

Table 4-63: +CGSMS Parameters

<Parameter>	Description
<service>	Indicates the service or service preference to be used. 0 GPRS 1 Circuit switched (default) 2 GPRS preferred (use circuit switched if GPRS is not available) 3 Circuit switched preferred (use GPRS if circuit switched is not available) Other values are reserved and will result in an ERROR response to the Set command.

Example
AT+CGSMS=?
CGSMS:(0-3)
OK
AT+CGSMS?
CGSMS: 1
OK

4.4.1.21. +CMGS, Send SM to Network

This command sends an SM from the G30 to the network. The message reference value <mr> is

returned to the G30 upon successful delivery of the message.
Valid <toda> will be any value between 128-255.
The header parameters in TEXT mode will be set according to CSMP settings.

Command Type	Syntax	Response/Action	Remarks
Set	If text mode (+CMGF=1): +CMGS=<da>[,<toda>]<CR> text is entered<ctrl-Z/ESC> If PDU mode (+CMGF=0): +CMGS=<length><CR> PDU is entered<ctrl-Z/ESC>	+CMGS: <mr> +CMS ERROR: <err>	The Set command validates the input parameters, sends the SM to network and reports the result of the operation to the G30.

The following table shows the +CMGS parameters.

Table 4-64: +CMGS Parameters

<Parameter>	Description
<da>	Destination address in quoted string. This field contains a single MIN number.
<toda>	Type of DA. Value between 128-255 (according to GSM23.040, 9.1.2.5). If this field is not given and first character of <da> is '+' , <toda> will be 145, otherwise 129.
<length>	Size of message in PDU mode format, in octets, excluding SMSC data.
<mr>	Sent message reference number.
PDU	Message header and contents in PDU mode format. See description in +CMGW, Write Message to Memory

Example
AT+CMGS="064593042",129
>This is the message body <CTRL+Z> //<CTRL+Z> ends the prompt text mode and returns to regular AT command mode
OK
AT+CMGF=0
OK
AT+CMGS=24
>07917952120100951 1FF0B917962543940F20008001400410042004300440045 <CTRL+Z>
+CMGS: 128
OK

Note: Any character sent by TE to G30 before G30 has reported a result of AT+CMGS operation, will abort AT+CMGS command execution. However, if SMS was already sent to network and sending operation was successful, the result of operation "+CMGS <mr>" will be reported by G30.
A flex dependant enhancement enables the reporting of numeric error code to TE, in case the sending operation has failed. The numeric error code will be reported in format: "+CMGS ERROR: <err>".
If after aborting AT+CMGS command execution and before result of operation was reported by G30, a second AT+CMGS command is executed, then the result of the second AT+CMGS operation only will be reported by G30.

4.4.1.22. +CSCB, Cell Broadcast Messages

This command handles the selection of cell broadcast message types and data coding schemes received by the G30.

Command Type	Syntax	Response/Action	Remarks
Set	+CSCB=[<mode>[,<mids>[,<dcss>]]]	If mode=0 and <mids> is not specified, then no channels are accepted, and the G30 channel/mid list is cleared. If mode=1 and <mids> is not specified, then the G30 channel list will stay as is. OK or: +CME ERROE:<err>	The Set command sets the cell broadcast message type and data coding scheme.
Read	+CSCB?	+CSCB: <mode>,<mids>,<dcss>	The Read command displays the current MID and DCS settings.
Test	+CSCB=?	+CSCB: (list of supported <mode>s)	The Test command displays the supported values of <mode>.

Note: The Channel and DCS list is saved to the SIM card.

The maximum number of active channels is SIM dependent.

The AT+CSCB set command is not available when the phone is either in "Emergency Only" or "No Service" status.

The following table shows the AT+CSCB parameters.

Table 4-65: +CSCB Parameters

<Parameter>	Description
<mode>	The current broadcast message mode: 0 MIDs and DCSs accepted 1 MIDs and DCSs not accepted
<mids>	Cell broadcast message identifiers 0-65534
<dcss>	Cell broadcast message data coding schemes 0-255

Notes:

- A combination of discrete values or intervals can be entered for <mids> and <dcss>, for example, "0,1,5,320-324,922".
- Parameter values must be entered in ascending order.
- The default value for missing <mode> is 0.
- Clear all <mids> & <dcss> might be done by one of the following commands: AT+CSCB=0 or AT+CSCB=
- The string type lists <mids> and <dcss> may include only numbers (0-9), comma and minus (-) characters.
- <mids> = 1-5 is equivalent to five channels.
- When <mode> is 0, and <mids> is a non empty list, the list will be added to the current G30 list, as long as the accumulated G30 list does not exceed the maximum allowed.
- When <mode> is 1, and <mids> is a non empty list, <mids> items from the list will be deleted from the G30 list. Nothing will be done with item that does not exist in the G30 list.
- When <mode> is 0, and <mids> is a non empty list, the <mids> will be added to the current G30 list, as long as the accumulated G30 list does not exceed the maximum allowed.
- The dcss specified refers to all incoming messages, and not only to mids specified in the same AT command. For example, AT+CSCB=0,"1-5","1-7" followed by AT+CSCB=0,"6-10","8" will update the G30 mids list to 1-10, and the dcs list to 1-8. Any CB message that arrives with mid value of 1-10 and a dcs value between 1-8, will be accepted by G30.

Example
Testing the modes supported:
AT+CSCB=?
+CSCB: (0,1)
OK
Reading the current mid and dcs lists:
AT+CSCB?
+CSCB: 0,"","""
OK

Adding channels 3, 4,5,6,22 to mid list and languages 1,8 to dcs list:
AT+CSCB=0,"3-6,22","1,8"
OK
AT+CSCB?
+CSCB: 0,"3-6,22","1,8"
OK
Removing channels 4 and 6 from channel list, and removing dcs 1 from the dcs list:
AT+CSCB=1,"4,6","1"
OK
AT+CSCB?
+CSCB: 0,"3,5,22","8"
OK
Clear all <mids> and <dcss>
AT+CSCB=0 / Or AT+CSCB=
OK
AT+CSCB?
+CSCB: 0,"","""
OK

4.4.1.23. +MRICS, Motorola Ring Indicator Configuration for SMS

This command allows configuring the behavior of RI line in a case of SMS arrival.
The command setting supports 3 SMS types:

- SMS-DELIVER
- SMS-STATUS-REPORT
- CBM (broadcast message)

In a case that the RI indication was enabled for one of the above SMS types, the RI line will be asserted once for 1.5 sec.

Note: +MRICS value is saved after power cycle.

Command Type	Syntax	Response/Action	Remarks
Set	+MRICS=<n>	OK or: +CME ERROR: <err>	The set command sets the RI configuration flag.
Read	+MRICS?	+MRICS: <n> OK	The read command displays the current value of the last selected value for +MRICS set command.
Test	+MRICS=?	+MRICS: (Range of supported <n>'s) OK	The test command displays all supported values for +MRICS set command.

The following table shows the +MRICS parameters.

Table 4-66: +MRICS Parameters

<Parameter>	Description
<n>	Integer defines the RI configuration: 0 - Disable RI (default). 1 - Enable RI for SMS-DELIVER only. 2 - Enable RI for SMS-STATUS-REPORT only. 3 - Enable RI for SMS-DELIVER and SMS-STATUS-REPORT. 4 - Enable RI for CBM only. 5 - Enable RI for SMS-DELIVER and CBM. 6 - Enable RI for CBM and SMS-STATUS-REPORT. 7 - Enable RI for all kind of SMS.

Notes: If SMS storage is full, +MRICS shall alert RI, in case of TEXT SMS arrival, just if <mt> value in +CNMI command is equal to '2'.

If SMS storage is full, +MRICS shall alert RI, in case of Status Report SMS, just if <ds> value in +CNMI command is equal to '1'.

Example
```
AT+CMGF=1                    // switching to text mode
OK
AT+MRICS=?
+MRICS: (0-7)
OK
AT+MRICS=1                   // setting to TEXT SMS
OK
AT+MRICS?
+MRICS: 1
OK
AT+CMGS="0544565199"
>hi <ctr+z>
+CMGS: 11
OK        // RI is asserted for 1.5 seconds

        // The next example assumes SMS storage is full
AT+CMGF=1                    // switching to text mode
OK
AT+CPMS?
+CPMS: "MT",20,76,"ME",0,56,"SM",20,20
OK
AT+MRICS=1
OK

AT+CNMI=,2
OK
AT+CNMI?
+CNMI: 0,2,0,0,0             // mt = 2
OK
AT+CMGS="0544565199"
>hi <ctr+z>
+CMGS: 12
```


```
OK
+CMT: "+972544565199",,"07/04/25,12:34:06+08"
hi       // RI is asserted for 1.5 seconds

         // The next example show alerting on status report SMS
AT+CMGF=1                    // text mode
OK
AT+CSMP=49
OK
AT+MRICS=2                    // configure to status report
OK
AT+CMGS="0522123456"                  // just a phone number
>hi <ctr+z>
+CMGS: 13
OK          // after status report has been received, RI is asserted for 1.5 seconds
```

4.4.1.24. DCS Handling

Sending or Storing SM

When sending or storing SM in TEXT mode, only the specified <dcs>s in Table 4-38, +CSMP command definitions, will be supported. Handling will be as shown in Table 4-67.

Table 4-67 shows the conversion between the <dcs> and +CSCS setting when storing SM to memory or sending SM.

Table 4-67: <dcs> field and +CSCS settings conversion when writing SM

CASE	<dcs> field	User-Data-Header	Current TE character set (+CSCS)	Action
A	Default alphabet	Not Set	IRA	Input is in ASCII format, converts each two IRA characters long hexadecimal number to 7-bit septet.
B	Default alphabet	Not Set	GSM & HEX	G30 converts each two IRA characters long hexadecimal number to 7-bit Septet.
C	Default alphabet	Not Set	UCS2	Returns an error since conversion from these character sets to default alphabet is impossible.
D	Default alphabet	Set	GSM	G30 converts each two IRA characters long hexadecimal number to one 8-bit octet.
E	8-bit	ALL	ALL	Error
F	UCS2	ALL	UCS2	G30 converts each two IRA characters long hexadecimal number to one 8-bit octet.

Note: HEX character set is treated as GSM.

Reading SM

When reading an incoming SM, the message header will be passed as usual. The DATA will be output in as received from NW without any conversions.

Example:

```
// Store in text mode +CSCS="IRA" , <dcs>="GSM", UDHI=1
AT+CSCS?
+CSCS: "IRA"

OK
AT+CSMP=81,167
OK
AT+CMGF=1
OK
AT+CMGW="123456"
0605040B8423F0 414243444546474849
OK
AT+CMGW="123456"
0605040B8423F04142434445464748 49
+CMGW: 9

OK
AT+CSDH=1
OK
AT+CMGR=9
+CMGR: "STO UNSENT","+123456","",145,81,0,0,167,"123456789",145,16
0605040B8423F04142434445464748 49

OK
// Storing in text mode +CSCS="UCS2" , <dcs>=16 bits, UDHI=1
AT+CSMP=81,167,0,8
OK
AT+CSCS="UCS2"
OK
AT+CMGW="123456"
0605040B8423F04142434445464748 49
+CMGW: 10

OK
AT+CMGR=10
+CMGR: "STO UNSENT","123456","",145,81,0,8,167,"+123456789",145,8
0605040B8423F04142434445464748 49

OK
AT+CNMI=1,1
OK
AT+CMSS=10
+CMSS: 20

OK

+CMTI: "SM",12
AT+CMGR=12
+CMGR: "REC UNREAD","123456","","10/01/12,14:15:56+08",145,68,0,8,"123456789",145,7
0605040B8423F04142434445464748

OK
```

4.5. Network

4.5.1. Network Commands

4.5.1.1. +CSQ, Signal Strength

This command displays the received signal strength indication <rssi> and channel bit error rate <ber> from the G30.

Command Type	Syntax	Response/Action
Execute/Read	AT+CSQ AT+CSQ?	+CSQ: <rssi>,<ber> OK or: +CME ERROR: <err>
Test	AT+CSQ=?	+CSQ: (list of supported <rssi>s),(list of supported <ber>s) OK or: +CME ERROR: <err>

The following table shows the +CSQ parameters.

Table 4-68: +CSQ Parameters

<Parameter>	Description
<rssi>	0 through 31 - covers the range of -113 dbm (or less) to -51dbm (or greater)
<ber>	Channel bit error rate (in percent) **99 - Not supported**

Example
AT+CSQ
+CSQ: 031,000
OK
AT+CSQ=?
+CSQ: (000-031,099),(000-007,099)
O

4.5.1.2. +CRLP, Radio Link Protocol

This command displays the Radio Link Protocol parameters that are used when non-transparent data calls are originated.

Command Type	Syntax	Response/Action	Remarks
Set	+CRLP= [<iws>[,<mws>[,<T1> [,<N2>]]]]	OK or: +CME ERROR: <err>	The Set command enables you to change the RLP parameters.
Read	+CRLP?	+CRLP= <iws>,<mws>,<T1>,<N2> OK or: +CME ERROR: <err>	
Test	+CRLP=?	+CRLP= (list of supported <iws>s), (list of supported <mws>s), (list of supported <T1>s), (list of supported <N2>s) OK or: +CME ERROR: <err>	

The following table shows the +CRLP parameters.

Table 4-69: +CRLP Parameters

<Parameter>	Description
<iws>	IWF to MS window size. The default value is 61.
<mws>	MS to IWF window size. The default value is 61.
<T1>	Acknowledgement timer T1. The default value is 48.
<N2>	Retransmission attempts N2 in integer format (refer to GSM 04.22 [18] subclause 5.4.3) The default value is 6.

Example
AT+MSELINT=0

AT+CRLP=?
+CRLP: (0-61),(0-61),(39-255),(1-255)

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


```
OK
AT+MSELINT=1
OK
AT+CRLP=?
+CRLP: (000-061),(000-061),(039-255),(001-255)

OK
AT+CRLP?
+CRLP: 061,061,048,006

OK
```

4.5.1.3. +CREG, Network Registration Status

Command type	*Syntax*	*Response/action +mselint=0*	*Response/action +mselint=1*	*Remarks*
Set	AT+CREG=[<n>]	OK or: +CME ERROR: <err>	OK or: +CME ERROR: <err>	The Set command controls the presentation of an unsolicited result code and the result of the Read operation.
Read	AT+CREG?	+CREG: <n>,<stat>[,<lac>,<ci>] OK or: +CME ERROR: <err>	+CREG: <n>,<stat>[,<lac>,<ci>] OK or: +CME ERROR: <err>	The Read command returns the status of the result code presentation and shows whether the network has currently indicated the registration of the G30. Location information elements <lac> and <ci> are returned only when <n>=2 and the G30 is registered in the network.
Test	AT+CREG=?	+CREG: (list of supported <n>s) OK	+CREG: (list of supported <n>s) OK	

The following table shows the +CREG parameters.

Table 4-70: +CREG Parameters

<Parameter>	Description	
	+MSELINT = 0	+MSELINT = 1
<n>	0 Disables the network registration unsolicited result code. 1 Enables the network registration unsolicited result code +CREG: <stat>. 2 Enables the network registration and location information in unsolicited reports and Read command +CREG:<stat>[,<lac>,<ci>]. The default is 0.	0 Disables the network registration unsolicited result code. 1 Enables the network registration unsolicited result code +CREG: <stat>. 2 Enables the network registration and location information in unsolicited reports and Read command +CREG:<stat>[,<lac>,<ci>]. The default is 0.
<stat>	0 Not registered, and the ME is not currently searching for a new operator to which to register. 1 Registered, home network. 2 Not registered, but the ME is currently searching for a new operator to which to register. 3 Registration denied. 4 Unknown. 5 Registered, roaming.	0 Not registered, and the ME is not currently searching for a new operator to which to register. 1 Registered, home network. 2 Not registered, but the ME is currently searching for a new operator to which to register. 3 Registration denied. 4 Unknown. 5 Registered, roaming.
<lac>	Two-byte location area code in hexadecimal format.	Two-byte location area code in hexadecimal format.
<ci>	Two-byte cell ID in hexadecimal format.	Two-byte cell ID in hexadecimal format.

Example:

AT+MSELINT?
+MSELINT: 0

OK
AT+CREG=?
+CREG: (0-2)

OK

AT+CREG?
+CREG: 0,1

OK

AT+MSELINT=1
OK

AT+CREG=?
+CREG: (000-002)

OK

AT+CREG?
+CREG: 000,001
OK
AT+CREG=2
OK
AT+CREG?
+CREG: 002,001, a065,988b
OK
AT+CREG=1
OK
AT+CREG?
+CREG: 001,001
OK
AT+CREG=0
OK

4.5.1.4. +CGREG, GPRS Network Registration

Command type	Syntax	Response/action +mselint=0	Response/action +mselint=1	Remarks
Set	AT+CGREG=[<n>]	OK or: +CME ERROR: <err>	OK or: +CME ERROR: <err>	The Set command controls the presentation of an unsolicited result code "+CGREG:" and the result of the Read operation.
Read	AT+CGREG?	+CGREG: <n>,<stat>[,<lac>,<ci>] OK or: +CME ERROR: <err>	+CGREG: <n>,<stat>[,<lac>,<ci>] OK or: +CME ERROR: <err>	The Read command returns the status of the result code presentation and shows whether the network has currently indicated the GPRS registration of the G30. Location information elements <lac> and <ci> are returned only when <n>=2 and the G30 is registered in the network.
test	*AT+CGREG=?*	*+CGREG: (list of supported <n>s) OK*	*+CGREG: (list of supported <n>s) OK*	*The Test command displays the supported values of <n>.*

The following table shows the +CGREG parameters.

Table 4-71: +CGREG Parameters

<Parameter>	Description	
	+MSELINT = 0	+MSELINT = 1
<n>	0 Disables the network registration unsolicited result code. 1 Enables the network registration unsolicited result code +CGREG: <stat>. 2 Enables the network registration and location information in unsolicited result code and Read command +CGREG:<stat>[,<lac>,<ci>]. The default is 0	0 Disables the network registration unsolicited result code. 1 Enables the network registration unsolicited result code +CGREG: <stat>. 2 Enables the network registration and location information in unsolicited result code and Read command +CGREG:<stat>[,<lac>,<ci>]. The default is 0
<stat>	0 Not registered, and the ME is not currently searching for a new operator to which to register. 1 Registered, home network. 2 Not registered, but the ME is currently searching for a new operator to which to register. 3 Registration denied. 4 Unknown. 5 Registered, roaming.	0 Not registered, and the ME is not currently searching for a new operator to which to register. 1 Registered, home network. 2 Not registered, but the ME is currently searching for a new operator to which to register. 3 Registration denied. 4 Unknown. 5 Registered, roaming.
<lac>	Two-byte location area code in hexadecimal format.	Two-byte location area code in hexadecimal format.
<ci>	Two-byte cell ID in hexadecimal format.	Two-byte cell ID in hexadecimal format.

Example:

AT+MSELINT?
+MSELINT: 0

OK
AT+CGREG?
+CGREG: 0,4

OK

AT+CGREG=?

```
+CGREG: (0-2)
OK

AT+MSELINT=1
OK

AT+CGREG?
+CGREG: 000,004

OK

AT+CGREG=?
+CGREG: (000-002)
OK
AT+CGREG=2
OK
AT+CGREG?
+CGREG: 002,001,2648,988b
OK
AT+CGREG=1
OK
AT+CGREG?
+CGREG: 001,001
OK
AT+CGREG=0
OK
//Example for unsolicited reports:
AT+CGREG=1
OK
AT+CGATT=0
OK
+CGREG: 000
AT+CGATT=1
OK
+CGREG: 002
+CGREG: 001
//Remove GPRS enabled SIM
+CGREG: 000
//Insert GPRS enabled SIM
+CGREG: 002
+CGREG: 001
```

4.5.1.5. +COPS, Operator Selection

This command enables accessories to access the network registration information, and the selection and registration of the GSM network operator. The G30 is registered in the Home network. The Enhanced Operator Name String (EONS) feature enables the G30 to return the operator name displayed on the handset. This feature allows the SIM card to store a mapping of MCC/MNC code pairs to the displayed operator name. As a result, several operators can share a single network while having their handsets display their own name as the network operator. Testing the enhanced ONS feature requires a "SIM ONS" SIM card.

Note: +COPS Test command type execution does not require a SIM card.

Note: +COPS Test command type execution does not require a SIM card.

Command type	Syntax	Response/action +mselint=0	Response/action +mselint=1	Remarks
Set	AT+COPS=[<mode>[,<format>[,<oper>]]]	OK or: +CME ERROR: <err>	OK or: +CME ERROR: <err>	The Set command can force an attempt to select and register a specific GSM network operator. The <mode> selects whether this is done automatically by the G30, or whether the selection is forced to an operator <oper> (given in format <format>). If the selected operator is not available, no other operator is selected (except when the <mode> is set to 4). <mode>=2 forces an attempt to deregister from the network. <mode>=3 sets the operator format to all further Read commands (+COPS?) as well. The selected mode applies to future network registrations, for example, once you deregister from the network, the G30 remains unregistered until you select <mode>=0, <mode>=1, or <mode>=4
Read	AT+COPS?	+COPS: <mode>[,<format>,<oper>] OK or: +CME ERROR: <err>	+COPS: <mode>[,<format>,<oper>] OK or: +CME ERROR: <err>	The Read command returns the current mode and the currently selected operator.

Test	AT+COPS=?	+COPS: [list of supported (<stat>, long alpha numeric <oper>, short alphanumeric <oper>, numeric <oper>)] [,list of supported <mode>s, (list of supported <format>s)] OK or: +CME ERROR: <err>	+COPS: [list of supported (<stat>, long alpha numeric <oper>, short alphanumeric <oper>, numeric <oper>)] [,list of supported <mode>s, (list of supported <format>s)] OK or: +CME ERROR: <err>	The Test command returns a list of quadruplets, each representing an operator present in the network. A quadruplet consists of an integer indicating the availability of the operator <stat>, long and short alphanumeric format of the name of the operator, and numeric format representation of the operator. If any of the formats are unavailable, there is an empty field. The list of operators is in the following order: home network, networks referenced in SIM or active application in the UICC (GSM or USIM) in the following order: HPLMN selector, User controlled PLMN selector, Operator controlled PLMN selector and PLMN selector (in the SIM or GSM application), and other networks. After the operator list, the G30 returns lists of the supported <mode>s and <format>s. These lists are separated from the operator list by two commas.

The following table shows the +COPS parameters.

Table 4-72: +COPS Parameters

<Parameter>	**Description**	
	+MSELINT = 0	**+MSELINT = 1**
<format>	The operator format type: 0 Long alphanumeric 1 Short alphanumeric 2 Numeric The default value is 0.	The operator format type: 0 Long alphanumeric 1 Short alphanumeric 2 Numeric The default value is 0.

<mode>	Determines whether what is displayed is defined by <oper>, or is done automatically by the G30. 0 Automatic (<oper> field is ignored) 1 Manual (<oper> field is present) 2 De-register from network 3 Set only <format> (<oper> field is ignored); used for Read command only, do not attempt registration/deregistration 4 Manual/automatic (<oper> field is present; if manual selection fails, use automatic mode) The default value is 0.	Determines whether what is displayed is defined by <oper>, or is done automatically by the G30. 0 Automatic (<oper> field is ignored) 1 Manual (<oper> field is present) 2 De-register from network 3 Set only <format> (<oper> field is ignored); used for Read command only, do not attempt registration/deregistration 4 Manual/automatic (<oper> field is present; if manual selection fails, use automatic mode) The default value is 0.
<stat>	0 Unknown 1 Available 2 Current 3 Forbidden	0 Unknown 1 Available 2 Current 3 Forbidden
<oper>	Operator name displayed. The long alphanumeric format can be up to 16 characters long. The short alphanumeric format can be up to 8 characters long. The numeric format is the GSM Location Area Identification number (refer to GSM 04.08 [8] subclause 10.5.1.3), consisting of a three BCD digit country code (as per ITU-T E.212 Annex A [10]), plus a two BCD digit network code, which is administration specific. The returned <oper> is not in BCD format, but in IRA characters converted from BCD, and therefore the number has the following structure: (country code digit 3)(country code digit 2)(country code digit 1)(network code digit 2)(network code digit 1)	Operator name displayed. The long alphanumeric format can be up to 16 characters long. The short alphanumeric format can be up to 8 characters long. The numeric format is the GSM Location Area Identification number (refer to GSM 04.08 [8] subclause 10.5.1.3), consisting of a three BCD digit country code (as per ITU-T E.212 Annex A [10]), plus a two BCD digit network code, which is administration specific. The returned <oper> is not in BCD format, but in IRA characters converted from BCD, and therefore the number has the following structure: (country code digit 3)(country code digit 2)(country code digit 1)(network code digit 2)(network code digit 1)

Example:

AT+MSELINT=0
OK

AT+COPS?
+COPS: 0,0,"ORANGE"

OK
AT+COPS=?
+COPS: (2,"ORANGE","ORANGE","42501"),(3,"IL Cellcom","Cellcom","42502")

OK
AT+MSELINT=1
OK
AT+COPS=?
+COPS:(002,"IL ORANGE","ORANGE","42501"),(003,"IL
Cellcom","Cellcom","42502"),(001,"IL-77","I-77","42577"),, (000,001,002,003,004),(000,001,002)

OK
AT+COPS?
+COPS: 000,000,"IL ORANGE"

OK
AT+COPS=3,2
OK
AT+COPS?
+COPS: 000,002,"42501" //Specific provider number
AT+COPS=0
OK
AT+COPS=1,2,"31038"
OK
AT+COPS=1,1,"ORANGE"
OK

4.5.1.6. +CPOL, Preferred Operators

This command is used to edit the PLMN selector lists in the SIM card or active application in the UICC (GSM or USIM).
This command writes, reads, and deletes an entry in the SIM/USIM list of preferred PLMNs, previously selected by the command +CPLS.
If no list has been previously selected, the EFPLMNwAcT - user controlled PLMN selector with Access Technology list, is the one accessed by default.

Command type	***Syntax***	*Response/action* ***+mselint=0***	*Response/action* ***+mselint=1***	***Remarks***
Set	AT+CPOL=[<index>] [,<format>[,<oper>]]	OK or: +CME ERROR: <err>	OK or: +CME ERROR: <err>	The Set command writes an entry in a list of preferred operators, previously selected by the command +CPLS. Note: In case the index already exists in the list, the new entry will erase the old one and replace it in the list. The G30 may also update this list automatically when new networks are selected.
Read	AT+CPOL?	+CPOL: <index1>,<format>,<oper1> [<CR><LF> +CPOL: <index2>,<format>,<oper2> [...]] OK or: +CME ERROR: <err>	+CPOL: <index1>,<format>,<oper1> [<CR><LF> CPOL: <index2>,<format>,<oper2> [...]] OK or: +CME ERROR: <err>	The Read command returns all used entries from the SIM/USIM list of preferred PLMNs list, previously selected by the command +CPLS.
Test	AT+CPOL=?	+CPOL: (list of supported <index>s),(list of supported <format>s) OK or: +CME ERROR: <err> * Index range is SIM dependent	+CPOL: (list of supported <index>s),(list of supported <format>s) OK or: +CME ERROR: <err> * Index range is SIM dependent	The Test command displays the entire index range supported by the SIM.

The following table shows the +CPOL parameters.

Table 4-73: +CPOL Parameters

<Parameter>	Description	
	+MSELINT = 0	+MSELINT = 1
<indexn>	s	Order number of network operator in the SIM preferred operator list
<format>	Defines the <oper> format: 0 Long alphanumeric format (up to 16 characters) (default) 1 Short alphanumeric format (up to 8 characters) 2 Numeric	Defines the <oper> format: 0 Long alphanumeric format (up to 16 characters) 1 Short alphanumeric format (up to 8 characters) 2 Numeric (default)
<oper>	Name of the network operator	Name of the network operator

Note 1:

- • 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.

Note 2:

•User is prevented from editing index No. 0. This index is reserved for the HPLMN record and can not be modified.

•When entering a new item with an <index> to a full list, the G30 deletes the last item, stores the new item in the requested entry, and shifts the rest of the list down.

•When entering a new item without an <index> to a full list, the G30 replaces the last entry with the new item.

Note 3: MT may also update the User controlled PLMN selector with Access Technology list - EFPLMNwAcT, automatically when new networks are selected.

Note: The Operator controlled PLMN selector with Access Technology EFOPLMNwAcT and HPLMN selector with Access Technology - EFHPLMNwAcT can not be written since the access conditions is Administrative

Note: The command is implemented according to 3GPP TS 27.007 without acceptance in attention the <GSM_AcT2>, <GSM_Compact_AcT2>, <UTRAN_AcT2>] bits since

the G30 device not using this bits to get the best PLMN.

Note: When mselint=1 <index 0 > is the hplmn operator.

Example:

```
AT+MSELINT=0
OK

at+cpol?
+CPOL: 1,0,"Beeline" // Long alphanumeric format - default

OK
at+cpol=?
+CPOL: (1-50),(0-2)

OK


AT+MSELINT=1
OK


AT+CPOL?
+CPOL: 000,002,"42501"  // Numeric format - default

+CPOL: 001,002,"25099"

OK

AT+CPOL=?
+CPOL: (001-050),(000-002)
OK
AT+CPOL=,0
OK
```


```
AT+CPOL?
+CPOL: 000,000,"IL ORANGE"

+CPOL: 001,000,"Beeline"

OK


AT+CPOL=1,2,"42502"
OK
AT+CPOL?
+CPOL: 000,000,"IL ORANGE"

+CPOL: 001,000,"IL Cellcom"
OK

AT+CPOL=1
OK
AT+CPOL?
+CPOL: 000,000,"IL ORANGE"
OK
```

4.5.1.7. +CPLS, Selection of Preferred PLMN List.

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

Command Type	Syntax	Response/Action	Remarks
Set	AT+CPLS=<list>	OK or: +CME ERROR: <err>	The set command is used to select PLMN list in the SIM/USIM. It is used by the +CPOL AT command.
Read	AT+CPLS?	+CPLS: <list>[,<ef>] or +CME ERROR: <err>	The read command displays the current selected PLMN list and the Elementary File name.
Test	AT+CPLS=?	+CPLS: (list of supported <list>s) or +CME ERROR: <err>	The test command displays the supported list values for the current SIM/USIM.

The following table shows the +CPLS parameters.

Table 4-74: +CPLS Parameters

<Parameter>	Description
<list>	Represents the chosen PLMN selector list: 0 User controlled PLMN selector with Access Technology - EFPLMNwAcT, if not found in the SIM/UICC, then PLMN preferred list EFPLMNsel. (Default value). 1 Operator controlled PLMN selector with Access Technology - EFOPLMNwAcT. 2 HPLMN selector with Access Technology - EFHPLMNwAcT.
<ef>	Selected elementary file name. String type: PLMNwACT - User controlled PLMN selector with Access Technology - EFPLMNwAcT. PLMNSel - PLMN preferred list EFPLMNsel. OPLMNwACT - Operator controlled PLMN selector with Access Technology - EFOPLMNwAcT. HPLMNwACT - HPLMN selector with Access Technology - EFHPLMNwAcT.

Note: After phone power up <list> default value is retrieved.

Example
AT+CPLS=0
OK


```
AT+CPLS?
+CPLS: 0,"PLMNwACT"
OK
AT+CPLS=?
+CPLS:(0)
OK
AT+CPLS=1
OK
AT+CPLS?
+CPLS: 1,"OPLMNwACT"
OK
```

4.5.1.8. +MCELL, Motorola Cell Description

This command displays information about the Cellular Network. The information is divided throughout 20 screens, each of them with different parameters data.

Command Type	Syntax	Response/Action	Remarks
Set	+MCELL=<mode>, <screen_num>	+MCELL: <screen_title> <CR><LF><screen_info> OK or: +CME ERROR: <err>	The Set command will return the relevant <screen_info> according to requested <screen_num>.
Read	+MCELL?	OK or: +CME ERROR: <err>	The Read command just returns OK and does nothing.
Test	+MCELL=?	+MCELL: (list of supported <mode>s),(list of supported <screen_num>s) OK or: +CME ERROR: <err>	The Test command returns the possible <mode> & <screen_num> values.

The following table shows the +MCELL parameters.

Table 4-75: +MCELL Parameters

<Parameter>	Description
<mode>	0 One shot requested.
<screen_num>	The requested screen number - An integer number. 1 Serving Idle Information screen 2 Circuit Switched Serving Cell Information screen 3 Miscellaneous Information screen 4 Uplink Data Transfer screen 5 Downlink Data Transfer screen 6 Neighbor 1 Cell Information screen 7 Neighbor 2 Cell Information screen 8 Neighbor 3 Cell Information screen 9 Neighbor 4 Cell Information screen 10 Neighbor 5 Cell Information screen 11 Neighbor 6 Cell Information screen 12 Neighbor Cells Summary screen 13 Re-selection screen 14 Hopping Information screen 15 PDP1 Context Information screen 16 PDP2 Context Information screen 17 PDP3 Context Information screen 18 PDP4 Context Information screen 19 Serving Cell paging parameters 20 Optional SYSINFOs
<screen_title>	The requested screen title is written on the first line of each screen.
<screen_info>	The requested screen information. See screens description, Serving Idle Information Screen through I-PI Serving Cell Optional SYSINFOs.

Table 4-76: Title to Screen Mapping

<screen title>	Description	<screen num>
Serving Idle/PI	Idle/Packet Idle mode; Serving Cell Information screen.	1
Serving CS/TBF	Circuit Switched mode; Serving Cell Information screen.	2
Serving Misc	Idle/Packet Idle mode; Miscellaneous Information screen.	3
Uplink Transfer	Dedicated/TBF modes; Uplink Data Transfer screen.	4
Dnlink Transfer	Dedicated/TBF modes; Downlink Data Transfer screen.	5
Adjacent Cell x	Neighbor Cell Information screen. x - index cell.	6-11
Neighbors	Neighbor Cells Summary screen.	12
Reselection	Re-selection screen.	13
Hopping Info	Dedicated/TBF modes; Hopping Information screen.	14
PDP Context x	PDP Context Information screen x - index cell.	15-18
Paging Params	Idle/Packet Idle mode; Serving Cell Paging parameters.	19
SysInfos	Idle/Packet Idle mode; Optional SYSINFO.	20

The following describe the different screens.

4.5.1.8.1. Serving Idle Information Screen

(P)BCCH ARFCN:<value>, BSIC:<value>,RxLev:<value>,Cell ID:<value>,(PD)TCH ARFCN:<value>,Timeslot:<value>,C1:<value>,C2:<value>,C32:<value>,T3212: <value>,ATT flag:<value>,MCC:<value>,MNC:<value>,LAC:<value>

4.5.1.8.2. Circuit Switched Serving Cell Information Screen

(P)BCCH ARFCN:<value>,BSIC:<value>,RxLev:<value>,Cell ID:<value>,(PD)TCH ARFCN:<value>,Timeslot:<value>,RxLevFull:<value>,RxLevSub:<value>,RxQualFull:<value>,RxQualSub:<value>,Timing Advance:<value>,TxPower:<value>,RLT: <value>,Cipher Mode:<value>,DTX:<value>

4.5.1.8.3. I-PI Serving Cell Miscellaneous Information Screen

(P)BCCH ARFCN:<value>,BSIC:<value>,RxLev:<value>,Cell ID: <value>,(PD)TCH ARFCN:<value>,Timeslot:<value>,CBA:<value>,CBQ: <value>,T3314:<value>

4.5.1.8.4. TBF Uplink Data Transfer Screen

(P)BCCH ARFCN:<value>,BSIC:<value>,RxLev:<value>,Cell ID: <value>,(PD)TCH ARFCN:<value>,TxPower:<value>,Coding Scheme:<value>

4.5.1.8.5. TBF Downlink Data Transfer Screen

(P)BCCH ARFCN:<value>,BSIC:<value>,RxLev:<value>,Cell ID: <value>,(PD)TCH ARFCN:<value>,Coding Scheme:<value>

4.5.1.8.6. Neighbor Cell Information Screen

MCC:<value>,MNC:<value>,LAC:<value>,Cell ID:<value>,BSIC: <value>,(P)BCCH ARFCN:<value>,RxLev:<value>

4.5.1.8.7. Neighbor Cell Summary Screen

(P)BCCH ARFCN:<value>,RxLev:<value>,BSIC:<value>
(P)BCCH ARFCN:<value>,RxLev:<value>,BSIC:<value>
(P)BCCH ARFCN:<value>,RxLev:<value>,BSIC:<value>
(P)BCCH ARFCN:<value>,RxLev:<value>,BSIC:<value>
(P)BCCH ARFCN:<value>,RxLev:<value>,BSIC:<value>
(P)BCCH ARFCN:<value>,RxLev:<value>,BSIC:<value>

4.5.1.8.8. Reselection Screen

(P)BCCH ARFCN:<value>,,C1:<value>,C2:<value>,C31:<value>,C32:<value>

4.5.1.8.9. Hopping Information Screen

(P)BCCH ARFCN:<value>,BSIC:<value>,RxLev:<value>,Cell ID: <value>,(PD)TCH ARFCN:<value>,Timeslot:<value>,HSN:<value>,MAIO: <value>,Number of ARFCN:<value>

4.5.1.8.10. PDP Context Information Screen

(P)BCCH ARFCN:<value>,BSIC:<value>,RxLev:<value>,Cell ID:<value>,(PD)TCH ARFCN:<value>

4.5.1.8.11. I-PI Serving Cell Paging Parameters Screen

(P)BCCH ARFCN:<value>,BSIC:<value>,RxLev:<value>,Cell ID:<value>,(PD)TCH ARFCN:<value>,Timeslot:<value>,BS_PA_MFRMS:<value>,BS_AG_BLK_RES:<value>, BS_PAG_BLK_RES:<value>,BS_PBCCH_BLOCKS:<value>

4.5.1.8.12. I-PI Serving Cell Optional SYSINFOs

(P)BCCH ARFCN:<value>,BSIC:<value>,RxLev:<value>,Cell ID:<value>,(PD)TCH ARFCN:<value>,Timeslot:<value>
The following table provides conventions for the +MCELL AT command.

Table 4-77: +MCELL AT Command Conventions

Abbreviation/Term	Description
ARFCN	Absolute Radio Frequency Channel Number.
Dedicated mode	Operating mode of the phone. The phone is in this mode during a call, either incoming or outgoing.
EFEM	Enhanced Field Engineering Mode. This is a mode of operation for displaying field-test information based on the idle display of the phone. This special mode also allows the user to partly control the behavior of the phone. See Table 4-78.
Idle display	a.k.a Shared Display. This screen is displayed when nothing else is happening on the display (no menus, no message windows, and so on).
Idle mode	Operating mode of the phone. The phone is in this mode either when it is not attached, or when it is GSM-attached but not in a call.
Packet Idle mode	Operating mode of the phone. The phone is in this mode when it is GPRS attached, but not transmitting/receiving packet data.
TBF mode	Operating mode of the phone. The phone is in this mode when it is sending or receiving packet data via GPRS.

The following table provides definitions for EFEM-related terms.

Table 4-78: EFEM Parameters

Abbreviation/Term	Description
2bis	Binary information telling whether the ext_ind bit in the SysInfo 2 message (sent by the serving cell in idle mode) indicates that the network is sending a 2bis message.
2ter	Binary information telling whether the 2TI bit in the SysInfo 3 message (sent by the serving cell) indicates that the network is sending a 2ter message.
5bis	Binary information telling whether the ext_ind bit in the SysInfo 5 message (sent by the serving cell in dedicated mode) indicates that the network is sending a 5bis message.
5ter	Binary information indicating whether a 5ter message has been decoded on the SACCH of the serving cell.

Access class	GSM access control class, represented in hexadecimal.
ATT flag	Bit that allows or prohibits IMSI attach/detach procedures (from SI 3).
Attach state	Either states that the mobile is not camped (in which case it can be either attached and out-of-coverage, or just not attached), or indicates whether the mobile is IMSI-attached, GPRS attached, or combine-attached (that is, both IMSI- and GPRS-attached).
Average throughput	Average LLC or RLC throughput for the current TBF in kilobits per second. Throughput is calculated and displayed in the following format: ddd.ff (kbps). The nine Most Significant Bits provide the kbit/s part of the calculation (ddd<511); The seven Least Significant Bits provide the decabit/s part (ff<99). Throughput is calculated as follows: throughput = kbps*1000 + dbps*10. Warning: LLC throughput counts repeated data as transmitted data, whereas RLC throughput does not. Note that: the RLC/LLC data flow rates do not take headers into account; throughput refers to the useful data flow rate.
(P)BCCH ARFCN for serving cell	ARFCN of the serving cell, for either its BCCH in idle and packet/idle modes, or its PBCCH in packet idle mode (when a PBCCH is present in the cell).
Beacon carrier	BC for BCCH. PB for PBCCH.
BS_AG_BLKS_RES	Number of paging blocks reserved for AGCH (and not PCH) on the serving cell. This value (between 0 and 7) is broadcast on System Info 3.
BS_PA_MFRMS	Number of 51-frame multiframes between two consecutive paging blocks (on CCCH). This value (between 2 and 9) is broadcast on System Info 3.
BSIC	Base Station Identity Code - The value is represented by an octal format.
C1	The path loss criterion. This is used in cell selection and reselection.
C2	The reselection criterion, which is used only in cell reselection.
C31	GPRS signal-level threshold criterion for reselection, indicating whether or not to consider a hierarchical reselection.
C32	GPRS cell-ranking criterion for reselection, used to select among cells that have the same priority.
CBA or CBA2	Cell Bar Access (from System Info 1, 2, 2bis, 3, 4).
CBQ/EXC ACC	Cell Bar Qualify. Broadcast on System Info 3 rest octets and 4 rest octets.
Cell ID	Cell Identity parameter, from System Info 3.

CellResHys	Cell reselect hysteresis, used to compute C2, in Bm (0 to 14 dBm). It is broadcast on System Info 3.
Cell Resel. Offset	Cell Reselect Offset, in dBm (between 0 and 63 dBm). It is broadcast on System Info 3 rest octets.
Channel type	Type of channel used in the current operating mode.
Cipher mode	GSM encryption algorithm used. "5x" is displayed for the A5/x algorithm. "00" means there is no encryption. Hashes ("##") indicate an unknown algorithm.
Coding Scheme	CS1 to CS4 for GPRS or modulation and coding scheme MC1 to MC9 for EDGE.
Deliver order	Indicates whether the GPRS bearer shall provide in-seq SDU delivery or not.
Downlink coding scheme from (Timeslot, coding scheme)	Coding scheme for the downlink data transmission (between 1 and 4). "*" indicates an unknown coding scheme.
Downlink timeslot from (Timeslot, coding scheme)	Timeslot used for downlink data transfer in the current TBF. Information for as many as four timeslots can be displayed.
DTX	Indicates whether the use of discontinuous transmission has been reported to the network at least once during the last period of EFEM parameter refresh.
ECSC	Indicates whether the network accepts Early Classmark Sending (which it indicates in System Info 3).
Erroneous SDU delivered	Indicates whether the GPRS bearer detected as erroneous shall be delivered or discarded.
GPRS cell indicator	Indicates whether the serving cell offers GPRS services.
Granted delay class	Delay class (between 1 and 6; 0 or 7 for reserved) granted by the network for the current PDP context.
Granted mean throughput	Mean throughput (in decimal, between 0 and 32) granted by the network for the current PDP context.
Granted peak throughput	Peak throughput (in decimal, between 0 and 15) granted by the network for the current PDP context.
Granted reliability class	Reliability class (between 0 and 7) granted by the network for the current PDP context.

Granted precedence class	Precedence class (between 0 and 7) granted by the network for the current PDP context.
Guaranteed bit rate dl	Guaranteed bit rate for Downlink in KPBS.
Guaranteed bit rate ul	Guaranteed bit rate for Uplink in KPBS.
HSN	Hopping Sequence Number (between 0 and 63).
IP address	IP address for the PDP context.
LAC	Location Area Code.
MAIO	Mobile Allocation Index Offset (between 0 and 63).
Max bit rate dl	Max bit rate for Downlink in KPBS.
Max bit rate ul	Max bit rate for Uplink in KPBS.
MCC	Mobile Country Code.
MNC	Mobile Network Code.
MaxTxPWR	The maximum power (sent on System Info 3 and PSI 3) that the phone is allowed to transmit while sending channel request messages.
Network control order	This indicates whether the MS performs GPRS measurement reports and whether, in the ready state, the reselection is network- or MS-controlled. Possible values are: 0, 1, 2.
Network operation mode	GSM 03.60 network operation mode (1, 2 or 3), from System Info 13.
PC_meas_chan	GPRS flag that indicates whether the downlink measurements for power control are made on BCCH or PDCH. This is broadcast on System Info 13 rest octets.
PCR	Packet Channel Request. Type of request used to set up an Uplink TBF.
Penalty time	Indicates for how long the temporary offset will be applied. The time is calculated as follows: (Penalty_time+1)*20 in seconds. Value 31 has a special meaning, and will be displayed differently in the future.
Power offset	Power offset in dBm.
priority_access_thr	Indicates the radio priority of the transfer.
Radio priority	Radio priority of the current PDP context.

Repeated downlink/uplink blocks	Number of RLC blocks repeated (either in the uplink or downlink direction, depending on the screen). Repeated RLC frames are NOT taken into account when calculating the average throughput.
Repeated downlink/uplink frames	Number of LLC frames repeated (either in the uplink or downlink direction, depending on the screen). Repeated LLC frames are taken into account when calculating the average throughput.
Residual ber	Undetected bit error ratio in the delivered SDUs.
RLT	Radio Link Time-out, from System Info 3.
RxLev	Received signal level, in dBm. This parameter comes in several forms that have different meanings. Note that RxLev, Rx_Lev_Full and Rx_Lev_Sub are all calculated by the phone, but RxLev access min is sent by the serving cell (on System Info 3).
Rx_Lev_Full	Signal strength of the beacon channel of the serving cell.
Rx_Lev_Sub	Signal strength of the active dedicated channel.
RxLev access min	The minimum access RxLev of the cell currently being viewed.
RxQual	Received signal quality. This parameter may concern two channels.
Rx_Qual_Full	The base channel (carrying the BCCH).
Rx_Qual_Sub	The dedicated active channel.
split_pg_cycle	Number of paging blocks to read on the serving cell in each row of 64 multiframes (on CCCH or PCCCH). The value can range from 0 to 352.
Sync status	Provides information about the reporting status of the adjacent cell. Depending on the status, certain adjacent cell parameters are invalid.
T3212	MM location area update timer.
T3314	GMM ready timer value (triggering Cell Update procedure).
(PD)TCH ARFCN	The ARFCN used for the circuit-switched call or the data transfer. "HOPP" is displayed when hopping.
Temporary offset	Reselection parameter; between 0 and 60 dBm, or "##" for infinite value.
Timeslot	The phone's time slot for the current transmission.
Timing advance	Timing Advance in quarter of bits.

Total downlink LLC frames transmitted	Measured in frames for the current TBF. LLC frame count occurs roughly every 2 seconds. Repeated LLC frames are counted as transmitted frames.
Total downlink RLC blocks transmitted	Measured in blocks for the current TBF. RLC frame count occurs roughly every 2 seconds. **Warning**: Repeated RLC frames are not counted as transmitted frames.
Total uplink LLC frames transmitted	Measured in frames for the current TBF. LLC frame count occurs roughly every 2 seconds. Repeated LLC frames are counted as transmitted frames.
Total uplink RLC blocks transmitted	Measured in blocks for the current TBF. RLC frame count occurs roughly every 2 seconds. **Warning**: Repeated RLC frames are not counted as transmitted frames.
Traffic class	Type of application for which the GPRS bearer service is optimized.
Traffic handling priority	Specifies the relative importance for handling of all the GPRS bearer's SDUs compared to the other bearer's SDUs.
Tx power	Actual power used by the MS to transmit (in dBm).
Tx Integer	Number of slots over which to spread transmission (3 to 50), from SI type 1, 2, 2bis, 3 or 4.
Uplink coding scheme from (Timeslot, Coding scheme)	Coding scheme for the uplink data transmission (between 1 and 4). "*" indicates an unknown coding scheme.
Uplink timeslot from (Timeslot, Coding scheme)	Timeslot used for the uplink data transfer in the current TBF. Information for as many as four timeslots can be displayed.
Vocoder	Vocoder type.

Example

```
AT+MCELL=0,1
OK
+MCELL:Serving Idle/PI
(P)BCCH ARFCN:00522, BSIC:047,RxLev:042,Cell ID:03613,(PD)TCH ARFCN:INVALID_ARFCN,Timeslot:
00,C1   32,C2:00032,C32:00032,T3212:00005,ATT flag:1, MCC:460, MNC:  0, LAC:09340
AT+MCELL=0,9
OK
+MCELL: Adjacent Cell 4:
MCC:460,MNC:  0,LAC:09523,Cell ID:03912,BSIC:055,(P)BCCH ARFCN:0056,RxLev:017
AT+MCELL=0,15
OK
+MCELL:PDP Context
(P)BCCH ARFCN:00072,BSIC:029,RxLev:053,Cell ID:03623,(PD)TCH ARFCN:INVALID_ARFCN
```

4.5.1.9. +MGAUTH, Enable Authentication Protocol Setting (CHAP/PAP)

This command allows setting the authentication type for a user-name (using a password) for the specified PDP context.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MGAUTH=<cid>,<auth>,<user name>,<password>	OK or: +CME ERROR: <err>	
Read	AT+MGAUTH?	+MGAUTH: <auth> OK	
Test	AT+MGAUTH=?	+MGAUTH: (List of supported <cidr>s),(list of supported <auth>s),<name length>,<password length> OK	

The following table shows the +MGAUTH parameters.

Table 4-79:: +MGAUTH Parameters

<Parameter>	Description
<cid>	PDP context identifier, must be defined by AT+CGDCONT first.
<auth>	0 Meaning authentication protocol not used (NONE). 1 Meaning personal authentication protocol (PAP). 2 Meaning handshake authentication protocol (CHAP).
<user name>	User name string.
<password>	Password string.

Example

```
AT+ MGAUTH =?
+MGAUTH: (1-255),(0-2),20,32
OK
AT+MGAUTH=1,1,"gsm","1234"
OK
```

4.5.1.10. +MCI, Motorola Cell Information

This command returns neighbor cell information.

Command Type	Syntax	Response/Action	Remarks
Set **Or** **Execute**	AT+MCI=[<Filter>][,<bitmask>] Or AT+MCI	+MCI: <serving cell ARFCN>,<serving cell BSIC>,<signal strength>>[,<TA>][,<neighbor 1 ARFCN>,[< neighbor 1 BSIC>],<signal strength>[, <neighbor 2 ARFCN>,[< neighbor 2 BSIC>],<signal strength>[,<neighbor 3 ARFCN>,[< neighbor 3 BSIC>],<signal strength>[,<neighbor 4 ARFCN>,[< neighbor 4 BSIC>],<signal strength>[<neighbor 5 ARFCN>,[< neighbor 5 BSIC>],<signal strength>[,<neighbor 6 ARFCN>,[< neighbor 6 BSIC>],<signal strength>]]]]] OK	+MCI (Motorola Cell Information) command returns ARFCN, BSIC and RX level of serving and adjacent cells. In case G30 is registered, adjacent cells are from registered PLMN. In case G30 is in Emergency Mode, adjacent cells are physical neighbors. BSIC is displayed only in case SCH (Synchronization Channel) is decoded. The parameter <enable_TA> determines whether <TA> will be reported by +MCI command. <TA> is defined for serving cell only. This value will be displayed only in Dedicated mode. The command output is <Filter> dependent. In case the command output should be filtered to include just cells of a specific GSM band (one or more) the filter parameter should be set accordingly, see Table 4-80. The filtering will apply to the neighbor's cells only - the serving cell info will always be returned. Using the set command without a parameter will return output according to the currently set <Filter> value.
Read	AT+MCI?	+MCI: <Filter>,[<bitmask>] OK	The Read command returns the current set <Filter> and <bitmask> values.
Test	AT+MCI=?	+MCI: (List of supported <Filter>s), (Range of supported <bitmask>s) OK	The Test command returns the ranges of <Filter>'s supported values and <bitmask> supported values.

The following table shows the +MCI parameters.

Table 4-80:+MCI Parameters

<Parameter>	Description
<Filter>	The requested GSM band's ARFCNs. This is an integer which can be a combination of all (1-15): 1 - GSM 850 2 - GSM 900 4 - GSM 1800 8 - GSM 1900 The default value is 15.
<ARFCN>	Absolute Radio Frequency Channel Number Range: [1-124], [128-251], [512-885], [975-1023].
<BSIC>	Base transceiver Station Identity Code Range: [0 - 63]
<signal strength>	Range: -110 - (-48) dBm. For serving cell signal strength is defined as: • In dedicated mode - TCH Rx level • In idle mode average BCCH Rx level For adjacent cells, signal strength is defined as the average Rx level in the both modes.
<bitmask>	Required report of additional cell information. This is an integer which can be a combination of: 0 - Do not report any additional value. 1 - Report <TA> value. The default value is 0.
<TA>	TA (Timing Advance) is defined for serving cell only. This value will be reported only in Dedicated and TBF modes. Valid value range is from 0 to 63.

Example
AT+MCI // Get the current serving and neighbor's info.
+MCI: 74,17,-68,642,52,-77,77,53,-90,76,11,-93,81,,-94,66,57,-96
OK
AT+MCI=2 // Get serving cell info and GSM 900 neighbor's only info.
+MCI: 74,17,-68,77,53,-90,76,11,-93,81,,-94,66,57,-96
OK
AT+MCI=6 // Get serving cell info and GSM 1800 only neighbor's only info.
+MCI: 74,17,-68,642,52,-77
OK
AT+MCI=? // Get <Filter> and <enable TA> supported values.
+MCI: (1-15),(0-1)
OK
AT+MCI=,1


```
+MCI: 605,45,-78,,594,3,-88,592,4,-96,599,15,-97,597,60,-97,608,3,-99,590,,-101
OK
AT+MCI?                         // Get current set <Filter> and <enable TA> values.
+MCI: 15,1
OK          //While a call is connected.
AT+MCI                          // Get the current serving info including TA and neighbor's info.
+MCI: 512,45,-78,0,605,45,-75,594,3,-85,608,3,-95,597,60,-95,599,15,-96,596,20,-99
OK
```

4.5.1.11. +MJDC, Jamming Detection Control

This command is used to enables/disable the Jamming Detection feature.
When the Jamming detector is enabled, an unsolicited report with the current jamming state will be sent to the DTE. Than, an update report will be sent to the DTE each time a change in the jamming state is detected.
This command is a basic command.
The AT+MJDC's settings will be stored in a non-volatile memory and will also be effective after power cycle.
Default value: On first power up, the jamming detector is not active (i.e. the default value for <mjdc_mode> is "0").

Command Type	Syntax	Response/Action	Remarks
Set	AT+MJDC=<mjdc_mode>	OK +MJDC:<jamming_detection> Or: +CME ERROR: <err>	The set command configures the jamming mode. NOTE: <jamming_detection> will be displayed only when jamming detector is enabled (i.e. **Note:** <mjdc_mode>=1).
Read	AT+MJDC?	+MJDC: <mjdc_mode>,[jamming_detection] OK	The read command returns the current settings. NOTE: [jamming_detection] will be **Note:** displayed only when jamming detector is enabling (i.e. <mjdc_mode>=1).
Test	+MJDC =?	+MJDC:(range <mjdc_mode>) OK	The test command returns the possible ranges of <mjdc_mode>s.
Unsolicited Report		+MJDC:<jamming_detection>	Indicates the jamming state.

The following table shows the +MJDC parameters.

Table 4-81: +MJDC Parameters

<Parameter>	Description	Remark
<mjdc_mode>	0 - Disable jamming detection. 1 - Enable jamming detection.	
<jamming_detection>	5 - WCDMA jamming suspicious 4 - WCDMA jammed. 3- Reserved 2 - Reserved 1 - WCDMA and GSM jamming or GSM jamming (in case of GSM coverage only or 2G SIM) detected. 0 - jamming not detected.	

Each change of MJDC value follows by 2sec RI pulse.

Example
AT+MJDC = 1 // enable the jamming detector
+MJDC:0 // no jamming is currently detected.
OK
AT+MJDC?
+MJDC: 1,0 // jamming detector is enabled but no jamming is currently detect.
OK
AT+MJDC = 0 // disable the jamming detector
OK

AT+MJDC?
+MJDC: 0 // jamming detector is disable
OK

AT+MJDC=?
+MJDC: (0,1) // ranges of <mjdc_mode>s.
OK

AT+MJDC = 1 // enable the jamming detector
+MJDC:0 // no jamming is currently detected.
OK

// Use a jamming device to jam ME's bends.

+MJDC:5 // unsolicited report: jamming is now detected

+MJDC:4 // unsolicited report: jamming is now detected

+MJDC:1 // unsolicited report: jamming is now detected

4.6. Hardware Information

4.6.1. Hardware Information Commands

4.6.1.1. +CBC, Battery Charger Connection

This command enables a user to query the battery power level.

Command Type	Syntax	Response/Action		Remarks
Read	+CBC	+MSELINT = 0 +CBC:<bcs>,<bcl>	+MSELINT = 1 +CBC:<bcs>,<bcl>	

The following table shows the +CBC parameters.

Table 4-82: +CBC Parameters

<Parameter>	Description
<bcs>	Battery status values 0 Battery powered 1 Externally powered - not implemented in G30 **Note:** Note: The G30 input power source is connected via the battery pins only, so it is always battery powered.
<bcl>	+MSELINT = 0 Battery charge level- A decimal value representing the returned digital value. The level is multiplied by 1000.
	+MSELINT = 1 Battery charge level:

VCC, V	Battery Level
>3.70	90
3.50-3.70	60
3.40-3.50	20
3.35-3.40	10
3.30-3.35	5
<3.30	0

Note: The G30 does not allow the detection of battery use. The power supply of the G30 is connected via the battery pins. However, users can use this command to verify the level of the G30 input power source.

Example
at+mselint=0
OK
at+cbc
+CBC: 0,3821 //This example shows 0 (battery powered) with 60% power.

OK
at+mselint=1
OK

at+cbc
+CBC: 0,90 //This example shows 0 (battery powered) with 90% power.

OK

4.6.1.2. +CBAUD, Baud Rate Regulation

This command sets the baud rate. The baud rate of the G30 is changed/set to the request value <rate> written in the command.
Specifying a value of 9 or 0 disables the function and allows operation only at rates automatically detectable by the G30. The specified rate takes effect following the issuing of any result code(s) associated with the current command line.
The UART is configured according to the request, or to the specific constant baud rate or auto baud rate after output "OK" response to the terminal. For example, AT+CBAUD=8 is equivalent to AT+CBAUD=57600. Using AT+CBAUD with the <rate> value other than 9 or 0 disables the auto baud rate detection feature. The G30 supports up to 57600 auto baud.

Command Type	Syntax	Response/Action
Set	AT+CBAUD=<n> AT+CBAUD=<rate>	OK or: ERROR
Read	AT+CBAUD?	+CBAUD: <rate>
Test	AT+CBAUD=?	+CBAUD: (list of supported <n>s, list of supported <rate>s)

The following table shows the +CBAUD parameters.

Table 4-83: +CBAUD Parameters

<Parameter>	Description
<n> <rate>	0 Auto baud rate 2 1200 3 2400 4 4800 5 9600 6 19200 7 38400 8 57600 9 Auto baud rate 10 115200 12 230400 The default value is 9.

Example
AT+CBAUD=57600
or
AT+CBAUD=8 //These commands have the same effect
OK
AT+CBAUD?
+CBAUD: 57600
OK

4.6.1.3. +IPR, Local Terminal/G30 Serial Port Rate

This command is responsible for setting and saving the request baud rate. This numeric extended-format parameter specifies the data rate at which the G30 accepts commands. Specifying a value of 9 disables the function and allows operation only at rates automatically detectable by the G30. The specified rate takes effect following the issuing of any result code(s) associated with the current command line.

The <rate> value specified is the rate in bits per second at which the terminal-G30 interface operates, for example, 19200 or 115200. The rates supported by the G30 are manufacturer-specific. However, the +IPR parameter permits setting any rate supported by the G30 during online operation.

The UART is configured to rates of 1200, 4800, 9600, 19200, 38400, 57600, 115200, 230400 bits per second according to the parameters of the +IPR command.

Using AT+IPR=<rate> with a <rate> value other than 9 and 0 disables the auto baud rate detection feature. The entered baud rate is stored in the G30 and is restored after power up. The G30 supports up to 57600 auto baud.

Notes: +IPR is similar to +CBAUD, but with the ability to save.

The baud rate after ATZ(or AT&F) is the last baud rate that was set by +IPR, or +CBAUD.

Command Type	Syntax	Response/Action
Set	AT+IPR=<n> AT+IPR=<rate>	OK or: ERROR
Read	AT+IPR?	+IPR: <rate>
Test	AT+IPR=?	+IPR: (list of supported <rate>s)

Note: Read mode returns the current baud rate and not the value that was set by Set Mode.

The following table shows the +IPR parameters.

Table 4-84: +IPR Parameters

<Parameter>	Description
<n> <rate>	0 Auto baud rate 2 1200 3 2400 4 4800 5 9600 6 19200 7 38400 8 57600 9 Auto baud rate 10 115200 12 230400

Example
AT+IPR=6
OK
AT+IPR?
+IPR: 19200
OK

4.6.1.4. +GCAP, Request Overall Capabilities

This command indicates the major capability areas of the G30. The support of different areas is presented in the response of the +GCAP command. Each area may be presented by the selection command name of a specific capability area.

Command Type	Syntax	Response/Action
Execute	AT+GCAP	GCAP: <list of supported features><CR><LF> OK // at the end of the list.
Read	AT+GCAP?	GCAP: <list of supported features><CR><LF> OK // at the end of the list.

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

4.6.1.5. &K, RTS/CTS Flow Control

This command configures the flow control. The RTS (Request To Send) is an input line. The RTS signal is received from the terminal and a low condition indicates that the G30 can send more data. The CTS (Clear To Send) is an output line. The CTS signal is sent to the terminal and a low state indicates that more data can be sent to the G30.
The RTS and CTS together make up what is called RTS/CTS or "hardware" flow control. Both lines are used when "hardware flow control" is enabled in both the terminal and the G30 devices. When the terminal is ready and able to receive data, it puts the RTS line in an active (low) condition to indicate this to the G30. If the terminal is not able to receive data (typically because its receive buffer is almost full), it puts the RTS line in an inactive (high) condition as a signal to the G30 to stop sending data. When the terminal is ready to receive more data (for example, after data has been removed from its receive buffer), it places this line back in the active condition. The RTS line complements the CTS line. The G30 puts the CTS line in an active condition to tell the terminal that it is ready to receive the data. Likewise, if the G30 is unable to receive data, it places the CTS line in an inactive condition.

Command Type	Syntax	Response/Action
Set	AT&K[<param>]	OK
Read	AT&K?	&K: <param>
Test	AT&K=?	&K: (list of supported <param>s)

The following table shows the &K parameters.

Table 4-85: &K Parameters

<Parameter>	Description
<param>	0 Disable all terminal/G30 flow control 3 Enable CTS/RTS terminal/G30 flow control 4 Enable Xon/Xoff terminal/G30 flow control 5 Enable Xon/Xoff terminal/G30 flow control 6 Enable CTS/RTS terminal/G30 flow control The default value is 3.

Example
AT&K?
&K: 3
OK
AT&K4
OK

4.6.1.6. &C, Circuit 109 Behavior

This parameter determines how the state of the DCD line relates to the detection of the received line signal from the distant end. Changing the parameters will take effect immediately in both the command and online command states.
The DCD line is an output line that indicates the following:

- In Circuit Switch Data mode an active (low) indicates that a valid carrier (data signal) was detected by the G30 (CONNECT message is received), and inactive (high) indicates idle. The AT&C command always puts the DCD command ON, when set to 0. If the AT&C command is set to 1 then the "+++" escape command sets the DCD signal to an inactive state and the ATO command is set to active. The AT&C set to 2 sets the DCD signal OFF.
- In GPRS mode, the DCD line indicates the PDP context status. PDP context active sets the DCD to active (low); PDP context inactive sets the DCD to inactive (high). The DCD is activated only when the PDP context is achieved. The DCD is de-activated when the PDP context is off.
- In Local Link mode, the DCD line indicates the Local Link data status.
  When AT&C is set to 0, the DCD signal is always ON.
  When AT&C is set to 1:
  - DCD signal is set to OFF when Local link has been stopped.

  When AT&C is set to 2, the DCD signal is always OFF.

When AT&C is set to 0, the DCD signal is always ON. When AT&C is set to 1, the DCD is activated in online mode. When AT&C is set to 2, the DCD is activated only when the PDP context is achieved (temporary IP address is received).

Command Type	Syntax	Response/Action
Set	AT&C<param>	OK
Read	AT&C?	&C:<param>
Test	AT&C=?	&C:(list of supported <param>s)

The following table shows the &C parameters.

Table 4-86: &C Parameters

<Parameter>	Description
<param>	DCD signal ON 0 DCD is forced ON at all times. 1 DCD is set to ON when: a A CSD carrier is detected. b A GPRS external session is being established: G30 enters PPP mode TE is about to send an LCP configure-request to the G30 (GPRS connection is not yet established). DCD is set to OFF when: a No CSD carrier is detected. This can happen when a CSD call has been disconnected or when G30 enters CSD online command mode (switch operation). b The G30 has lost its GPRS connection with the network (PDP context was deactivated and the IP address is cancelled). c Local link has been stopped. 2 DCD is set to ON when G30 establishes a GPRS connection with the network (PDP context is activated and the IP address is received from the network). DCD is set to OFF when G30 has lost its GPRS connection with the network (PDP context was deactivated and the IP address is cancelled). The default value is 1.

Note: If &C is set to 2 when a CSD call is set, DCD will always remain OFF.

Example
AT&C?
&C: 1
OK
AT&C0
OK

4.6.1.7. &D, Circuit 108 Behavior

This command determines how the G30 responds when the DTR (Data Terminal Ready) status is changed from ON to OFF during the online data state. The DTR is an input line that indicates that the terminal is ready.
The DTR line must be active (low) in order for the G30 to recognize the terminal. This signal is raised by the terminal when a process activates the serial port. If the DTR is not used by the application, it should connect this line to ground (DTR active). The default value is active (low).
In case of local link during initial PPP retries, DTR change will be ignored.

Command Type	Syntax	Response/Action
Set	AT&D<param>	OK
Read	AT&D?	&D:<param>
Test	AT&D=?	&D:(list of supported <param>s)

The following table shows the &D parameters.

Table 4-87: &D Parameters

<Parameter>	Description
<param>	The G30's reaction when the DTR status is changed from ON to OFF. In CSD calls: 0,4 Ignores DTR changes 1 Switches the CSD call to asynchronous command mode (the call remains connected) 2,3 Disconnects the call and returns to the command mode In GPRS calls: 0,4 Ignores DTR changes 1 Switches the GPRS session to asynchronous command mode (the session remains connected) 2,3 Deactivates the GPRS and returns to command mode In MUX and MUX_INIT state: 0-3 Ignores DTE changes 4 Drops the MUX application and returns to PRE_MUX state The default value is 2.

Example
AT&D?
&D: 2
OK
AT&D1
OK

4.6.1.8. +MCWAKE, GPRS Coverage

This command tells the G30 whether to report on the status of the GPRS/GSM coverage. There are three possibilities:

- Do not report the status of the GPRS/GSM coverage.
- Report only when the GPRS/GSM coverage goes off.
- Report only when the GPRS/GSM coverage goes on.

Command Type	Syntax	Response/Action
Set	AT+MCWAKE=<param>	OK
Read	AT+MCWAKE?	+MCWAKE: <param> OK
Test	AT+MCWAKE =?	+MCWAKE: (list of supported <param>s) OK

The following table shows the +MCWAKE parameters.

Table 4-88: +MCWAKE Parameters

<Parameter>	Description
<param>	0 Sends no indication. 1 Sends an indication when GPRS coverage goes off. 2 Sends an indication when GPRS coverage goes on. The default value is 2.

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

4.6.1.9. +MGGIND, GSM/GPRS Service Indicator

This command configures the service indicator line of pin #16 in LGA or pin 49 of the 70 pin connector to be GPRS or GSM registration indicator.
The IO line (pin #16 of LGA or pin 49 of 70 pin connector) function according to the current registration state (in service or not) of the specific service indicator configuration.

Note: IO line (pin #16 of LGA or pin 49 of 70 pin connector) out come depends on +MCWAKE configuration.

Command Type	Syntax	Response/Action
Set	AT+MGGIND=<state>	OK or: +CME ERROR: <err>
Read	AT+ MGGIND ?	+MGGIND: <state> OK or: +CME ERROR: <err>
Test	AT+ MGGIND =?	+MGGIND: (list of supported <state>s) OK

The following table shows the +MGGIND parameters.

Table 4-89: +MGGIND Parameters

<Parameter>	Description
<state>	0 GPRS registration indicator. 1 GSM registration indicator.

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

4.6.1.10. +CFUN, Shut Down Phone Functionality

This command shuts down the phone functionality of smart phones and PDAs with phone capabilities in order to prevent interference from a nearby environment. This enables other functionality to continue to be used in environments where phone use is either impractical or not permitted. For example, on airplanes the use of cellular phones is forbidden during the entire flight, but the use of computers is allowed during much of the flight. This command enables other functionality to continue while preventing use of phone functionality.

Note: When disabling the phone RF transmit and receive, the G30 performs power down.

Command Type	Syntax	Response/Action	Remarks
Set	AT+CFUN=[<fun>]	OK +CME ERROR: <err>	The Set command selects the level of functionality <fun> in the smart phone or PDA incorporating the G30.
Read	AT+CFUN?	+CFUN: <power mode>, <STK mode> OK	The Read command displays the current level of functionality.
Test	AT+CFUN=?	+CFUN: (list of supported <fun>s) OK	The Test command displays the list of supported functionality settings.

The following table shows the AT+CFUN parameters.

Table 4-90: +CFUN Parameters

<Parameter>	Description
<fun>	Functionality levels: 0 Minimum functionality meaning switch off of the MS 1 Full functionality meaning start up MS (from offline mode) 4 Disables phone transmit & receive RF circuits 6 Enable the SIM-toolkit interface and fetching of proactive commands by SIM-APPL from the SIM-card 7 Disables 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 15 Silent reset (reset MS without resetting the SIM).
<power_mode>	1 MS is switched on 2 invalid mode

<STK_mode>	0 Inactive state. 6 Enables the SIM-toolkit interface and fetching of proactive commands by SIM-APPL from the SIM-card. 7 Disables the SIM-toolkit interface and enables fetching of proactive commands by SIM-APPL from the SIM-card. 8 Disables fetching of proactive commands by SIM-APPL from the SIM-card.

Example
AT+CFUN=?
+CFUN: (0,1,4,6,7,8,15)
OK

4.6.1.11. +ICF, DTE-DCE Character Framing

This command determines the local serial port start/stop (asynchronous) character framing used by the DCE when accepting DTE commands and transmitting information text and result codes, whenever these are not done automatically. Auto detect framing is not supported.

Command Type	Syntax	Response/Action	Remarks
Set	+ICF=[<format>[,<parity>]]	OK +CME ERROR: <err>	The Set command determines the local serial port start/stop character framing.
Read	+ICF?	+ICF: <format>,<parity> +CME ERROR: <err>	The Read command displays the currently selected character framing.
Test	+ICF=?	:+ICF:(list of supported <format> values),(list of supported <parity> values) +CME ERROR: <err>	The Test command displays a list of supported <format> and <parity> values.

The following table shows the +ICF parameters.

Table 4-91: +ICF Parameters

<Parameter>	Description
<format>	Determines the number of bits in the data bits, the presence (or absence) of a parity bit, and the number of stop bits in the start/stop frame. 1 8 Data, 2 Stop - can be set only with <parity> 4 2 8 Data, 1 Parity, 1 Stop - can be set with <parity> of 0 or 1 3 8 Data, 1 Stop (default) - can be set only with <parity> 4 7 8 Data, 1 Parity, 2 Stop - can be set with <parity> of 0 or 1
<parity>	Determines how the parity bit is generated and checked (if present). 0 Odd 1 Even 4 No parity (default)

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

4.6.1.12. +IFC, Terminal-G30 Local Flow Control

This parameter controls the operation of the local flow control between the terminal and the G30 during the data state when V.42 error control is used, or when fallback to non-error control mode is specified to include buffering and flow control. It accepts two numeric subparameters:

- <DCE_by_DTE>: Specifies the method to be used by the terminal to control the flow of received data from the G30.
- <DTE_by_DCE>: Specifies the method to be used by the G30 to control the flow of transmitted data from the terminal.

The implementation of this parameter is mandatory if V.42 error control or Buffered mode is provided in the G30. If not, it is optional. G30s which do not implement circuit 106 and/or circuit 133 do not need to support the value 2 for the corresponding subparameter.

Command Type	Syntax	Response/Action
Set	AT+IFC=[[<DCE_by_DTE>,[DTE_by_DCE>]]]	OK +CME ERROR: <err>
Read	AT+IFC?	+IFC: <DCE_by_DTE>,<DTE_by_DCE>
Test	AT+IFC=?	+IFC: (list of supported <DCE_by_DTE>s, list of supported <DTE_by_DCE>s)

The following table shows the <DCE_by_DTE> and <DTE_by_DCE> parameters.

Note: <DCE_by_DTE> and <DTE_by_DCE> of the same value only are supported.

Table 4-92: <DCE_by_DTE> and <DTE_by_DCE> Parameters

<Parameter>	Description
<DCE_by_DTE>	0 None 1 DC1/DC3 on circuit 103. Do not pass DC1/DC3 characters to the remote DCE. 2 Circuit 133 (ready for receiving). 4-127 Reserved for future standardization. Other Reserved for manufacture-specific use. The default is 2. DC1 is IA5 1/1. DC3 is IA5 1/3.
<DTE_by_DCE>	0 None 1 DC1/DC3 on circuit 104. 2 Circuit 106 (clear to Send/Ready for Sending). 3-127 Reserved for future standardization. Other Reserved for manufacture-specific use. The default is 2. DC1 is IA5 1/1. DC3 is IA5 1/3.

Example
AT+IFC=?
+IFC: (0-2),(0-2)

OK

AT+IFC?
+IFC: 2,2

OK

AT+IFC=2,2

OK

4.6.1.13. \Q, Set Flow Control

This command controls the operation of local flow control between DTE and DCE used when data are sent or received.

Command Type	Syntax	Response/Action	Remarks
Set		OK or: +CME ERROR: <err>	

The following table shows the \Q parameter.

Table 4-93: Q Parameter

<Parameter>	Description
<value >	0 No flow control 1 DC1/DC3 on circuit 103 and 104 (XON/XOFF) 2 DTE_by_DCE on circuit 106 (CTS) 3 DCE_by_DTE on circuit 133 (RTS and DTE_by_DCE on circuit 106 (CTS))

4.6.1.14. ATS97, Antenna Diagnostic

This command indicates whether an antenna is physically connected to the G30 RF connector. This information is also provided by a dedicated hardware signal, which is outputted on LGA pin #13 or on pin 41 (ANT_DET) of the interface connector.

Command Type	Syntax	Response/Action	Remarks
Execute		OK or: +CME ERROR: <err>	
Read		<info> OK or: +CME ERROR: <err>	The Read command indicates whether the antenna is connected.

The following table shows the ATS97 parameters.

Table 4-94: ATS97 Parameters

<Parameter>	Description
<info>	000 The antenna is not connected 001 The antenna is connected

Example
// Connect the antenna
ATS97?
001
ATS97
OK
ATS97=?
ERROR
// Disconnect the antenna
ATS97?
000

4.6.1.15. +MRST, Perform Power Off

The +MRST command enables customer software to perform a power off to the G30 unit. This command provides a software simulation for pressing the power-off button.

Command Type	Syntax	Response/Action	Remarks
Set		OK	The Set command performs a graceful power off to the G30 module. **Note:** The Read and Test commands are not permitted for the +MRST command.

Example
AT+MRST

OK

// Result - G30 module performs a power down

4.6.1.16. READY, Unsolicited Notification (UART Ready Indication)

The READY unsolicited notification is sent to the TE following radio power-up, when the UART is ready for communication, as indicated by DSR line state. This unsolicited notification is flex dependant.

4.6.1.17. +MIOC, Motorola I/O Configure

This command defines the G30 9 GPIO pins data value. The feature is flex enabled or disabled.

This command is a basic command.

The feature is active by default, however, changing the FLEX can eliminate it.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MIOC=<Pin selection>,<Data vector>	OK or: +CME ERROR: <err>	The set command defines the logic value of selected pins to high or low when pin is configured as output. The G30 saves the new setting in flex. Only selected pins are affected. Set action is allowed only for pins configured as output. In case <Data vector> includes values of input pins, those values will be ignored. In case <pin selection> includes input pins, an error will be issued "Operation not allowed". No action will take place.
Read	+ MIOC?	+MIOC: <Data vector> OK	The read command returns the actual logical value of the 9 GPIO pins.
Test	+ MIOC=?	+MIOC: (list of supported <Pin selection>s),(list of supported <Data vector>s) OK or: +CME ERROR: <err>	The test command returns the possible ranges of <Pin selection>s and <Data vector>s.

The following table shows the +MIOC parameters.

Table 4-95: +MIOC Parameters

<Parameter>	Description
<pin selection>	Selected pins for the action invoked. This is a binary vector in which each bit points to pin number. Vector size is 9. 0 Not selected 1 Selected pin (default)
<data vector>	This is a binary vector in which each bit show the physical value of pin. Data vector size is 9. 0 Physical low signal. 1 Physical high signal (default). **The default value:** On Power Up - as previously saved in FLEX bytes. Before set command first used with <Data vector> and <Mode>=0, or after +MIOC without <Data vector> and before +MIOC command used - 1.

Example
AT+MIOC=?
+MIOC: (000000000-111111111),(000000000-111111111)
OK

Light control example:

Client has an electronic controlled light switch. The intent is to connect this switch to the G30 (IO pin 5 - for example) and control the light by setting the logical values of pin 5.
Example of code is as follows:

```
AT+MIOD=000010000,0              // Set IO pin #5 to be output.
OK
AT+MIOD?                  // (Optional) Read the IO pin definitions to confirm correct settings.
+MIOD: 111101111          // Pins 1-4 and 6-9 are input pins. Pin 5 is output.
OK                  // At this point the module is configured to control the logic values of
                    pin 5.
AT+MIOC=000010000, 000010000     // Turn on the light by setting pin 5 to high.
AT+MIOC?                  // (Optional) read the pins status.
+MIOC: 000010000          // Pin 5 is set to high.
OK
AT+MIOD=000010000,0, 000010000          // All previous defined in one command.
OK
AT+MIOC=000010000,000000000             // Turn off the light by setting pin 5 to low.
OK
AT+MIOC?        // (Optional) read the pins status.
+MIOC: 000000000                  // Pin 5 is set to low.
OK
```

Data sending (vector example):

Client has a data bus with 9 bits and plans to implement some protocol over it. In this example 4 pins (pins 1-4) are used as an output and 4 pins (5-9) are used as input.
Example of code is as follows:

```
AT+MIOD=000001111,0              // Set IO pins 1-4 to be output level mode.
OK
AT+MIOD=011110000,1              // Set IO pins 5-8 to be input level mode.
OK      // Unnecessary, because by default all pins are input.
AT+MIOD?                  // (Optional) Read the IO pin definitions to confirm correct settings.
+MIOD: 011110000          // Pins 1-4 output pins 5-8 input.
OK                  // At this point the module is configured to control the logic values of
                    all pins.
AT+MIOC=000001111,000000011      // Write vector, 0x3 on pins 1-4.
OK                  //  (pins 1,2 high, pins 3,4 low).
AT+MIOC?        // Read the pins status.
+MIOC: 001000011                  // Pins 1,2,7 show the logical value high.
OK
AT+MIOC=000001111,000000000             // Write vector 0x0 on pins 1-4.
OK
AT+MIOC?                  // (Optional) read the pins status.
+MIOC: 001110000                  // Pin 1-4 low, pins 5,6,7 show logical high.
OK
```

4.6.1.18. +MIOD, Motorola I/O Define

This command defines the G30 9 GPIO pins configuration. The feature is flex enabled or disabled.
This command is a basic command.
The feature is active by default, however, changing the FLEX can eliminate it.

Note: When using the GPIO lines feature, lines should not be connected directly to ground, a resistor must be used. This is applicable when changing an I/O from input to output.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MIOD=<Pin selection>,<Mode> [,<Data vector>]	OK or: +CME ERROR: <err>	The set command defines the behavior mode of each selected IO pin. The G30 saves the new setting in flex. The selected pins are affected. Validity check of all parameters will be done and appropriate standard error will be issued. In case of legal parameters the new configuration is set. If <Data vector> doesn't supply and new <Mode> is output a line will care physical high signal. In case <Data vector> is supply and includes values of input pins, those values will be ignored. In case <Mode> is input and <Data vector> is supply, an error will be issued "Operation not allowed". No action will be done.
Read	+ MIOD?	+MIOD: <Mode vector> OK	The read command returns the current behavior mode of the 9 GPIO pins.
Test	+ MIOD=?	+MIOD: (list of supported <Pin selection>s),(list of supported <Mode>s),(list of supported <Data vector>s) OK or: +CME ERROR: <err>	The test command returns the possible ranges of <Pin selection>s, <Mode>s and <Data vector>s.

The following table shows the +MIOD parameters.

Table 4-96: +MIOD Parameters

<Parameter>	Description
<pin selection>	Selected pins for the action invoked. This is a binary vector in which each bit points to pin number. Vector size is 9. 0 Not selected 1 Selected pin (default)
<mode>	GPIO pin operation mode. 0 Output (level only) 1 Input (level mode)
<mode vector>	This is a binary vector in which each bit shows the operation mode of pin. Data vector size is 9. 0 Output (level only) 1 Input (level mode) **The default value:** On Power Up - as previously saved in FLEX bytes. Before set command first used - 1. (This means that all lines are configured as Input before set command first used).
<data vector>	This is a binary vector in which each bit shows the physical value of pin. Data vector size is 9. 0 Physical low signal. 1 Physical high signal (default). **The default value:** On Power Up - as previously saved in FLEX bytes. Before set command first used with <Data vector> and <Mode>=0, or after +MIOD without <Data vector> and before +MIOD command used - 1.

The following table shows the GPIOs pin numbers.

Table 4-97: GPIOs Pin Numbers

GPIO Number	LGA	70 pin
1	80	28
2	81	30
3	34	32
4	33	34
5	1	36
6	2	38
7	5	40
8	6	42
9	12	NA

Example
+MIOD: (000000000-111111111),(0,1),(000000000-111111111)
AT+MIOD=000010000,0 // Set IO pin #5 to be output.
OK
AT+MIOD?
+MIOD: 111101111 // Pins 1-4 and 6-9 are input. Pin 5 is output.
OK
AT+MIOD=000011111,0 // Set IO pins 1-5 to be output level mode.
OK
AT+MIOD=111110000,1 // Set IO pins 5-9 to be input level mode.(Default settings).
OK
AT+MIOD?
+MIOD: 111110000 // Pins 1-4 output pins, 5-9 input pins.
OK

4.6.1.19. +MMAD, Query and Monitor ADC Value

This command intends to query and monitor ADC value.
This command returns the current ADC values for the requested channel.
The returned value is a multiplication of the input level by 1000 (e.g. input level of 1.56V will return 1560).

Command Type	Syntax	Response/Action	Remarks
Execute	AT+MMAD	+MMAD: <Converter_number>, <Converted_Value> OK	
Read	AT+MMAD?	+MMAD: <Converter_number>, <Converted_Value> OK	

The following table shows the +MMAD parameters.

Table 4-98: +MMAD Parameters

<Parameter>	Description	Range/Remark
<Converter Number>	**1-3** Select the A2D converter.	
<Converted Value>	A decimal value represents the returned digital value. The returned value represent the input level multiplied by 1000.	

Example
AT+MMAD
+MMAD:1,1248
+MMAD: 2,1963
+MMAD: 3,1963
OK

4.6.1.20. +MADCM, Motorola Analog to Digital Measurement

This command intends to query and monitor the G30 three ADC's values.
This command returns the current ADC values for the requested channel:

- The 1st converter (ADC1) represents the (external) DC voltage levels of G30, LGA #36 (70 pin connector #37).
- The 2nd converter (ADC2) represents the (external) DC voltage levels of G30, LGA #35 (70 pin connector #43).
- The 3rd converter (ADC3) represents the (internally) supply DC voltage levels of the G30 (pins #2/#3 VCC).
  All parameters should be saved on the NVM, and used after power up.
  <Rate> value should be 1, the rest of the parameters values should be 0 (zero) after manufacturing.

Note: In case we set the AT parameters (of course we execute the AT), and a reset or a power-cycle occurs, G30 should continue the execution of the AT command with the saved parameters, until the user changes the settings.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MADCM=<adc_id>,<report>[,<rate>][,<low>,<high>]	For <Report>=0 OK For <Report>=1 +MADCM: <adc_id>,<value> OK For <Report>=2 or 3 OK +MADCM: <adc_id>,<value> … +MADCM: <adc_id>,<value> or ERROR: <error code>	Read the value of specific ADC.
Read	AT+MADCM?	+MADCM: 1,<report>,<rate>,<low>,<high> 2,<report>,<rate>,<low>,<high> 3,<report>,<rate>,<low>,<high> OK	Read the setting parameters.
Test	AT+MADCM=?	+MADCM: (range of <adc_id>),(range of <report>),(range of <rate>),(range of <low>/<high> for each ADC) OK	

The following table shows the +MADCM parameters.

Table 4-99: +MADCM Parameters

<Parameter>	Description	Range/Remark
<acc-id>	1; ADC1 (LGA #36) (70 pin connector #37). 2; ADC2 (LGA #35) (70 pin connector #43). 3; ADC3 (internally VCC).	
<Report>	0; Deactivate unsolicited report. 1; Report once the current value. 2; Activate unsolicited report. 3; Activate unsolicited report only for out-off-boundaries events.	
<Rate>	1-255; Select the time interval in seconds between the unsolicited reports. (Default value = 1 Second).	
<low>,<High>	0-1920; ADC1 boundaries (milliVolts). 0-1920; ADC2 boundaries (milliVolts). 0-5180; ADC3 boundaries (milliVolts). (Default value = 0).	Setting corresponding <Low> and <High> voltage boundaries for <Report>=3 only.
<value>	0-1920; ADC1 measured value (milliVolts). 0-2500; ADC2 measured value (milliVolts). 0-5180; ADC3 measured value (milliVolts).	

Example

```
AT+MADCM=?              // Test the range of the parameters.
+MADCM: (1-3),(0-3),(1-255),(0-1920, 0-1920, 0-5180)
OK

AT+MADCM=1,1            // Set ADC1 to read for once the current measurement
                        // and after that the <report> will set to 0.
+MADCM: 1, 635          // ADC1 current measurements is 635 millivolts.
OK

AT+MADCM =2,2,5                 // Set ADC2 to unsolicited reports for every 5 seconds.
OK
+MADCM: 2,1000          // ADC2 current measure report 1000 millivolts
+MADCM: 2,1500          // ADC2 unsolicited report 1500 millivolts after 5 seconds.
+MADCM: 2,0             // ADC2 unsolicited report 0 millivolts after 10 seconds.
+MADCM: 2,2000          // ADC2 unsolicited report 2000 millivolts after 15 seconds.
…
+MADCM: 2,1500          // ADC2 unsolicited report 1500 millivolts after Nx5 seconds.
…
+MADCM: 2,1500          // (continue) ADC2 unsolicited report 1500 millivolts after Nx5 seconds.
…

AT+MADCM?               // Read the current setting of all ADC's.
+MADCM: 1,0,0,0,0               // ADC1 sets to not to report (already report once).
```


```
+MADCM: 2,2,5,0,0                    // ADC2 sets to unsolicited reports for every 5 seconds.
+MADCM: 3,0,0,0,0                    // ADC3 sets to not to report.
OK

…
+MADCM: 2,1500              // (continue) ADC2 unsolicited report 1500 millivolts after Nx5
                    seconds.
…

AT+MADCM =3,3,30,1800,1900                  // Set ADC3 to out-off boundary (1800-1900 millivolts)
                  // unsolicited reports for every 30 seconds.
OK
…
+MADCM: 3, 1770              // ADC3 unsolicited current report out-off the Low boundary.
…
+MADCM: 2,1500              // (continue) ADC2 unsolicited report 1500 millivolts after Nx5
                    seconds.
…
+MADCM: 3, 1600             // ADC3 unsolicited report out-off the Low boundary after 30
                    seconds.
…
+MADCM: 2,1500              // (continue) ADC2 unsolicited report 1500 millivolts after Nx5
                    seconds.
…
+MADCM: 3, 1984              // ADC3 unsolicited report out-off the High boundary after Nx30
                    seconds
…
…
+MADCM: 2,1500              // (continue) ADC2 unsolicited report 1500 millivolts after Nx5
                  seconds.
…

AT+MADCM?                   // Read the current setting of all ADC's.
+MADCM: 1,0,0,0,0                    // ADC1 sets to not to report (already report once).
+MADCM: 2,2,5,0,0                    // ADC2 sets to unsolicited reports for every 5 seconds.
+MADCM: 3,3,30,1800,1900             // ADC3 sets to unsolicited reports for every 30 seconds
                  // when out-off boundary (1800-1900 millivolts).
OK

…
+MADCM: 2,1500              // (continue) ADC2 unsolicited report 1500 millivolts after Nx5
                    seconds.
…

AT+MADCM=3,0                         // Set ADC3 to stop the unsolicited report, all values will be cleared
                    (set to 0).
OK

AT+MADCM?                    // Read the current all ADC's setting.
+MADCM: 1,0,0,0,0                    // ADC1 sets to not to report.
+MADCM: 2,2,5,0,0                    // ADC2 sets to unsolicited reports for every 5 seconds.
+MADCM: 3,0,0,0,0                    // ADC3 sets to not to report.
OK

…
+MADCM: 2,1500              // (continue) ADC2 unsolicited report 1500 miliVolts after Nx5
                    seconds.
…

AT+MADCM=2,0                // Set to stop the ADC2 unsolicited report, all values will be cleared
                    (set to 0).
```

OK

AT+MADCM? // Read the current all ADC's setting.
+MADCM: 1,0,0,0,0 // ADC1 sets to not to report.
+MADCM: 2,0,0,0,0 // ADC2 sets to not to report.
+MADCM: 3,0,0,0,0 // ADC3 sets to not to report.
OK

4.6.1.21. +MPCMC, Continuous PCM Clock

This command defines whether the PCM clock is generated continuously or not, when phone is in digital audio mode (configured by AT+MADIGITAL command). The change takes effect after the next audio operation.

Note: The user is advised not to enable sleep mode feature if he wants to use continuous PCM clock feature. PCM clock will not work correctly while the module is in deep sleep mode.

Command Type	Syntax	Response/Action	Remarks
Set	+MPCMC=<flag>	OK or: +CME ERROR: <err>	The Set command is used for setting the PCM clock configuration.
Read	+MPCMC?	+MPCMC: <flag> OK or: +CME ERROR: <err>	The Read command returns the current PCM clock <flag> value.
Test	+MPCMC=?	+MPCMC: (list of supported <flag>s) OK	The Test command returns the possible <flag> values.

The following table shows the +MPCMC parameters.

Table 4-100: +MPCMC Parameters

<Parameter>	Description
<flag>	0 Non-continuous PCM clock. 1 Continuous PCM clock. Before the AT+MPCMC command is set for the first time, this value is 0. Power-up is according to the flex.

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

4.6.1.22. +MTSM, Motorola Temperature Sensor Measurement

This command measures the current temperature sensor value in Celsius degrees.
This temperature is taken from a Thermistor internally in Egold.
All the parameters are saved on the NVM, and used after power up.
All the parameter values should be 0 (zero) in first operation of the module.

Note:

- In case AT parameters are set and executed, and a reset or a power-cycle occurs, the G30 continues with the execution of the AT command using the saved parameters, until the user changes the settings.
- Temperature readings are enabled after about 15 seconds from power up.

Command Type	Syntax	Response/Action	Remarks
Set	+MTSM=<Report>[,<Rate>][,<Low>,<High>]	For <Report>=0 OK For <Report>=1 +MTSM: <Temp> OK For <Report>=2 or 3 OK +MTSM: <Temp> … +MTSM: <Temp> or: ERROR: <error code>	Read the temperature.
Read	+MTSM?	+MTSM=<Report>,<Rate>,<Low>,<High> OK	Read the setting parameters.
Test	+MTSM=?	+MTSM: (range of <Report>),(range of <Rate>),(range of <Low>/<High>) OK	

The following table shows the +MTSM parameters.

Table 4-101: +MTSM Parameters

<Parameter>	Description
<Temp>	(-)40 - 125; Temperature measurements in Celsius degrees.
<Report>	0; Deactivate unsolicited report. 1; Report once the current temperature. 2; Activate unsolicited report. 3; Activate unsolicited report only for out-off boundaries events.
<Rate>	1-255; Select the time interval in seconds between the unsolicited reports. (Default value = 1 Second).
<Low>	(-)40 - 125; The lowest boundary level of the temperature value for unsolicited report. (Default value = 0 Celsius). Setting corresponding <Low> and <High> temperature boundaries for <Report>=3 only.
<High>	(-)40 - 125; The Highest boundary level of the temperature value for unsolicited report. (Default value = 0 Celsius). Setting corresponding <Low> and <High> temperature boundaries for <Report>=3 only.

Example

```
AT+MTSM=?                  // Test the range of the parameters.
+MTSM: (0-3),(1-255),(-40-125)
OK

AT+MTSM=1                  // Set to read for once the current temperature measurement.
+MTSM: 35                  // Current temperature is +35 Celsius degree.
OK

AT+MTSM=2,5                // Set to unsolicited temperature reports to TE for every 5 seconds.
OK
+MTSM: -10                 // Current temperature measure report -10 Celsius.
+MTSM: -5                  // Unsolicited temperature report -5 Celsius after 5 seconds.
+MTSM: 7                   / Unsolicited temperature measure report +7 Celsius after 10 seconds.
+MTSM: 20                  // Unsolicited temperature measure report +20 Celsius after 15
                           seconds.
…
+MTSM: 50                  // Unsolicited temperature measure report +50 Celsius after Nx5
                           seconds.

AT+MTSM=0                  // Set to stop the unsolicited report.
OK
```

AT+MTSM=3,30,-10,40 // Set to out-off boundary (-10 to +40 Celsius) unsolicited reports for every 30 seconds.
OK
+MTSM: -20 // Unsolicited current report out-off the Low boundary.
+MTSM: -12 // Unsolicited report out-off the Low boundary after 30 seconds.
+MTSM: 47 // Unsolicited report out-off the High boundary after Nx30 seconds

AT+MTSM? // Read the current setting.
+MTSM: 3,30,-10,40
OK

AT+MTSM=0 // Set to stop the unsolicited report.
OK

AT+MTSM? // Read the current setting.
+MTSM: 0
OK

4.6.1.23. +MSMPD, SIM Presence Detection Feature - Enable/Disable

This command is used for Enabling/Disabling the polling for SIM insertion event feature.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MSMPD=< SIM_PD_Polling>	OK or: +CME ERROR: <err>	The set command is used for Enabling/Disabling the polling for SIM insertion event feature.
Read	AT+ MSMPD?	+MSMPD: <SIM_PD_Polling> OK or: +CME ERROR: <err>	The read command returns the current state of polling for SIM insertion event feature (Enabled or Disabled).
Test	AT+ MSMPD =?	+MSMPD: (0-1) OK or: +CME ERROR: <err>	The test command returns the possible value's range.

The following table shows the + MSMPD parameters.

Table 4-102: +MSMPD Parameters

<Parameter>	Description
< SIM_PD_Polling>	0 Disabled 1 Enabled. **The default value**: SIM_PD_Polling shall be flex parameter - default "Enable". On Power Up - as previously saved in FLEX bytes.

4.7. Audio

4.7.1. Scope

The audio control can be Summarized to the following three issues:

- Path: Selection of microphone and speaker to be used.
- Gain: Control of volume levels for rings, voice, etc.
- Algorithm: Activation of audio algorithms (echo cancellation, noise suppression and sidetone).

The G30 incorporates two audio modes: 'Basic Audio' and 'Advanced Audio'. Each mode has a different behavior and a set of relevant AT commands. Figure 4-2 describes the two audio modes, switching between them and the AT commands related to each mode.

Audio Control of Path, Gain and Algorithms is available by these two different modes' sets of commands. It is advised to select the audio mode according to the application needs, either the 'Basic Audio' set or the 'Advanced Audio' set.

Switching between the Basic mode and advance mode will be done using the +MAPATH command, but basic commands will still function in this mode as well.

Basic Audio

This mode of commands suits most users. It provides a simple audio control. In this mode the G30 will also adjust the paths automatically upon headset interrupt. The G30 powers up in 'Basic Audio' mode.

Basic audio specific commands are: +CRSL, +CLVL, +CMUT, S94, S96.

Advanced Audio

This mode suits users who require a full control of the audio. When using these advanced commands, the audio control will ignore the headset interrupt (when the headset will be connected the paths will not change automatically). Upon invoking, any of the advanced Audio specific commands: +MAVOL, +MAPATH, +MAMUT and +MAFEAT, the G30 enters 'Advanced Audio' mode. G30 remains in 'Advanced audio' mode until the next power up.

General Audio Commands

The following audio commands can be used in both Basic and Advanced audio modes:
+CRTT, +VTD, +VTS, +CALM, +MMICG, +MADIGITAL, +MATONE, +MUBF, +MDBF, +MAHF and +MAHFD.

Table 4-103shows the differences between Basic and Advanced audio modes in controlling the audio.

Table 4-103: Basic and Advanced Audio Modes Comparison

	Basic Audio	Advanced Audio

Path	Paths are set automatically (upon interrupt).	Paths are set manually. All routings are available; any microphone with any speaker for each type of sound (voice, feedback tone, alert, etc.).
Gain	There are two types of gains: phone (voice, feedback) and alerts.	There is a matrix of gains: a different gain is saved for each type of sound through a specific speaker. For example, one volume level for rings through the speaker and a different volume level for rings through the transducer. Therefore, there will be 16 different volume levels, which is the product of the number of output accessories (speaker, headset speaker, transducer and digital output) and the number of audio tones (voice, feedback tone and alert).
Algorithm	Algorithms are set by ATS94 and ATS96.	

4.7.2. Audio Setup

The G30 has two audio modes: 'Basic Audio' and 'Advanced Audio'. Each mode has a different behavior and a set of relevant AT commands.
Figure 4-2 describes the two audio modes, switching between them and the AT commands related to each mode.

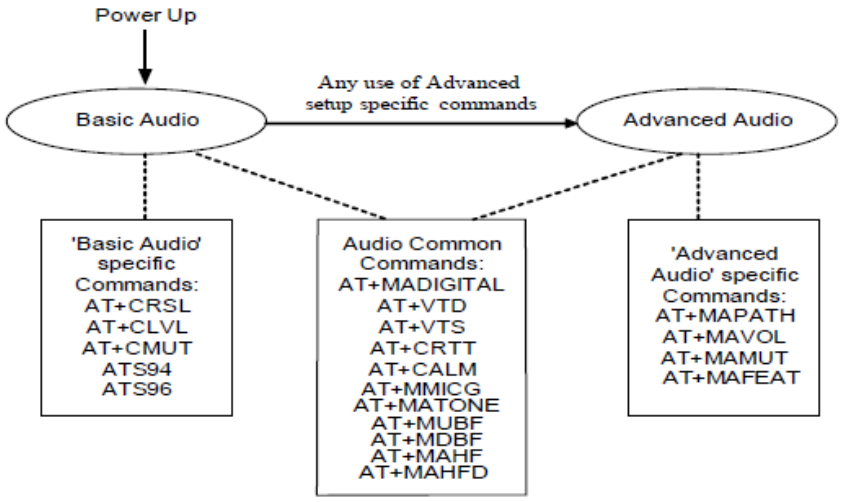


Figure 4-2:Audio Modes

Audio Control of Path, Gain and Algorithms is available by these two different modes' sets of commands. It is advised to select the audio mode according to the application needs, either the 'Basic Audio' set or the 'Advanced Audio'.

4.7.2.1. Basic Audio Setup

This mode's set of commands suits most users. It provides a simple audio control. In this mode the G30 will also adjust the paths automatically upon headset interrupt. The G30 powers up in 'Basic Audio' mode.
Basic audio specific commands are: +CRSL, +CLVL, +CMUT, S94, S96.
Figure 4-3 shows the basic audio setup.

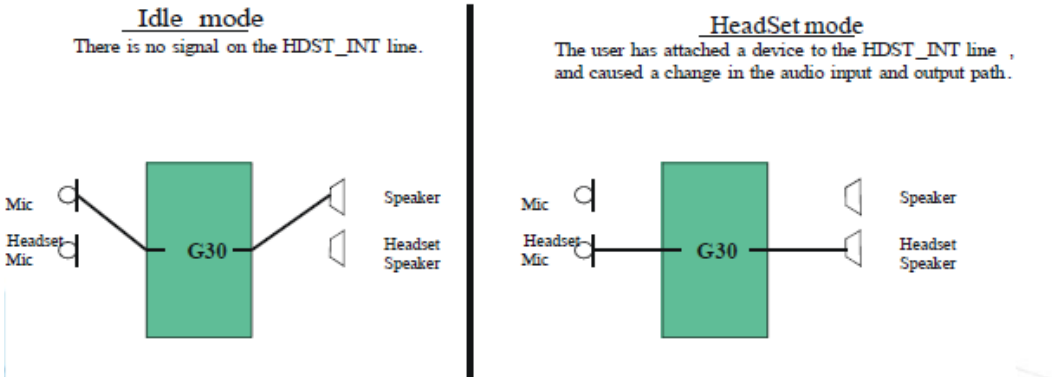


Figure 4-3:Basic Audio Setup

4.7.2.2. Advanced Audio Setup

This mode suits users which require a full control of the audio. When using these advanced commands the audio control will ignore the headset interrupt (when the headset will be connected the paths will not change automatically). Upon invoking +MAPATH the G30 will enter 'Advanced Audio' mode. G30 will remain in 'Advanced audio' mode until power cycle.
Figure 4-4 shows the advanced setup.

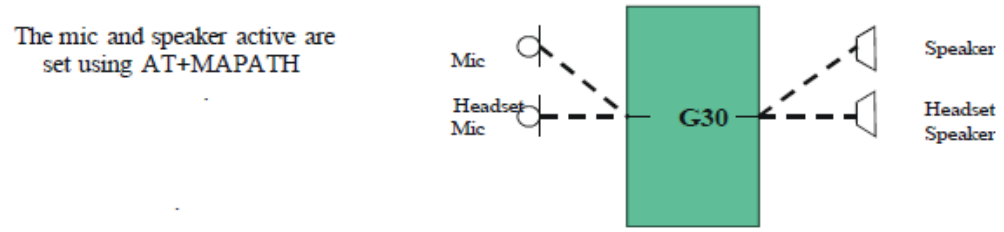


Figure 4-4:Advanced Audio Setup

G30 supports both analog and digital audio. Digital audio is supported in both basic and advanced audio setups. Switching between analog and digital audio modes is done by AT+MADIGITAL command. The default state is analog.

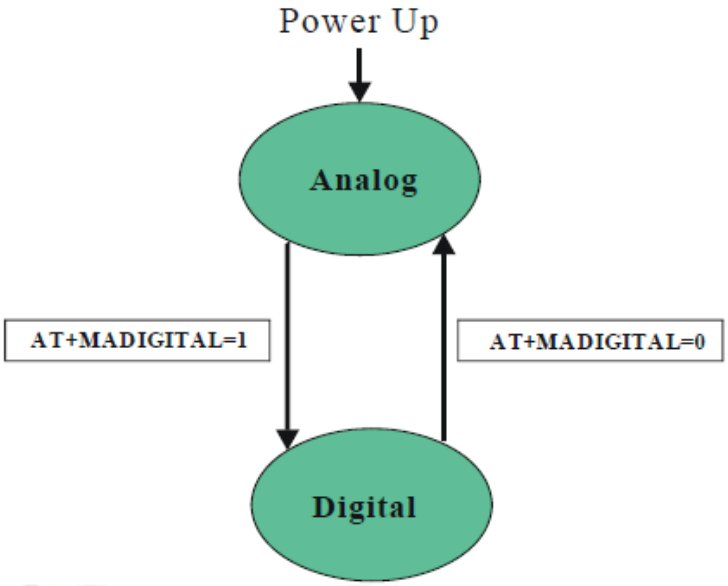


Figure 4-5;Analog/Digital Switching

4.7.2.3. General Audio Commands

The following audio commands can be used in both Basic and Advanced audio modes.
General audio commands are: +CRTT, +VTD, +VTS, +CALM, +MMICG, +MADIGITAL, +MATONE, +MUBF, +MDBF and +MAHF.

4.7.3. Basic Audio Setup Commands

4.7.3.1. +CRSL, Call Ringer Level

This command handles the selection of the incoming call ringer and alert tone (SMS) sound level on the alert speaker of the G30. The new value remains after power cycle. This command has no affect on digital audio mode.

Command Type	Syntax	Response/Action	Remarks
Set	+CRSL=<level>	OK +CME ERROR: <err>	The Set command sets the call ringer and alert (SMS) level.
Read	+CRSL?	+CRSL: <level> +CME ERROR: <err>	The Read command displays the current ringer alert (SMS) sound level setting.
Test	+CRSL=?	+CRSL: (list of supported <level>s) +CME ERROR: <err>	The Test command displays the list of supported sound level settings.

The following table shows the +CRSL parameters.

Table 4-104: +CRSL Parameters

<Parameter>	Description
<level>	0-7 Ringer sound level (0 is the lowest volume; 4 is default)

Example
AT+CRSL?
+CRSL: 7
OK
AT+CRSL=?
+CRSL: (0-7)
OK
AT+CRSL=5
OK

4.7.3.2. +CLVL, Loudspeaker Volume

This command sets the volume of the internal loudspeaker (which also affects the feedback tone) of the G30.
The level value is added to the value that was set in +MAVOL command and does not replace this value.
In this command, the new value remains after power cycle.
The +CLVL command can be used even when the SIM is not inserted. This command is applicable for Analog and Digital mode as well.

Command Type	Syntax	Response/Action	Remarks
Set	+CLVL=<level>	OK +CME ERROR: <err>	The Set command sets the internal loudspeaker volume level.
Read	+CLVL?	+CLVL: <level> +CME ERROR: <err>	The Read command displays the current internal loudspeaker volume setting.
Test	+CLVL=	+CLVL: (list of supported <level>s) +CME ERROR: <err>	The Test command displays the possible loudspeaker volume settings.

The following table shows the +CLVL parameters.

Table 4-105: +CLVL Parameters

<Parameter>	Description
<level>	0-7 Manufacturer-specific volume range. 0 is lowest volume (not mute). The default value is 4.

Example
AT+CLVL?
+CLVL: 7
OK
AT+CLVL=?
+CLVL: (0-7)
OK
AT+CLVL=3
OK

4.7.3.3. +CMUT, Mute/Unmute Currently Active Microphone Path

This command is used to mute/unmute the currently active microphone path by overriding the current mute state.
The CMUT setting should take effect only for the current call or for the next call once the command setting was typed in idle mode.

Command Type	Syntax	Response/Action	Remarks
Set	+CMUT=<state>	OK or: +CME ERROR: <err>	The Set command enables/disables uplink voice muting during a voice call.
Read	+CMUT?	+CMUT: <state> OK	The Read command returns the current uplink voice mute/unmute state.
Test	+CMUT=?	+CMUT: (list of supported <state>s) OK	The Test command returns the possible <state> values.

The following table shows the +CMUT parameters.

Table 4-106: +CMUT Parameters

<Parameter>	Description
<n>	0 Unmute microphone path (default) 1 Mute microphone path

Example
AT+CMUT=?
+CMUT: (0,1)
OK
AT+CMUT?
+CMUT: 0 uplink voice is unmuted
OK
AT+CMUT=1 uplink voice is muted
OK
AT+CMUT?
+CMUT: 1
OK
AT+CMUT =2
+CME ERROR: <err>

4.7.3.4. S94, Sidetone Effect

This command reduces the microphone audio input that is routed to the selected speaker, so that people speaking will hear themselves talking (The default value of S94 is "4").

Note: The value of the command is saved after a power cycle (flex).

Command Type	Syntax	Response/Action	Remarks
Set	ATS94=<n>	OK or: +CME ERROR: <err>	The Set command sets the sidetone status.
Read	ATS94?	<n> OK or: +CME ERROR: <err>	The Read command returns the sidetone status.
Test	ATS94=?	+CME ERROR: <err>	The Test command displays the supported values of <n>.

The following table shows the S94 parameters.

Table 4-107: S94 Parameters

<Parameter>	Description
<n>	0-7 Sidetone range. 0 - Disable sidetone. Default value is 4.

Example

```
ATS94=0          //Disable sidetone
OK
ATS94?
000              //Sidetone disabled
OK
```

4.7.3.5. S96, Echo Canceling/Noise Suppressions/AGC (Hands Free)

This command suppresses a large amount of the output sound picked up by the input device. S96 value is saved in the Flex.
The following table explains the use of the ATS96 set.

Command Type	Syntax	Response/Action	Remarks
Set	ATS96=<n>	OK or: +CME ERROR: <err>	The Set command sets the echo canceling/noise suppressions/agc (hands free) status.
Read	ATS96?	<n> OK or: +CME ERROR: <err>	The Read command returns the echo canceling/noise suppressions/agc (hands free) status.
Test	ATS96=?	+CME ERROR: <err>	

The following table shows the S96 parameters.

Table 4-108: S96 Parameters

<Parameter>	Description
<n>	0-3 levels select of echo canceling/noise suppressions/agc (hands free). Default value is 3.

Example
ATS96=1 //Hands free table number 1
OK
ATS96?
001 //Hands free table
OK

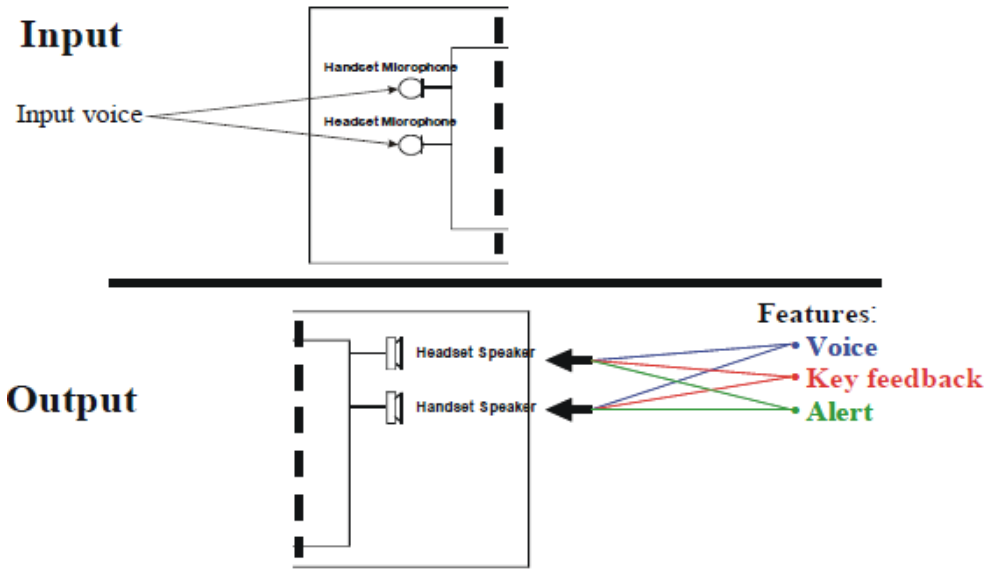
4.7.4. Advanced Audio Setup Commands

This group of commands enables accessory devices to control certain audio aspects within the system.

4.7.4.1. +MAPATH, Audio Path

This command sets/requests the active input accessory, and the output accessory for each feature. For example, you can choose the headset mic to be active, the voice and key feedbacks to go to the speaker, and the alerts to the headset speaker. On power up, the default path, are restored.

Note: +MAPATH cannot be used to set digital audio, but only to read it. In order to set the digital audio path, use +MADIGITAL. For more information, refer to section +MADIGITAL, Analog/Digital Audio Switching .
The value of the command is not saved after power cycle.
The following diagram shows the audio paths:



.

Figure 4-6: Audio Paths

Command Type	Syntax	Response/Action	Remarks
Set	+MAPATH= <direct>,<accy> [,<features>]	OK or: +CME ERROR: <err>	The Set command sets the audio path mode. The mode indicates which I/O accessories are now active for the different audio features. The <features> field is only used for outputs (direct=2).
Read	+MAPATH?	+MAPATH:1(mode in),<accy> +MAPATH:2(mode out), <accy>,<feature> [<CR><LF>+MAPATH:2(mode out), <accy>,<feature> [...]] OK	The Read command returns the active input audio accessory and the output accessory for each feature.
Test	+MAPATH=?	+MAPATH: (list of supported directions),(list of supported accessories),(list of supported features combinations) OK	The Test command returns the supported audio directions (input/output), accessories and features.

The following table shows the +MAPATH parameters.

Table 4-109: +MAPATH Parameters

<Parameter>	Description
<direct>	1 Mode in, field <features> is ignored. 2 Mode out, field <features> is present.
<accy>	Mode in: 1 Mic 2 Headset mic 3 Digital RX (for read command only) Mode out: 1 Speaker 2 Headset speaker 3 Digital TX (for read command only)
<features> (1-7)	1 Voice 2 Key feedback tone (DTMF back tone) Internal Tones (Busy tone, ring back tone, Confirm tone etc) 4 Alert (MT call Ring, SMS Alert etc)

Example

AT+MAPATH=1,2 //Direct=1 (input), accy=2 (headset mic)

OK

AT+MAPATH=2,1,3 //Direct=2 (output), accy=1 (speaker), feature=1 (voice and feedback tone)

OK

AT+MAPATH? //Set the headset mic as the input accessory

MAPATH: 1,2 //Direct=1 (input), accy=2 (headset mic)

MAPATH: 2,1,1 //Direct=2 (output), accy=1 (speaker), feature=1 (voice)

MAPATH: 2,1,2 //Direct=2 (output), accy=1 (speaker), feature=2 (feed back tone)

MAPATH: 2,3,4 //Direct=2 (output), accy=3 (alert speaker), feature=4 (alert)

OK

AT+MAPATH=?

+MAPATH: (1,2),(1-3),(1-7)

OK

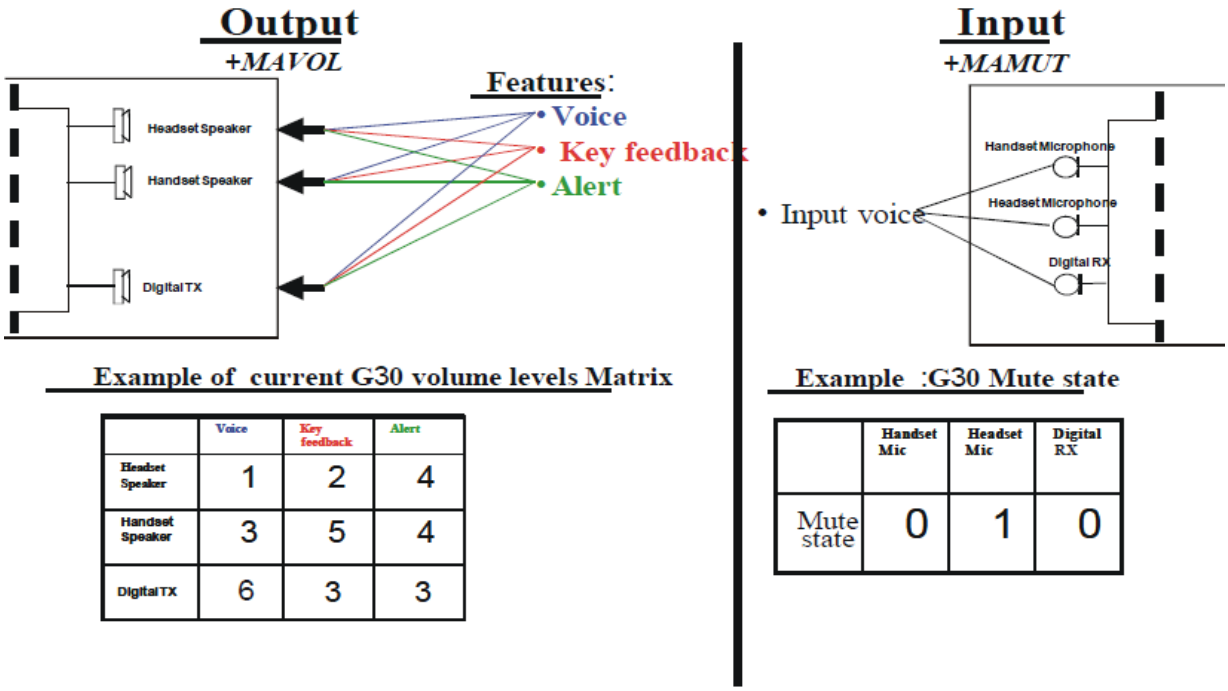
4.7.4.2. +MAVOL, Volume Setting

This command enables you to determine a volume level for a particular feature via a particular accessory. The gain levels are saved in flex. Therefore, upon power up, the path active (mic and speaker) will have these saved gain levels. This command is applicable for Analog and Digital mode as well.

The <vol> value is added to the value that was set in +CLVL command and does not replace this value.

Note: The SMS MT volume is adjusted using the +MAVOL command with type "Alert". The RING value is related to the SMS alert, the MT call, and so on.

+MAVOL setting is saved by flex for advance setting (flex).



Example of current G30 volume levels Matrix

	Voice	Key feedback	Alert
Headset Speaker	1	2	4
Handset Speaker	3	5	4
Digital TX	6	3	3

Example :G30 Mute state

	Handset Mic	Headset Mic	Digital RX
Mute state	0	1	0

Figure 4-7: G30 Audio Gain

Command Type	Syntax	Response/Action	Remarks
Set	+MAVOL=<accy>, <feature>,<vol>	OK or: +CME ERROR: <err>	The Set command sets the volume level <n> to a certain <feature> through a certain <accy>.
Read	+MAVOL?	(Current path volume) +MAVOL: <accy>,<feature1>,vol> +MAVOL: <accy>,<feature2>,vol> +MAVOL: <accy>,<feature4>,vol> OK	The Read command returns the volume level of all the features in the current active accessories.
Test	+MAVOL=?	+MAVOL:(supported accessories),(supported features combinations),(supported volume levels)	Test command returns the supported range of volume levels, accessories and features.

The following table shows the +MAVOL parameters.

Table 4-110: +MAVOL Parameters

<Parameter>	Description
<accy> (1-11)	1 Speaker 2 Headset speaker 8 Digital TX
<feature> (1-7)	1 Voice 2 Key feedback tone (DTMF back tone) Internal Tones (Busy tone, ring back tone, Confirm tone etc) 4 Alert (MT call Ring, SMS Alert etc)
<vol>	Volume level 0-7

Example
//Set volume level 3 for voice through speaker
AT+MAVOL=1,1,3 //Accy=1 (speaker), feature=1 (voice), vol=3 (volume level)
OK
//Set volume level 5 for voice and feedback through speaker
AT+MAVOL=1,3,5 //Accy=1 (speaker), feature=3 (voice and feedback), vol=5 (volume level)
OK
AT+MAVOL? //Requests the volume level of the current path's features
//Currently the voice outputs through speaker and its volume level is 5
+MAVOL: 1,1,5 //Accy=1 (speaker), feature=1 (voice), vol=5
//Currently the feedback tones outputs through speaker and its volume level is 5


```
+MAVOL: 1,2,5          //Accy=1 (speaker), feature=2 (feedback tones), vol=5
OK
```

4.7.4.3. +MAMUT, Input Devices Mute

This command controls the muting/unmuting of all input paths (mic, headset mic or digital RX). Upon power up, all the devices are unmuted.

Command Type	Syntax	Response/Action	Remarks
Set	+MAMUT=<accy>, <state>	OK or: +CME ERROR: <err>	The Set command mutes/unmutes any input accessory or any combination of them.
Read	+MAMUT?	+MAMUT:<accy1>,<state> +MAMUT:<accy2>,<state> +MAMUT:<accy4>,<state> OK	The Read command returns the current mute/unmute state of all the input accessories.
Test	+MAMUT=?	+MAMUT:(<accy> range),(<state> range)	The Test command returns the mute states available and the output accessories supported.

The following table shows the +MAMUT parameters.

Table 4-111: MAMUT Parameters

<Parameter>	Description
<accy> (1-7)	1 Mic 2 Headset mic 4 Digital RX
<state>	0 Unmute (default) 1 Mute

Example

```
AT+MAMUT=2,0           //Accy=2 (headset mic), state=0 (unmute)
OK
AT+MAMUT=5,1           //Accy=5 (mic + Digital RX), state=1 (mute)
OK
AT+MAMUT?
+MAMUT: 1,1            //Accy=1 (mic), state=1 (mute)
+MAMUT: 2,0            //Accy=2 (headset mic), state=0 (unmute)
+MAMUT: 4,1            //Accy=4 (Digital RX), state=1 (mute)
AT+MAMUT=?
+MAMUT: (1-7),(0,1)
OK
```

4.7.4.4. +MAFEAT, Features Selection

This command controls the algorithm features: sidetone, Hands free (echo cancel, noise suppression, and agc).

Note: The value of the command is saved after a power cycle (flex).

Command Type	Syntax	Response/Action	Remarks
Set	AT+MAFEAT=<feature>,<side tone state>,<hands free>	OK or: +CME ERROR: <err>	The Set command selects the table feature combinations.
Read	AT+MAFEAT?	+MAFEAT: <feature><state>, <table> OK or: +CME ERROR: <err>	The Read command returns the table features combinations.
Test	AT+MAFEAT=?	+MAFEAT: (<list of supported <feature>s), (<range of Sidetone values),(<range of hands free values) OK or: +CME ERROR: <err>	The Test command returns the list of supported features' numbers and supported tables states.

The following table shows the +MAFEAT parameters.

Table 4-112: MAFEAT Parameters

<Parameter>	Description
<feature>	A number between 1 to 3 which is built from a combination of: 1 - Side tone 2 - Hands free (echo cancel, noise suppression, and agc)
<side tone state>	0 - Disable 1 - 7 Side tone levels (Default enable in level 4)
<Hands Free table>	0 - 3 Echo cancellation table (Default table 0)

Example
The user should be able to set empty fields when the value is irrelevant.
For Example:
AT+MAFEAT=2, 5,1 // Side Tone table 5, Hand free table 1
OK
AT+MAFEAT?
1, 5 // Side tone table

2, 1 // Hands free table
OK

4.7.5. General Audio Commands

4.7.5.1. +MADIGITAL, Analog/Digital Audio Switching

This command switches between analog and digital audio modes. AT+MADIGITAL=1 switches to digital audio mode, and AT+MADIGITAL=0 switches it back to analog mode.

Command Type	Syntax	Response/Action	Remarks
Set	+MADIGITAL= <mode>	OK or: +CME ERROR: <err>	The Set command toggles between analog and digital audio modes.
Read	+MADIGITAL?	+MADIGITAL:<mode> OK	The Read command returns the current audio mode (analog or digital).
Test	+MADIGITAL=?	+MADIGITAL: <available audio modes> OK	The test command returns the available digital audio modes.

The following table shows the +MADIGITAL parameters.

Table 4-113: +MADIGITAL Parameters

<Parameter>	Description
<mode>	0 G30 works in analog audio mode. 1 G30 works in digital audio mode.

Example

AT+MADIGITAL=?

+MADIGITAL: (0,1)

OK

AT+MADIGITAL?

+MADIGITAL: 0

OK

AT+MADIGITAL=1

OK

AT+MADIGITAL?

+MADIGITAL: 1

OK

AT+MADIGITAL=0

OK

AT+MADIGITAL?

+MADIGITAL: 0

OK

AT+MADIGITAL=3

ERROR

AT+MADIGITAL?

+MADIGITAL: 0

OK

4.7.5.2. +CALM, Alert Sound Mode

This command handles the selection of the G30's alert sound mode. The value of the command is saved after a power cycle.

Command Type	Syntax	Response/Action		Remarks
Set	+CALM=<mode>	OK or: +CME ERROR: <err>		The Set command sets the alert sound mode.
Read	+CALM?	+CALM: <mode> +CME ERROR: <err>		The Read command displays the current alert sound mode setting.
Test	+CALM=?	+MSELINT = 0 +CALM: (list of supported <mode>s) +CME ERROR: <err>	+MSELINT = 1 +CALM: (list of supported <mode>s) +CME ERROR: <err>	+CALM=?

The following table shows the +CALM parameters.

Table 4-114: +CALM Parameters

<Parameter>	Description
<mode>	Alert sound mode of the G30. 0 Ring (default) 1 Silent mode (ring prevented)

Note: Selecting the ring mode with this command retrieves the current alert volume level setting.

Example
AT+CALM?
+CALM: 0
OK
AT+CALM=1
OK
AT+MSELINT=0
OK
AT+CALM=?
+CALM: (0-1)
OK
AT+MSELINT=1
OK
AT+CALM=?
+CALM: (0,1)
OK

4.7.5.3. +MMICG, Microphone Gain Value

This command handles the selection of microphone gain values of MIC-handsets. The new value remains after power cycle.

Command Type	Syntax	Response/Action	Remarks
Set	+MMICG=<gain>	OK +CME ERROR: <err>	The Set command sets the microphone gain value.
Read	+MMICG?	+MMICG: <gain> +CME ERROR: <err>	The Read command displays the current microphone gain.
Test	+MMICG=?	+MMICG (list of supported <gain>s) +CME ERROR: <err>	The Test command displays the list of supported gain values.

The following table shows the +MMICG parameters.

Table 4-115: +MMICG Parameters

<Parameter>	Description
<gain>	Microphone gain values in db: 0-15 0 is lowest gain value (not mute); default is 8

Example
AT+MMICG=?
+MMICG: (0-15)
OK
AT+MMICG?
+MMICG: 8
OK
AT+MMICG=15
OK

4.7.5.4. +MMICV, Microphone Voltage Value

This command handles the selection of microphone voltage values of 1st channel MIC port. The new value remains after power cycle.

Command Type	Syntax	Response/Action	Remarks
Set	+MMICV=<volt>	OK Or: +CME ERROR: <err>	The Set command sets the microphone voltage value.
Read	+MMICV?	+MMICV: <volt> +CME ERROR: <err>	The Read command displays the current microphone voltage.
Test	+MMICV=?	+MMICV (list of supported <volt>s) +CME ERROR: <err>	The Test command displays the list of supported voltage values.

The following table shows the +MMICV parameters.

Table 4-116: +MMICV Parameters

<Parameter>	Description
<volt>	Microphone voltage values: 0 means 1.8V 1 means 2.0V 2 means 2.2V

4.7.5.5. +CRTT, Ring Type Selection

This command plays one cycle of a ring tone, stops the cycle in the middle and sets the ring tone to be used.

Command Type	Syntax	Response/Action	Remarks
Set	AT+CRTT= <RingTypeNumber>, <operation>	OK or: +CME ERROR: <err>	The Set command sets the ring type and operation.
Read	AT+CRTT?	+CRTT: <RingTypeNumber> OK or: +CME ERROR: <err>	The Read command returns the ring type number.
Test	AT+CRTT=?	+CRTT: (list of supported <RingTypeNumber>s), (list of supported <operation>s) OK or: +CME ERROR: <err>	The Test command returns the list of supported tone type numbers and operations.

The following table shows the +CRTT parameters.

Table 4-117: +CRTT Parameters

<Parameter>	Description
<RingType Number>	Ring tone styles (Table 4-118)
<operation>	Play or set a tone 0 Play (play one cycle) 1 Set 2 Stop

Table 4-118: Ring Tone Types Available

CRTT=X	Ring Tone Style Name
1	Alert
2	Alert
3	Bells
4	Bits & Bytes
5	Charger1
6	Charger2
7	Door Bell
8	Triads
9	Wind Chimes
10	Up and Down
11	Random
12	Start Up
13	Cosmic
14	Cosmic2
15	Interlude
16	Power Surge

Example

```
AT+CRTT=6,0              //Ring type number 6, operation 0 (play)
OK                  //When 6 is in the supported <RingTypeNumber> range
AT+CRTT=6,2              //Ring type number=6, operation 2 (stop)
OK
AT+CRTT=?
+CRTT: (1-16),(0-2)
OK
AT+CRTT?
+CRTT: 6                 //Ring type number 6
AT+CRTT=5,4              //Invalid operation
+CME ERROR: <err>
```

Command Type	Syntax	Response/Action	Remarks
Set	+CVIB=<mode>	OK +CME ERROR: <err>	The Set command enables/disables the vibrator alert feature of the G24.
Read	+CVIB?	+CVIB:<mode> +CME ERROR: <err>	The Read command displays the current vibrator alert setting.
Test	+CVIB=?	+CVIB: (list of supported <mode>s) +CME ERROR: <err>	The Test command displays the list of supported CVIB modes.

Table 4-119: +CVIB Parameters

<Parameter>	Description
<mode>	Enables/disables the vibrator alert feature of the G24. 0 Disable (default) 1 Enable 16 Ring and vibrate

Table 4-120: Interaction between +CVIB and +CALM

Change +CVIB Mode	Change +CALM Mode
0 -> 1 - Change to enable	Change to 2 (vibrate mode)
1 -> 0 - Change to disable	Change to 0 (default ring mode)
-> 16 - Change to ring/vibrate	Change to 3 (ring/vibrate)

4.7.5.6. +VTD, Tone Duration

This command handles the selection of tone duration. An integer <n> defines the length of tones emitted as a result of the +VTS command. This command does not affect the D (dial) command. (Refer to D, Dial Command
.)
Any value other than zero causes a tone of duration <n> in multiples of 100 msec.
The value of the command is saved after a power cycle (flex).
Note: The new value will remain after power cycle.

Note: In GSM, the tone duration value can be modified depending on the specific network.

Command Type	Syntax	Response/Action	Remarks
Set	+VTD=<n>	OK. +CME ERROR: <err>	The Set command sets the tone duration.
Read	+VTD?	<n> +CME ERROR: <err>	The Read command displays the current tone duration.
Test	+VTD=?	+VTD: (list of supported <n>s) +CME ERROR: <err>	The Test command displays the list of supported tone durations.

The following table shows the +VTD parameters.

Table 4-121: +VTD Parameters

<Parameter>	Description
<n>	Defines the length of tones emitted by the +VTS command. 0-255

Example
AT+VTD=?


```
+VTD: (0-600)
OK
AT+VTD?
+VTD: 5
OK
AT+VTD=10
OK
```

4.7.5.7. +VTS, Command-Specific Tone Duration

This command transmits a string of DTMF tones when a voice call is active. DTMF tones may be used, for example, when announcing the start of a recording period.
The duration does not erase the VTD duration.

Note: In GSM, the tone duration value can be modified depending on the specific network.

If the active call is dropped in the middle of playing a DTMF tone, the following unsolicited message transfers to TE: +VTS: "Call termination stopped DTMF tones transmission".

Command Type	Syntax	Response/Action	Remarks
Set	+VTS= <DTMF>,[<duration>]	OK +CME ERROR: <err>	The Set command sets the tone and duration (if entered).
Read	+VTS?	+VTS: <DTMF> +CME ERROR: <err>	The Read command displays the currently transmitted DTMF tone. An error is displayed if no tone is active.
Test	+VTS=?	+VTS: (list of supported <DTMF>, (list of supported <durations>s) +CME ERROR: <err>	The Test command displays the list of supported DTMF tones and tone lengths.

The following table shows the +VTS parameters.

Table 4-122: +VTS Parameters

<Parameter>	Description
<DTMF>	String of ASCII characters (0-9, #, *, A-D) String length is up to 32 characters long.
<duration>	A DTMF tone of different duration from that set by the +VTD command. 0-255

Note: The duration defined by +VTS is specific to the DTMF string in this command only. It does not erase the duration defined by the +VTD command, and is erased when the G30 is powered down.

If <duration> is not defined, the +VTD value is used.

Example
AT+VTS ?
+VTS: "5"
OK
AT+VTS="2",10
OK

4.7.5.8. +MATONE, Start/Stop the Tone Play

This command starts/stops the tone play.

Command Type	Syntax	Response/Action	Remarks
Set	+MATONE=<state>, <tone_id>,<nof_play_times>, <mix_fac tor>	OK Or: +CME ERROR: <err>	
Read	+MATONE?	+MATONE: <result>, <aud_ret_code> OK	
Test	+MATONE=?	+MATONE: <state>,<tone_id>,<nof_play_times>, <mix_factor> OK	

The following table shows the +MATONE parameters.

Table 4-123: +MATONE Parameters

<Parameter>	Description
<state>	0 Stop 1 Start

<tone_id>	0: aud_tone_DTMF_0 1: aud_tone_DTM F_1 2: aud_tone_DTMF_2 3: aud_tone_DTMF_3 4: aud_tone_DTMF_4 5: aud_tone_DTMF_5 6: aud_tone_DTMF_6 7: aud_tone_DTMF_7 8: aud_tone_DTMF_8 9: aud_tone_DTMF_9 10: aud_tone_DTM F_hash 11: aud_tone_DTMF_asterix 12: aud_tone_key_tone_1 13: aud_tone_key_tone_2 14: aud_tone_key_tone_3 15: aud_tone_key_tone_4 16: aud_tone_key_tone_5 17: aud_tone_sv_su bscriber_busy 18: aud_tone_sv_congestion 19: aud_tone_sv_radio_path_ack 20: aud_tone_sv_radio_path_not_avail 21: aud_tone_sv_error_i nfo 22: aud_tone_sv_call_waiting 23: aud_tone_sv_call_alert 24: aud_tone_info_free_tone 25: aud_tone_info_connection 26: aud_tone_info_disconnect 27: aud_tone_info_device_in 28: aud_tone_info_device_out 29: aud_tone_info_msg_full 30: aud_tone_info_ussd 31: aud_tone_info_minutte_minder 32: aud_tone_info_error_1 33: aud_tone_info_error_2 34: aud_tone_info_sms_in_call 35: aud_tone_info_broadcast_in_call 36: aud_tone_info_alarm_in_call 37: aud_tone_info_low_bat_in_call 38: aud_tone_info_power_off 39: aud_tone_info_power_on 40: aud_tone_info_single_beep 41: aud_tone_info_positive_acknowledgement 42: aud_tone_info_negative_acknowledgement 43: aud_tone_info_auto_redial 44: aud_tone_info_network_attention 45: aud_tone_info_dial_tone 46: aud_tone_info_low_bat 47: aud_tone_ringing_test
<nof_play_times>	Indicating the amount of tone repetitions; range 0 .. 32767 (0x7FFF); 0 means repeats for ever; for other values a response is returned when the tone generation is finished.
<mix_fac tor>	Indicating the kind of volume for tone generation; range 0 .. 7.

<result>	Indicating the overall result of the command, may be: 0: RESULT_OK 1: RESULT_PARAM_OUT_OF_RANGE 2: RESULT_DRV_NOT_SUPPORTED 3: RESULT_AUD_RESOURCE_NOT_AVAI L 4: RESULT OTHER ERROR
<aud_ret_code>	Indicating the return code of the audio driver function call: 0: aud_rc_ok 1: aud_rc_resource_in_use 2: aud_rc_resource_conflict 3: aud_rc_handle_not_used 4: aud_rc_no_hw_support 5: aud_rc_sharing_violation 6: aud_rc_parameter_out_of_range 7: aud_rc_audio_driver_disabled 8: aud_rc_missing_dsp_resou rces 10: aud_rc_format_not_supported 11: aud_rc_no_playback 12: aud_rc_unknown_position 13: aud_rc_request_error 14: aud_rc_syntax_error 15: aud_rc_tone_error 16: aud_rc_storage_problems 17: aud_rc_performance_problems 18: aud_rc_ram_buffer_used 19: aud_rc_suspend_resume_error 20: aud_rc_info

4.7.5.9. +MUBF, Uplink Digital Filters (Uplink Biquad Filters)

This command change the digital audio filters parameters for a specific uplink path.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MUBF==<uplinkpath_num>, <filter_number>,<a1>,<b1>, <a2>,<b2>,<a0>	OK Or: +CME ERROR: <err>	
Read	AT+MUBF?	+MUBF: Path =<uplinkpath_num>: Filter1: a1:<a1>, b1:<b1>, a2:<a2>, b2:<b2>, a0:<a0> Filter2: a1:<a1>, b1:<b1>, a2:<a2>, b2:<b2>, a0:<a0> […] (all the supported path)	
Test	AT+MUBF=?	+MUBF: (List of supported <uplinkpath_num>s), (List of supported <filter_number>s), (List of supported <a1>s), (List of supported <b1>s), (List of supported <a2>s), (List of supported <b2>s), (List of supported <a0>s) OK or: +CME ERROR <err>	

The following table shows the +MUBF parameters.

Table 4-124: +MUBF Parameters

<Parameter>	Description

<uplinkpath_num>	0: handset_mic; // For analog audio
	1: headset_mic; // For analog audio
	2: I2S_rx. // For digital audio

<filter_number>	1-2 - Two digital filters in cascade are available for each uplink path (Filter1, Filter2)
<a1>	-32768 : 32767
<b1>	-32768 : 32767
<a2>	-32768 : 32767
<b2>	-32768 : 32767
<a0>	-32768 : 32767

Note:

- The value of the command is saved after a power cycle (flex).
- These parameters are the biquad filter coefficient. The biquad filter transfer function is:

$$H(z)=\frac{A_0+2A_1z^{-1}+A_2z^{-2}}{1+2B_1z^{-1}+B_2z^{-2}}$$

With coefficients A0,A1,A2,B1,B2 in the range -1:1
In the command they are scaled in the range -32768 : 32767
For example:
Set both headset microphone filters to all pass:
In this case the biquad filter transfer function is
H(z)=1

Then the coefficients are:
A0=1 a0=32767*A0
A1=A2=B1=B2=0 a1=a2=b1=b2=0
Commands are:
AT+MUBF=1,1, 0,0,0,0, 32767
AT+MUBF=1,2, 0,0,0,0, 32767

Example
AT+MUBF=0,1,-13915,2249,4377,-325,23450
OK
AT+MUBF=?

+MUBF: (0-2),(1-2),(-32768-32767),(-32768-32767),(-32768-32767),(-32768-32767),(-32768-32767)
OK

4.7.5.10. +MDBF, Downlink Digital Filters (Downlink Biquad Filters)

This command change the digital audio filters parameters for a specific downlink path.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MDBF==<downlinkpath_num>, <filter_number>,<a1>,<b1>, <a2>,<b2>,<a0>	OK Or: +CME ERROR: <err>	
Read	AT+MDBF?	+MDBF: Path =< downlinkpath_num>: Filter1: a1:<a1>, b1:<b1>, a2:<a2>, b2:<b2>, a0:<a0> Filter2: a1:<a1>, b1:<b1>, a2:<a2>, b2:<b2>, a0:<a0> […] (all the supported path)	
Test	AT+MDBF=?	+MDBF: (List of supported < downlinkpath_num>s), (List of supported <filter_number>s), (List of supported <a1>s), (List of supported <b1>s), (List of supported <a2>s), (List of supported <b2>s), (List of supported <a0>s) OK or: +CME ERROR <err>	

The following table shows the +MDBF parameters.

Table 4-125: +MDBF Parameters

<Parameter>	Description
<**downlinkpath _num**>	Specifies the downlink path that should change the sidetone 0 Normal earpiece (pins of Board-to-Board connector: EPP1B and EPPA2A); 1 Mono headset (pins of Board-to-Board connector: EPP1B and EPPA2A); 2 Stereo headset; 3 Loudspeaker (pins of Board-to-Board connector: AUON and AUOP); 4 I2S TX. // For digital audio
<**filter_number**>	1-2 - Two digital filters in cascade are available for each uplink path (Filter1, Filter2)
<**a1**>	-32768 : 32767
<**b1**>	-32768 : 32767
<**a2**>	-32768 : 32767
<**b2**>	-32768 : 32767
<**a0**>	-32768 : 32767

- The value of the command is saved after a power cycle (flex).
- These parameters are the biquad filter coefficient. The biquad filter transfer function is:

$$H(z)=\frac{A_0+2A_1z^{-1}+A_2z^{-2}}{1+2B_1z^{-1}+B_2z^{-2}}$$

With coefficients A0,A1,A2,B1,B2 in the range -1:1
In the command they are scaled in the range -32768 : 32767.
For example:
Set both loudspeaker filters to all pass:
In this case the biquad filter transfer function is
H(z)=1
Then the coefficients are:
A0=1 a0=32767*A0
A1=A2=B1=B2=0 a1=a2=b1=b2=0
Commands are:
AT+MDBF=3,1,0,0,0,0, 32767
AT+MDBF=3,2,0,0,0,0, 32767

Example
AT+MDBF=0,1,-13915,2249,4377,-325,23450
OK
AT+MDBF=?
+MDBF: (0-4),(1-2),(-32768-32767),(-32768-32767),(-32768-32767),(-32768-32767),(-32768-32767)
OK

4.7.5.11. +MAHFD, Features Selection

This command controls the algorithm features: Hands free Default (echo cancel, noise suppression, and agc).

Command Type	Syntax	Response/Action	Remarks
Set	AT+MAHFD=<n>	OK or: +CME ERROR: <err>	The Set command sets to default Hands free table.
Read	AT+MAHFD?	+CME ERROR: <err>	No read command.
Test	AT+MAHFD=?	+MAHFD: <list of number of table>	The Test command returns the list of supported table.

The following table shows the +MAHFD parameters.

Table 4-126: +MAHFD Parameters

<Parameter>	Description
<n>	0 - 3 List of Hands Free table

Example
AT+MAHFD=1 //Hands free table number 1 set to default
OK

4.7.5.12. +MAHF, Features Selection

This command controls the algorithm features: Hands free (echo cancel, noise suppression, and agc).

Note: The value of the command is saved after a power cycle.

Note: This command is available for advanced models only.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MAHF=<table>,< hf_algorithm_init>,< hf_algorithm_restart>,<step_width>, <lms_length>,<lms_offset>,<block_length>, <rxtx_relation>,<add_atten>,<min_atten>, <max_atten>,<nr_sw_2>,<nr_u_fak_0>,<nr_u_fak>	OK or: +CME ERROR: <err>	The Set command set Hands Free values for each table.
Read	AT+MAHF?	+MAHF: <feature><state>, <table> OK or: +CME ERROR: <err>	The Read command returns the table features combinations and Hands Free values.
Test	AT+MAHF=?	+MAHF: (<list of number of table>), (<range of hf_algorithm_init values),…(<range of nr_u_fak values) OK or: +CME ERROR: <err>	The Test command returns the list of supported table and Hands Free values range.

The following table shows the +MAHF parameters.

Table 4-127: +MAHF Parameters

<Parameter>	Description
<Hands Free table>	0 - 3 Hands Free table
<hf_algorithm_init>	The SWITCH parameter controls the activity and initialization of the EC,AGC,NR blocks Bit #0 set: Echo Canceller (EC) initialization Bit #1 set: EC restart (without coefficient initialization) Bit #2 set: EC on Bit #3 set: EC adaptation on Bit #4 set: Noise reduction initialization Bit #5 set: Noise reduction on Bit #6 set: Noise reduction works with additional AGC Bit #7 set: Automatic Gain Control (AGC) initialization Bit #8 set: AGC on Setting the bits is not mutually exclusive; more than one bit can be set at the same time. 0-511
<hf_algorithm_restart>	This bit mask allow to restart the activity of the EC,AGC,NR blocks without initialization. Allow hold current tuning when occur handover. For bit map refer to **<hf_algorithm_init>** 0-511
<step_width>	The higher this value, the faster the echo characteristic gets adapted. *Limit*: STEP_WIDTH *BLOCK_LENGTH<=2*32767 0-32767
<lms_length>	This is the maximum impulsive response of the FIR filter considered by the adaptive LMS algorithm, in samples. (Max time length: 400*Ts=50ms) *Limit*: 2<= LMS_LENGTH+ LMS_OFFSET<=400 (DSP memory limit) 2-400
<lms_offset>	This parameter is used by the LMS adaptation algorithm and indicates the expected delay of the echo after the RX signal, in samples. Calculation: Sample period T= 1/8000 s= 125us Loudspeaker to mic distance on a phone: L= 10 cm Sound velocity V=340 m/s Delay of echo D =L/V = 0.1/ 340 = 294us Number of samples=D/T= 2.35 --> LMS_OFFSET =2 0-400
<block_length>	The higher this number, the slower but more accurate the adaptation converge. 2,4,5,8

<rxtx_relation>	This parameters checks the power relation between Rx (loudspeaker) and Tx (microphone) signals in order to recognize the double talk condition from the echo condition. The system is considered to be in double talk condition when the TX power (mic signal) is higher that the maximum expected echo power: Tx (dB) > Rx (dB) - RxTx (dB) with RxTx (dB)=RXTX_RELATION*3/32 This is the most critical parameter in hand free. Values typical for handset are in range 50 to 150. For back speaker: -100 to -400. When in double talk, adaptation of FIR and AGC are suspended. -960 - +960
<add_atten>	When AGC decides to attenuate, ADD_ATTEN is added to the calculated attenuation. 0-960
<min_atten>	Minimal attenuation of the mic signal by the AGC. Level(dB)=3/32 * MIN_ATTEN 0-960
<max_atten>	Maximal attenuation of the mic signal by the AGC. Level(dB)=3/32 * MAX_ATTEN 0-960
<nr_sw_2>	Max attenuation. Linear; 0x7FFF means 1 = 0 dB Example: 0x4000= 0.5 = -6dB 0-32767
<nr_u_fak_0>	Factor of NR in the band 0Hz-250 Hz. Linear; 0x4000 means 1 = 0 db 0-16384
<nr_u_fak>	Factor of NR in the bands 250Hz -3750Hz. Linear; 0x4000 means 1 = 0 db A factor lower than 1 causes a better NR but also speech distortion and lowering of SLR 0-16384

Note: Any change in the gain on uplink or downlink path impacts on the amount of echo feedback from the speaker to the microphone. This means that performance of EC algorithm could change and rxtx_relation parameter will need to be changed to better fit the new gain on uplink or downlink path.

Example

The user should able to set empty fields when the value is irrelevant.
For Example:

```
AT+MAHF=1, 511,366, 2200,250,8,5,-150,0,0,500,256,768,2560   // Hand free table 1
OK
AT+MAHF?
0, 511,366, 2200,250,8,5,-150,0,0,500,256,768,2560        // Hand free table 0 (Default)
1, 511,366, 2200,250,8,5,-150,0,0,500,256,768,2560        // Hand free table 1
2, 511,366, 2200,250,8,5,-150,0,0,500,256,768,2560        // Hand free table 2
3, 511,366, 2200,250,8,5,-150,0,0,500,256,768,2560        // Hand free table 3
```

OK

4.7.5.13. +MAI2SY, PCM/I2S Audio Clock Switching

This command switches between PCM and I2S audio modes. AT+MAI2SY=1 switches to I2S audio mode (I2S Normal mode 512 KHz clock), and AT+ MAI2SY =0 switches it back to PCM mode (PCM mode 144 KHz clock).

Note: To use this command, the trace tool must be set off (+MTRACE=0).

Command Type	Syntax	Response/Action	Remarks
Set	+MAI2SY= <mode>	OK or: +CME ERROR: <err>	The Set command toggles between PCM and I2S audio modes.
Read	+MAI2SY?	+MAI2SY:<mode> OK	The Read command returns the current audio mode (PCM or I2S).
Test	+MAI2SY=?	+MAI 2SY: <available audio modes> OK	The test command returns the available audio modes.

The following table shows the +MAI2SY parameters.

Table 4-128: +MAI2SY Parameters

<Parameter>	Description
<mode>	0 G30 works in PCM audio mode (PCM mode 144 KHz clock). 1 G30 works in I2S audio mode (I2S Normal mode 512 KHz clock).

Example

AT+ MAI2SY =?

+ MAI2SY: (0,1)

OK

AT+ MAI2SY?

+ MAI2SY: 0

OK

AT+ MAI2SY =1

OK

AT+ MAI2SY?

+ MAI2SY: 1

OK

AT+ MAI2SY =0

OK

AT+ MAI2SY?

+ MAI2SY: 0

OK

AT+ MAI2SY =3

ERROR

AT+ MAI2SY?

+ MAI2SY: 0

OK

4.8. Access

4.8.1. Access Control Commands

When the phone or SIM card is locked or blocked, the only accessory operations allowed are those found in the list of Core AT commands (allowed while phone/SIM card is locked), shown in "Core AT Commands". All other AT commands are not executed. However, the phone is still capable of sending asynchronous message events via AT responses, for example, incoming call notification.

4.8.1.1. A/, Repeat Last Command

This command repeats the last command. It is not necessary to press <Enter> after this command.

Command Type	Syntax	Response/Action
Execute	A/	Repeats last command

Example
AT&D?
&D: 2
OK
A/
&D: 2
OK

4.8.1.2. AT, Check AT Communication

This command only returns OK.

Command Type	Syntax	Response/Action
Execute	AT	OK

Example
AT
OK

4.8.1.3. +CPIN, Enter PIN for Unlocking SIM Card or Enter PUK for Unblocking SIM Card

This command locks the SIM card, and therefore is only relevant for phones that use SIM cards. It unlocks the SIM card when the proper SIM PIN is provided and unblocks the SIM card when the proper SIM PUK is provided.
The SIM card is unlocked only once the provided pin is verified as the SIM PIN. If the required PIN (determined by the error code returned from the requested operation or the Read command) is SIM PUK or SIM PUK2, the second pin is required. This second pin, <newpin>, is used to replace the old pin in the SIM card. When entering the pin, a <new pin> is not required.

Note: For a list of commands that can be given when the G30 is awaiting the SIM PIN or SIM PUK, refer to Table 3-1: Core AT Commands .

Note: The SIM card lock is another level of security independent of the phone lock (See Access Control C for more information).

Figure 4-8 presents a diagram of what occurs when using the SIM card. Note that if an incorrect password is entered three times, the G30 requires that a master password be entered, If this also fails three times, the SIM will be blocked, and you will have to go to your provider to unblock it.

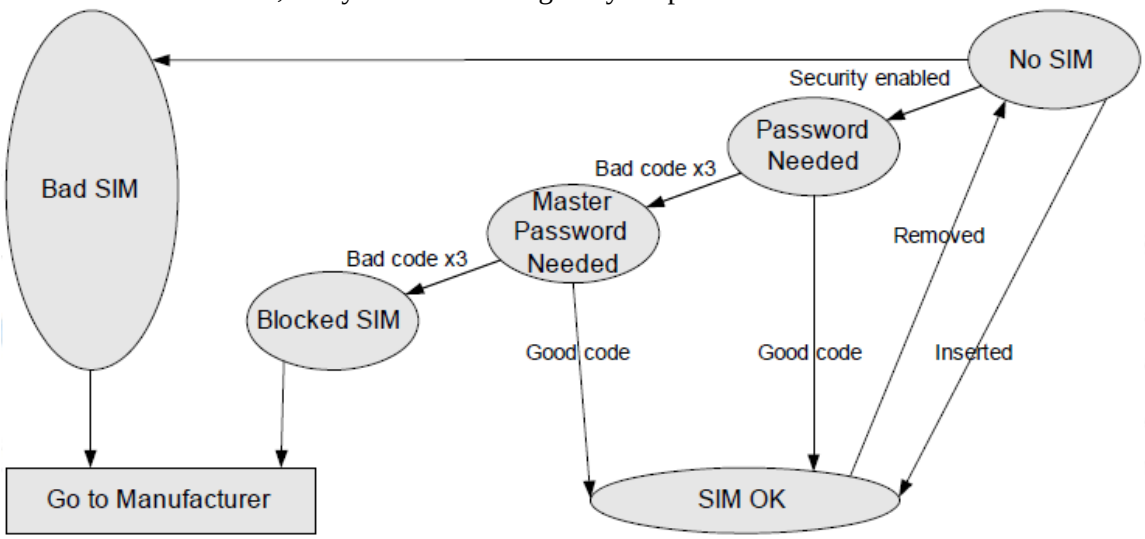


Figure 4-8: SIM States

A SIM card related error is returned if an AT command operation is unsuccessful due to a SIM card problem. The following table shows the SIM card errors.

Table 4-129: SIM Card Errors

Error	Description
10 SIM not inserted	SIM Card is not inserted
11 SIM PIN required	SIM Card waiting for SIM PIN to be entered
12 SIM PUK required	SIM PIN is blocked
13 SIM failure	SIM Card is permanently blocked
17 SIM PIN2 required	SIM Card is waiting for SIM PIN2 to be entered
18 SIM PUK2 required	SIM PIN2 is blocked

Command Type	Syntax	Response/Action	Remarks
Set	AT+CPIN=[<puk> or <pin>], [<newpin>]	OK or: +CME ERROR: <err>	The Set command sends the password to the G30 that is necessary before it can be operated (SIM PIN or SIM PUK). If there is no PIN request pending, no action is taken towards the G30, and an error message, +CME ERROR, is returned to the terminal. The Set command issued gives the code (SIM PIN or SIM PUK) corresponding to the error code required or returned as the result of the Read command. For example, if the SIM PIN is blocked, the error code 11 or "SIM PIN required" is returned. The user must then issue the Set command with the SIM PIN.
Read	AT+CPIN?	+CPIN: <code> OK or: +CME ERROR: <err>	The Read command returns an alphanumeric string indicating the status of the SIM card, and whether a password is required or not. This is an independent SIM card lock status check only, and does not check the phone lock status.
Test	AT+CPIN=?	OK or: +CME ERROR: <err>	

The following table shows the +CPIN parameters.

Table 4-130: +CPIN Parameters

<Parameter>	Description
<puk>	PUK code for unblocking a blocked phone
<pin>	Current PIN for unlocking a locked phone
<newpin>	New PIN (after changing or after entering PUK) 4 - 8 digits
<code>	READY - Not waiting for a password SIM PIN - Waiting for SIM PIN SIM PUK - Waiting for SIM PUK SIM PIN2 - Waiting for SIM PIN, this response is given when the last executed command resulted in PIN2 authentication failure SIM PUK2 - Waiting for SIM PUK2, this response is given when the last executed command resulted in PUK2 authentication failure
SIM PIN **SIM PUK** **SIM PUK2** **SIM PIN 2**	AT+CPIN=<pin> AT+CPIN=<puk>,<newpin> AT+CPIN=<puk2>,<newpin2> AT+CPIN=<pin2>

Example
AT+CPIN=?
OK
AT+CLCK="SC",1,"<correct PIN>" //Not case-sensitive
OK The facility is enabled by the +CLCK command

AT+CPIN?

+CPIN: SIM PIN

OK
AT+CPIN="<correct PIN>"
OK
AT+CPIN?
+CPIN: READY
OK
The status of the SIM is still enabled, but the PIN is READY for this session.
The SIM is enabled per session. After power-up SIM must be unlocked again by using the +CLCK command.
The following case shows an example of three unsuccessful attempts at entering the PIN:
AT+CPIN?
+CPIN: SIM PIN
OK
AT+CPIN="<wrong pin>"
+CME ERROR: incorrect password
AT+CPIN="<wrong pin>"
+CME ERROR: incorrect password
AT+CPIN="<wrong pin>"


```
+CME ERROR: SIM PUK required
AT+CPIN?
+CPIN: SIM PUK              //PIN is blocked. The PUK is needed for unblocking.
OK
AT+CPIN="<PUK>","<NEW PIN>"              //Enter PUK and new PIN
OK
AT+CLCK="FD",1,"<wrong PIN2>"
+CME ERROR: incorrect password
AT+CLCK="FD",1,"<wrong PIN2>"
+CME ERROR: incorrect password
AT+CLCK="FD",1,"<wrong PIN2>"
+CME ERROR: SIM PUK2 required
AT+CPIN?
+CPIN: SIM PUK2             //PIN2 is blocked. The PUK2 is needed for unlocking.
OK
AT+CPIN="<PUK2>","<NEW PIN2>"            //Enter PUK2 and new PIN2
OK
```

4.8.1.4. +TPIN, Query Number of Remaining SIM PIN/PUK Entering Attempts

This command returns the number of remaining attempts of entering the PIN and PUK for the SIM card in use. The command returns the number of remaining attempts for PIN1 (CHV1), PIN2 (CHV2), PUK1 (unblock CHV1) and PUK2 (unblock CHV2).
Number of available attempts is provider dependant. Typically it is 3 attempts for PIN, 10 attempts for PUK.
This command will return error if SIM is not inserted.

Command Type	Syntax	Response/Action	Remarks
Read	AT+TPIN?	+TPIN:<chv1>, <unb1_chv1>,<chv2>,<unb1_chv2> or ERROR	

The following table shows the +TPIN parameters.

Table 4-131: +TPIN Parameters

<Parameter>	Description
<chv1>	Number of remaining PIN attempts
<chv2>	Number of remaining PIN2 attempts
<unbl_chv1>	Number of remaining PUK attempts
<unbl_chv2>	Number of remaining PUK2 attempts

Example
AT+TPIN=?
+TPIN: 3,10,3,10
OK
AT+CPIN="7777"
+CME ERROR: incorrect password
AT+TPIN?
+TPIN: 2,10,3,10
OK

4.8.1.5. +CPWD, Change Password

This command sets a new password for the facility lock. The password can only be changed once the required facility is enabled by the +CLCK command.

A password can be changed only if the provided password <oldpwd> has been verified. The entered password <newpwd> must also comply to the password rules. The facility value <fac> is not case-sensitive. In the password value, letters are not allowed.

Command Type	Syntax	Response/Action	Remarks
Set	AT+CPWD=<fac>, <oldpwd>, <newpwd>	OK or: +CME ERROR: <err>	The Set command sets a new password for the facility lock function, defined by the +CLCK command.
Read	AT+CPWD?	+CME ERROR: <err>	
Test	AT+CPWD=?	+CPWD:list of supported (<fac>,<pwdlength>)s OK or: +CME ERROR: <err>	The Test command returns a list of pairs which represent the available facilities, and the maximum length of their passwords.

The following table shows the +CPWD parameters.

Table 4-132: +CPWD Parameters

<Parameter>	Description	
<fac>	List of supported facilities. All the facility messages, except for SC and P2, are sent to the network. (The facilities are not case-sensitive.) SC SIM (lock SIM card) The SIM requests the password during G30 power-up and when this command is issued. AO BAOC (Bar All Outgoing Calls) OI BOIC (Bar Outgoing International Calls) OX BOIC-exHC (Bar Outgoing International Calls except to Home Country) AI BAIC (Bar All Incoming Calls) IR BIC-Roam (Bar Incoming Calls when Roaming outside the home country) AB All Barring services (applicable only for <mode>=0) AG All outGoing barring services (applicable only for <mode>=0) AC All inComing barring services (applicable only for <mode>=0) P2 SIM PIN2	
<oldpwd>	**+MSELINT = 0** String type, for "SC" and "P2" 4-8 character other facilities until 4 character password specified for the facility from the G30 user interface.	+MSELINT = 1 String type, 4-8 character password specified for the facility from the G30 user interface.
<newpwd>	**+MSELINT = 0** String type, for "SC" and "P2" 4-8 character other facilities until 4 character new password specified by the user.	+MSELINT = 1 String type, 4-8 character new password specified by the user.
<pwdlength>	Maximum length of the facility password. Integer type.	

Example
At+mselint =0
AT+CPWD =?
+CPWD: ("SC",8),("P2",8),("AO",4),("OI",4),("OX",4),("AI",4),("IR",4),("AB",4),(
"AG",4),("AC",4)
OK

At+mselint =1
AT+CPWD =?
+CPWD: ("SC",8),("AO",8),("OI",8),("OX",8),("AI",8),("IR",8),("AB",8),("AG",8),(
"AC",8),("P2",8)
OK

At+mselint=0 and at+mselint=1

AT+CPWD?
+CME ERROR: operation not supported


```
AT+CLCK: "sc",1,"current pin password"
AT+CPWD="sc","incorrect old password","new password"
+CME ERROR: incorrect password
AT+CLCK="sc",2
+CLCK: 0
OK
AT+CPWD="sc","old password","new password"
+CME ERROR: operation not allowed
AT+CLCK="fd",1,"current pin2 password"
AT+CPWD="p2","old password","new password"
OK
AT+CLCK="ai",2
+CLCK: 0,1
+CLCK: 0,2
+CLCK: 0,4
OK
AT+CLCK="ai",1,"correct password"
OK
AT+CLCK="ai",2
+CLCK: 1,1
+CLCK: 1,2
+CLCK: 1,4
OK
AT+CPWD="ai","old password","new password"
OK
```

4.8.1.6. +CLCK, Facility Lock

This command locks, unlocks or interrogates a G30 or a network facility <fac> (any kind of call barring program). A password is mandatory for performing locking and unlocking actions, but not for querying. The feature of the G30 that is affected by this is the fixed dialing list. When querying the status of a single call barring program <mode>=2, the <status> for each call type will be returned.
For <fac>="SC", SIM Card PIN setting and for <fac>="FD", SIM Fixed Dialing memory setting, the <class> is irrelevant (For more information about <class>, refer to the following table shows the +CLCK parameters.). The <passwd> for "SC" is SIM PIN, and for "FD" it is SIM PIN2.

Command Type	Syntax	Response/Action	Remarks
Set	+CLCK=<fac>,<mode> [,<passwd> [,<classx>]]	For <fac> where <class> is irrelevant (SC, FD): +CLCK=<fac>,2 +CLCK: <status> For <fac> with several supported <class>es: +CLCK=<fac>,2 +CLCK: <status>,<class1> [<CR><LF>+CLCK: <status>,<class2> […]] OK	The Set command performs the specified <mode> action on the specified <fac>.
Read	+CLCK?	+CLCK: ERROR	
Test	+CLCK=?	+CLCK: (list of supported <fac>s)	The Test command returns the list of supported facilities.

The following table shows the +CLCK parameters.

Table 4-133: +CLCK Parameters

<Parameter>	Description
<fac>	SC SIM Card PIN setting <mode> 0 Disable PIN 1 Enable PIN) FD SIM Fixed Dialing memory setting <mode> 0 Disable fixed dialing feature 1 Enable fixed dialing feature) PS PH-SIM (lock Phone to SIM card) ME asks password when other than current SIM card inserted PN Network Personalization PU Network sUbset Personalization PP Service Provider Personalization PC Corporate Personalization AO BAOC (Bar All Outgoing Calls) OI BOIC (Bar Outgoing International Calls) OX BOIC-exHC (Bar Outgoing International Calls except to Home Country) AI BAIC (Bar All Incoming Calls) IR BIC-Roam (Bar Incoming Calls when Roaming outside the home country) AB All Barring services (applicable only for <mode>=0) AG All outgoing barring services (applicable only for <mode>=0) AC All incoming barring services (applicable only for <mode>=0)
<passwd>	String type, 4-8 character password
<mode>	0 Unlock 1 Lock 2 Query status (<passwd> does not apply) **Note:** Query mode return only the active <fac>. In case no <fac> is active the query will return the default (7).
<class>	Sum of integers, each representing a class of information <class>. Only applies to call barring related facilities. 1 Voice (telephony) 2 Data (refers to all bearer services) 8 SMS (Short Message Services) The default value is 7.
<status>	0 Inactive 1 Active

Example
AT+CLCK=?
+CLCK: ("SC","PS","PN","PU","PP","PC","FD","AO","OI","OX","AI","IR","AB","AG","AC","FD")
OK
AT+CLCK="SC",2
+CLCK: 0
OK


```
AT+CLCK="SC",1
+CME ERROR: operation not allowed
AT+CLCK="SC",1,"incorrect password
+CME ERROR: incorrect password
AT+CLCK="SC",1,"correct password"
OK
(From now SIM Card is locked and PIN is requested on power up)
AT+CLCK="AB",0,"incorrect password"
+CME ERROR: incorrect password
AT+CLCK="IR",2
+CLCK: 0,7
OK
AT+CLCK="IR",1,"correct password"  //<classx> is defaulted to 7 when not specified
OK
AT+CLCK="IR",2
+CLCK: 1,1
+CLCK: 1,2
+CLCK: 1,4
OK
AT+CLCK="OI",2
+CLCK: 0,7
OK
AT+CLCK="OI",1,"correct password",3
OK
(Voice and data international calls barred, and SMS not barred.)
AT+CLCK="OI",2
+CLCK: 1,1
+CLCK: 1,2
OK
AT+CLCK="AO",2                    // Class data can be represented as two indication for
                                  synchronous/asynchronous
+CLCK: 1,1
+CLCK: 1,4
+CLCK: 1,16
+CLCK: 1,32
OK
```

4.8.1.7. +CSIM, Generic SIM Access

This command allows a direct control of the SIM by an distant application on the TE. The TE shall then take care of processing SIM information within the frame specified by GSM/UMTS.

Note: Compared to Restricted SIM Access command (+CRSM), the definition of +CSIM allows TE to take more control over the SIM MT interface. The locking and unlocking of the interface may be done by a special <command> value or automatically by TA/MT (by interpreting <command> parameter). In case that TE application does not use the unlock command (or does not send a <command> causing automatic unlock) in a certain timeout value, MT may release the locking.

Command Type	Syntax	Response/Action	Remarks
Set	+CSIM=<length>,<command>	+CSIM: <length>,<response>+CME ERROR: <err>	Set command transmits to the MT the <command> it then shall send as it is to the SIM. In the same manner the SIM <response> shall be sent back by the MT to the TA as it is.
Test	+CSIM=?	+CME ERROR: <err>	

Note:

The following table shows the +CSIM parameters.

Table 4-134: +CSIM Parameters

<Parameter>	Description
<length>	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 SIM in the format as described in GSM 51.011 [28] (hexadecimal character format; refer to +CSCS, Select Terminal Character Set
<response>	Response to the command passed on by the SIM to the MT in the format as described in GSM 51.011 [28] (hexadecimal character format; refer to +CSCS, Select Terminal Character Set

4.9. Modem Configuration and Profile

4.9.1. Modem Register Commands

The G30 holds certain data items in selected memory space, named Software Registers (S-registers) and Modem Registers. Some of these registers are used as bitmaps, where one register holds more than one data item.

All S-registers can be accessed using the S command, described in “S, Bit Map Registers”

V, G30 Response Format

This command determines the response format of the data adapter and the contents of the header and trailer transmitted with the result codes and information responses. This command also determines whether the result codes are transmitted in a numeric or an alphabetic ("verbose") form. The text portion of information responses is not affected by this setting.

The following table shows the effect that setting this parameter has on the format of information text and result codes.

Table 4-135: Effects of Parameter Settings

V0	V1	Information Responses
<ATV0><cr><lf>	<ATV1><cr><lf>	0 - "OK" 1 - "CONNECT" 2 - "RING" 3 - "NO CARRIER" 4 - "ERROR" 5 - "NO DIALTONE" 6 - "BUSY" 7 - "NO ANSWER"
<numeric code><cr><if>	<verbose code><cr><lf>	

Command Type	Syntax	Response/Action	Remarks
Set	**ATV<value>**	OK or: +CME ERROR: <err>	The Set command sets the format of information responses and result codes.
Read	**ATV?**	<current value>	The Read command reads the current setting of response format.
Test			The Test command for V is not defined, and therefore is not supported by the G30. The G30 returns an error.

The following table shows the V parameters.

Table 4-136: V Parameters

<Parameter>	Description
<value>	0 Transmits limited headers and trailers, and numeric text. 1 Transmits full headers and trailers, and verbose response text. The default value is 1.

Example
ATV?
V: 1
OK
ATV0
0
ATV7
4
ATV1
OK
ATV7
ERROR

4.9.1.1. Q, Result Code Suppression

This command determines whether to output the result codes. Information text transmitted in response to commands is not affected by the setting of this parameter.

Command Type	Syntax	Response/Action	Remarks
Set	**ATQ<value>**	OK or: +CME ERROR: <err>	The Set command sets the format of information responses and result codes.
Read	**ATQ?**	<current value>	The Read command reads the current setting of response format.
Test			The Test command for V is not defined, and therefore is not supported by the G30. The G30 returns an error.

The following table shows the Qn parameters.

Table 4-137: Qn Parameters

<Parameter>	Description
<value>	0 Transmit result codes. 1 Suppress result codes. The default value is 0.

Example
ATQ0
OK
ATQ4
ERROR
ATQ1 //No response because result codes are suppressed.
ATQ4 //No response because result codes are suppressed.

4.9.1.2. E, Command Echo

This command defines whether input characters are echoed to output. If so, these characters are echoed at the same rate, parity and format at which they were received.

Command Type	Syntax	Response/Action		Remarks
Set	ATE<value>	OK or: +CME ERROR: <err>		The Set command sets whether or not to echo characters.
Read	ATE?	+MSELINT = 0 <current value>	+MSELINT = 1 E: <current value>	ATE?
Test				The Test command for E is not defined by ITU, and therefore is not supported by the G30. The G30 returns an error.

The following table shows the E parameters.

Table 4-138: En Parameters

<Parameter>	Description
<value>	0 Does not echo characters 1 Echoes characters The default value is 1.

Example

AT+MSELINT=0
OK

ATE?
001

OK
AT+MSELINT=1
OK

ATE?
E: 1

OK

4.9.1.3. X, Result Code Selection and Call Progress Monitoring Control

This command defines the CONNECT result code format. It determines whether or not the G30 transmits particular result codes to the user. It also controls whether the G30 verifies the presence of dial tone when it first goes off-hook to begin dialing, and whether the engaged tone (busy signal) detection is enabled.

Command Type	Syntax	Response/Action	Remarks
Set	ATX<value>	OK or: +CME ERROR: <err>	The Set command sets the result code and call progress monitoring control.
Test			The Test command for X is not defined by ITU, and therefore is not supported by the G30. The G30 returns an error.

The following table shows the X parameters.

Table 4-139: X Parameters

<Parameter>	Description
<value>	0 CONNECT result code given upon entering online data state: 1 CONNECT <text> result code given upon entering online data state 2 CONNECT <text> result code given upon entering online data state 3 CONNECT <text> result code given upon entering online data state 4 CONNECT <text> result code given upon entering online data state The default value is 0.

4.9.1.4. S, Bit Map Registers

This command reads/writes values of the S-registers. The G30 supports this command for various S values, according to official specifications (ITU-I, ETSI, or manufacturer specific).

Command Type	Syntax	Response/Action	Remarks
Set	ATSn=<value	OK or: +CME ERROR: <err>	The Set command is allowed for read/write S-registers, and not allowed for read-only S-registers.
Read	ATSn?	<current value of S-register n> or: +CME ERROR: <err>	
Test			The Test command for Sn is not defined by ITU, and therefore is not supported by the G30. The G30 returns an error.

The following table shows the different S-registers and their associated values.

Sn	Description	Min Value	Max Value	Default Value
S0	Sets/gets number of rings before auto answer.	0	255	0
S2	Sets/gets escape code character.	0	255	43
S3	Sets/gets carriage return code character.	0	127	13
S4	Sets/gets line feed code character.	0	127	10
S5	Sets/gets command line editing character (backspace).	0	127	8
S6	Sets/gets the amount of time in seconds, that the DCE waits between connecting to the line and dialing, when dial tone is not implemented or enabled.	2	10	2
S7	Sets the number of seconds in which connection must be established before the call is disconnected.	1	255	30

S8	Sets/get the amount of time in seconds, that the DCE shall pause, during dialing, when a "," dial modifier is encountered in a dial string.	0	255	3
S10	Sets/get the amount of time in tenth of second, that the DCE will remain connected to the line after the DCE has indicated the absence of received line signal. The command is not supported in GSM but OK returned.	1	254	
S12	Sets/gets guard time (in units of 50 msec) for the escape character during CSD connections.	0	255	20

Note: S0 (Auto Answer) should work regardless of the DTR HW line state. This is a deviation from the ITU V. 25-ter standard.

Example

ATS36?
005
OK
ATS0=3
OK
ATS?
003
OK

4.9.1.4.1. S2

This command handles the selection of the escape characters, which are stored in S-Register 2, and specifies the escape character used in CSD connections.

Command Type	Syntax	Response/Action	Remarks
Set	S2=<escape_character>	OK +CME ERROR: <err>	The Set command sets the CSD escape character value if all parameters are valid.
Read	S2?	<escape_character> OK +CME ERROR: <err>	The Read command displays the currently defined escape character for CSD connections.

The following table shows the S2 parameters.

Table 4-140: S2 Parameters

<Parameter>	Description
<escape_character>	CSD escape character. Range is 0 to 255. The default value is 43 ("+").

4.9.1.4.2. S12

This command handles the selection of the guard time, which is stored in S-Register 12, and specifies the behavior of escape characters during CSD connection.

Note: For a guard time specified by S-Register 12, no character should be entered before or after "+++". The duration between escape codes must be smaller than the guard time.

Command Type	Syntax	Response/Action	Remarks
Set	S12=<guard_time>	OK +CME ERROR: <err>	The Set command sets the CSD escape character guard time value if all parameters are valid.
Read	S12?	<guard_time> OK +CME ERROR: <err>	The Read command displays the current CSD escape character guard time.

Note:

The following table shows the S12 parameters.

Table 4-141: S12 Parameters

<Parameter>	Description
<guard_time>	CSD escape character guard time (units of 50 msec). Range is 0 to 255. The default value is 20.

4.9.1.5. +CBAND, Change Radio Band

This command allows switching from automatic band selection to selection of one or more (up to four) bands from the following:

- 850 MHz
- 900 MHz
- 1800 MHz
- 1900 MHz

Command Type	Syntax	Response/Action	Remarks
Set	+CBAND=[<band_1>[,<band_2>[,<band_3>[,<band_4>]]]]	OK +CME ERROR: <err>	
Read	+CBAND?	+CBAND: [<band_1>[,<band_2>[,<band_3>[,<band_4>]]]] OK	
Test	+CBAND=?	+CBAND: (list of supported bands) OK	

The following table shows the +CBAND parameters.

Table 4-142: +CBAND Parameters

<Parameter>	Description
<band_1> or **<band_2> or** **<band_3> or** **<band_4>**	0 - Automatic band selection (entering every time possible, display improbable) 850 - Selection of 850 MHz band 900 - Selection of 900 MHz band 1800 - Selection of 1800 MHz band 1900 - Selection of 1900 MHz band

4.9.1.6. &F, Set to Factory Defined Configuration

This command restores the factory default configuration profile. The G30 only supports one factory default profile, 0.

Command Type	Syntax	Response/Action	Remarks
Set	AT&F<value>	OK or: +CMS ERROR: <err>	
Read	AT&F?	<current profile number>	
Test			The Test command for &F is not defined by ITU, and therefore is not supported by the G30. The G30 returns an error.

The following table shows the &F parameters.

Table 4-143: &F Parameters

<Parameter>	Description
<value>	0 Factory default configuration profile. This is the only value supported.

Example
AT&F?
&F: 0
OK

4.9.1.7. Z, Reset to Default Configuration

This command drops the current call, and resets the values to default configuration.

Command Type	Syntax	Response/Action	Remarks
Set	ATZ<value>	OK or: +CMS ERROR: <err>	
Read			The Read command for Z is not defined, and therefore is not supported by the G30. The G30 returns an error.
Test			The Test command for Z is not defined, and therefore is not supported by the G30. The G30 returns an error.

The following table shows the Z parameters.

Table 4-144: Z Parameters

<Parameter>	Description
<value>	0 Set to user profile 0 1 Set to user profile 1 The default value is 0.

Example
ATZ0
OK

4.9.1.8. +MSTART, Enable/Disable Power Up Reports

This command enables/disables the two types of reports during the power on process.
The two reports are: "wait…at command ready" and "SIM READY".
The values will be saved after power cycle.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MSTART=<report1>,<report2>	OK or: +CMS ERROR: <err>	The Set command enables/disables unsolicited indications.
Read	AT+MSTART?	+MSTART: <report1>,<report2> OK or: +CME ERROR <err>	
Test	AT+MSTART=?	+MSTART: (List of supported <report1>s), (List of supported <report2>s) OK or: +CME ERROR <err>	

The following table shows the +MSTART parameters.

Table 4-145: +MSTART Parameters

<Parameter>	Description
<report1>	0 Disable "wait…at command ready" indication 1 Enable "wait…at command ready" indication The default value is 0.
<report2>	0 Disable "SIM READY" indication 1 Enable "SIM READY" indication The default value is 0.

Example

```
AT+MSTART=?
+MSTART: (0,1),(0,1)
OK
AT+MSTART?
+MSTART: 0,0
OK
AT+MSTART=1,1     // both reports are enabled for the next power up
OK
```

4.9.1.9. +MTRACE, Switch trace On/Off

This command switches the trace tool On/Off.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MTRACE=<mode>	OK or: +CME ERROR: <err>	Sets the command on/off.
Read	AT+MTRACE?	+MTRACE: <mode> OK or: +CME ERROR <err>	
Test	AT+MTRACE=?	+MTRACE: (List of supported <mode>s) OK or: +CME ERROR <err>	

The following table shows the +MTRACE parameters.

Table 4-146: +MTRACE Parameters

<Parameter>	Description
<mode>	0 Switch trace off 1 Switch trace on The default value is 0.

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

4.9.2. Sleep Mode Commands

When the G30 is connected using RS232 connection to an external device, a sleep mechanism is available. In order to improve the power consumption, the G30 supports a low-power consumption mode, called "Sleep mode". The G30 has internal decision conditions for entering and exiting sleep mode. As the terminal and the G30 operate in a combined system, and as the communication between the G30 and the terminal must be reliable, there should be a mechanism agreed upon by both the G30 and the terminal to co-ordinate their separate sleep mode entering and exiting sequences. The G30 will not enter sleep mode unless the terminal enables the G30 sleep mode and signals its readiness for sleep. For this purpose, a set of AT commands and dedicated HW lines are defined.

4.9.2.1. Sleep Mode AT Commands

The following are the Sleep mode AT commands:

- ATS24: Activates/deactivates Sleep mode.

The G30 receives a request to activate or deactivate Sleep mode.

- ATS102: Sets the value of the delay before sending data to the terminal.

The G30 receives the value that defines the period to wait between sending the wake-up signal, and sending data to the terminal.

- ATS100: The minimum time that takes the Terminal to enter sleep mode. Only if this time period passes, the G30 will wait ATS102 time between wake-up out line and data transmission.
- AT+MSCTS: The UART's CTS line control.

The G30 receives a request to define the behavior of the CTS line when the G30 is in Sleep mode. It enables or disables activation of the CTS line after wakeup.

4.9.2.2. Sleep Mode HW Signals

Two HW lines are used:

- One for waking the G30 (Wakeup-In)
- One for waking the terminal (Wakeup-Out)

Terminal Does Not Wake the G30 (If the Terminal Uses Hardware Flow Control Only)

When the G30 is in Sleep mode, the CTS line is also inactive. The terminal does not send any characters to the G30 if the CTS is inactive, otherwise the character may be lost (Hardware Flow Control).

Terminal Wakes the G30 Using the Wakeup-In Line

The terminal uses the Wakeup-In line (LGA #25) (70 pin connector #16) to wake up the G30 when it wants to send data. When the Wakeup-In line is low, the G30 will not enter the Sleep mode. If the terminal has data to send while the G30 is sleeping, it activates the line (brings it to active low), then waits 30 ms (the time required to wake the G30). Only then can the terminal start sending data.

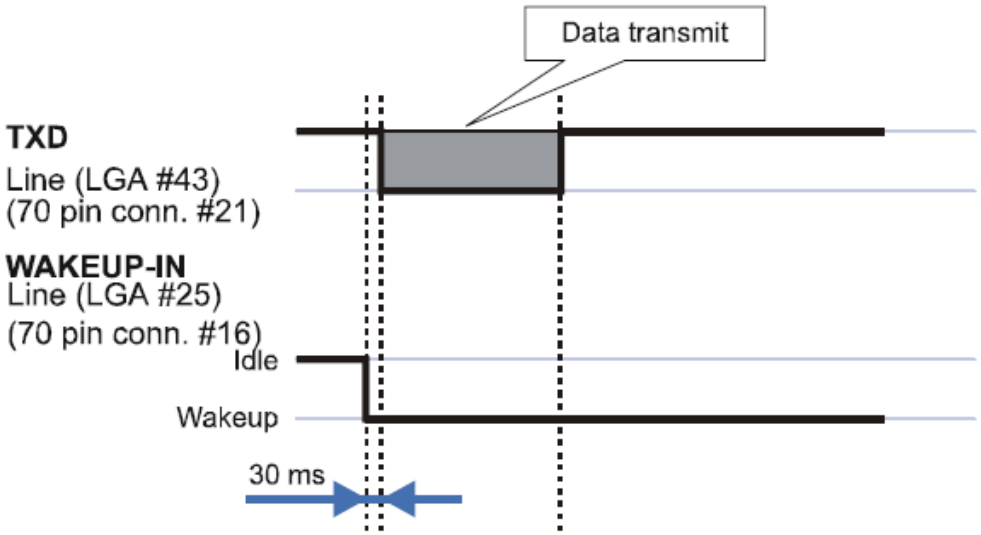


Figure 4-9: Wakeup-In Line

Two modes exist:

- Idle Mode: The terminal has no data to send. If the terminal enables sleep mode (using ats24), the G30 activates its Sleep mode module.
- Wakeup Mode: The G30 does not enter sleep mode, and the terminal can send data.
  Once the terminal changes the line edge to Wakeup mode, it needs a 30 ms delay before sending any data to the G30 (using the RS232 protocol).

G30 Wakes the Terminal

- The G30 follows these steps in order to wake up the terminal:
- The G30 indicates to the terminal that it has data and that it must wake up. The G30 uses the Wakeup-Out Line (LGA #14) (70 pin connector #26) (brings it to active low).
- While the Wakeup Out line is low, the terminal should not enter Sleep mode.
- The terminal should set a value of the delay (in ms) needed for waking it (using the ATS102 command) before receiving data (default value is 30 ms).
  When the data transmission is complete, the G30 gets the output wakeup line to high

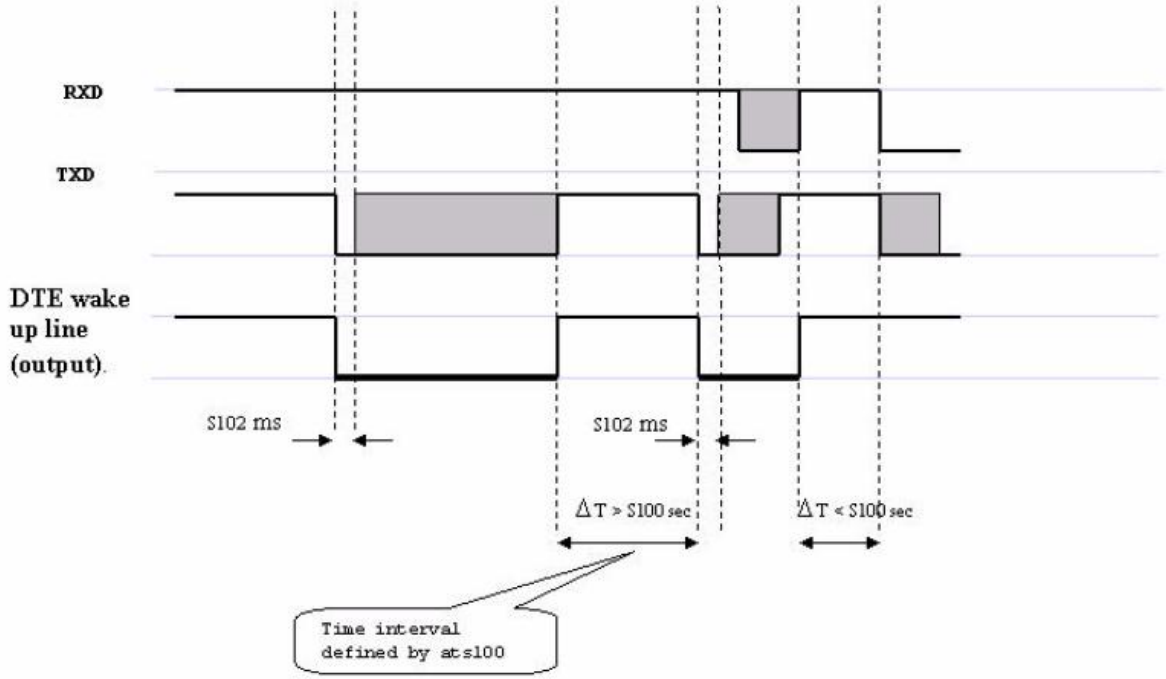


Figure 4-10: Wake up Outline

Two modes exist:

- Idle mode: The G30 has no data to send.
- Wakeup mode: The G30 has data to send to the terminal.
  After the G30 changes the line edge to Wakeup mode, there will be a delay (the default is 30 ms) sent by the ats102 command before sending any data to the terminal (using RS232 protocol).

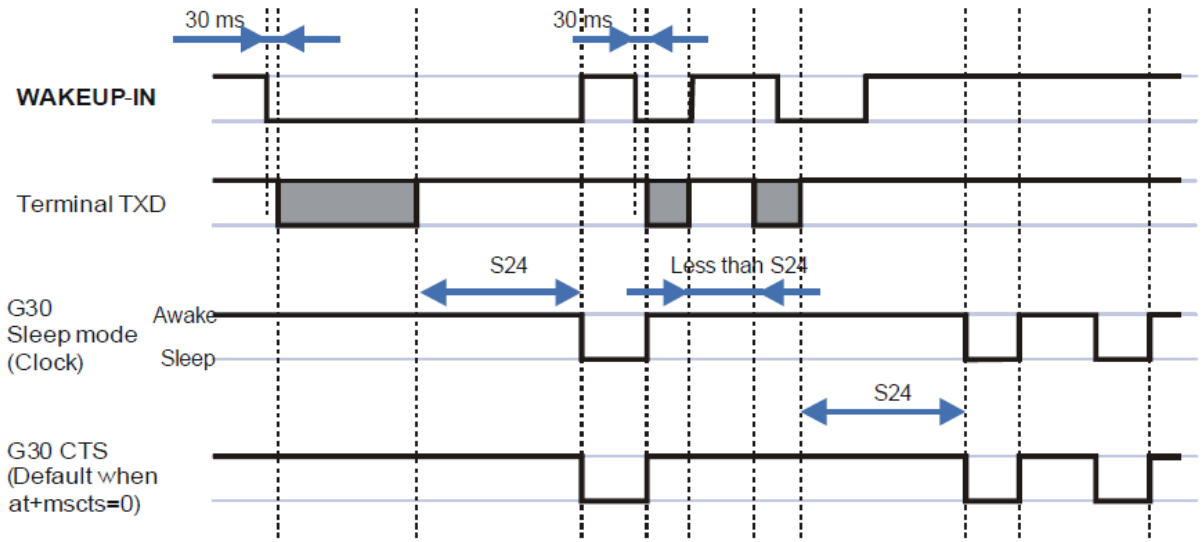


Figure 4-11: Sleep Mode when S24 > 0

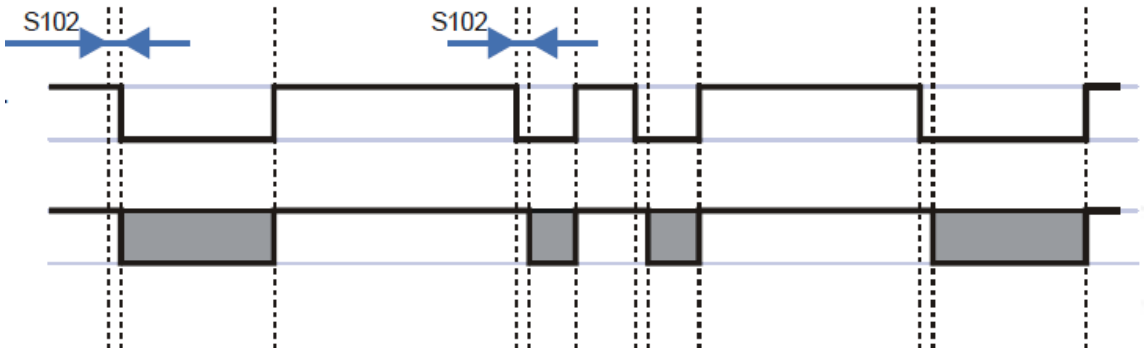


Figure 4-12: G30 Lines when S24 > 0

4.9.2.3. S24, Set Number of Seconds Delay Before G30 Enters Sleep Mode

This command activates/disables the Sleep mode. The terminal sends ATS24=5, and if there are no radio and UART activities, the G30 enters sleep mode in 5 seconds.
If terminal has some indication of the CTS pin activity, it can see:

- If +MSCTS=0 (default), the line changes its state periodically. (For more information refer to

+MSCTS, Enable/Disable CTS During Wakeup Period

+MSCTS, Enable/Disable CTS During Wakeup Period

- If +MSCTS=1, the line is switched off at the moment of entering Sleep mode and stays off even if G30 is awakened.

Note: The G30 will wake up from sleep mode and timer will reset only in case the DTE wakes up the module. In case of a report to the terminal the G30 continue to sleep.

S24 timer is relevant only when receiving an interrupt from UART.

Command Type	Syntax	Response/Action	Remarks
Set	ATS24=[<value>]	OK	The Set command sets the amount of time, in seconds, the G30 should wait before entering Sleep mode.
Read	ATS24?	<value> OK	The Read command returns the current value.

The following table shows the S24 parameters.

Table 4-147: S24 Parameters

<Parameter>	Description
<value>	Number of seconds (0 <= n <= 255) 0 Disable Sleep mode >0 Enable Sleep mode The default value is 0.

Example
ATS24? <enter>
000
OK
ATS24=5 <enter>
OK
ATS24? <enter>
005
OK
(If there are no radio and UART activities, the G30 will enter sleep mode in 5 seconds)

4.9.2.4. S102, Set Delay Before Sending Data to the Terminal

This command sets the value of the delay before sending data to the terminal. Before receiving data, the terminal connected to the G30 will receive:

- Terminal Wakeup signal (the Wakeup Out Line (LGA #14) (70 pin connector #26) state will be active low).
- A delay that is equal ATS102 value.
- Data (GPRS, CSD, AT commands' echo and results, unsolicited reports).

Command Type	Syntax	Response/Action	Remarks
Set	ATS102 = <value>	OK	The Set command sets the delay before sending data to the terminal, and defines a period between sending the wakeup signal and sending data to the terminal.
Read	ATS102?	<value> OK	The Read command returns the current value.

The following table shows the S102 parameters.

Table 4-148: S102 Parameters

<Parameter>	Description
<value>	0 <= value <= 255 The default value is 30 ms.

Example
ATS102? <enter>
030
OK
ATS102=100 <enter>
OK
ATS102? <enter>
100
OK

(This means if there is data for transmission to the terminal, the G30 drops the Wakeup Out line, waits 100 ms. and then sends data to the terminal.)

4.9.2.5. S100, Set Minimum Time for Terminal to Fall into Sleep Mode

ATS100 is a terminal minimum time limit for entering sleep mode.
In order to limit the number of interrupts on the DTE side and reduce data sending delay time on our side, G30 sends wakeup-out pulse when the interval between one burst of sent/received data to the other is bigger than specified in ATS100.

Command Type	Syntax	Response/Action	Remarks
Set	ATS100=<delta>	OK Or +CME ERROR: <err>	The set command sets the terminal minimum time limit for entering sleep mode.
Read	ATS100?	<delta> OK	The Read command returns the current ATS100 value.

Table 4-149: Command parameters

<Parameter>	Description	Remarks
<delta>	Time interval between one burst of sent/received data to the other before the terminal enters sleep mode. 0 : Wakeup out feature isn't active. (default when +S100 set command is never used) 1 - 255: Time in seconds.	This value is saved on power down.

Example
ats100?
001
OK
ats100=0
OK
ats100?
000
OK

4.9.2.6. +MSCTS, Enable/Disable CTS During Wakeup Period

This command defines the behavior of the CTS line when the G30 is in normal mode (not Sleep mode).
The command configures the G30 CTS line behavior always to follow the flow control requirements, or to follow it only if the terminal initiated a serial transmission session. This saves the terminal from following the CTS interrupt every time the G30 exits Sleep mode for internal G30 reasons (non-terminal communication related reasons).

Command Type	Syntax	Response/Action	Remarks
Set	AT+MSCTS=<control>	OK	The Set command tells the G30 whether to activate the CTS when the unit is awakening.
Read	AT+MSCTS?	+MSCTS: <current control> OK	The Read command returns the current control value.
Test	AT+MSCTS=?	+MSCTS: (list of supported <control>) OK	The Test command returns the possible control values.

The following table shows the +MSCTS parameters.

Table 4-150: +MSCTS Parameters

<Parameter>	Description
<control>	0 In Normal Mode: The CTS is used for Flow Control In Sleep mode: The CTS is inactive. 1 Wakeup In line is Active: The CTS is used for Flow Control. Wakeup In line is Inactive: The CTS is inactive. The default value is 0.

Example
AT+MSCTS =?
+MSCTS: (0-1)
OK
AT+MSCTS?
+MSCTS: 0
OK
AT+MSCTS = 1
OK
ATS102?
1
OK

Note: This means that by waking up, the CTS line will stay OFF and it can be activated by the Wakeup IN Line interrupt only.

4.9.3. Error Handling Commands

4.9.3.1. +CMEE, Report Mobile Equipment Error

The 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 G30. When enabled, G30-related errors cause a +CME ERROR: <err> final result code instead of the regular ERROR final result code. Usually, ERROR is returned when the error is related to syntax, invalid parameters or terminal functionality.
For all Accessory AT commands besides SMS commands, the +CMEE 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 G30. When enabled, G30 related errors cause a +CME ERROR: <err> final result code instead of the regular ERROR result code.
For all SMS AT commands that are derived from GSM27.005, the +CMEE Set command disables or enables the use of result code +CMS ERROR: <err> as an indication of an error relating to the functionality of the G30. When enabled, G30-related errors cause a +CMS ERROR: <err> final result code instead of the regular ERROR final result.

Command Type	Syntax	Response/Action	Remarks
Set	AT+CMEE=[<n>]	OK or: +CME ERROR: <err>	The Set command enables or disables the use of result code +CME ERROR: <err> as an indication of an error relating to the functionality of the G30.
Read	AT+CMEE?	+CMEE: <n> OK	The Read command returns the current setting format of the result code.
Test	AT+CMEE=?	+CMEE: (list of supported <n>s) OK Example: AT+CMEE=? +CMEE: (0-2) OK	The Test command returns values supported by the terminal as a compound value.

The following table shows the +CMEE parameters.

Table 4-151: +CMEE Parameters

<Parameter>	Description

<n>	0 Disable the +CME ERROR: <err> result code and use ERROR. 1 Enable the +CME ERROR: <err> or +CMS ERROR: <err> result codes and use numeric <err> values or +STK ERROR: <err> result codes and use numeric <err> values. 2 Enable the +CME ERROR: <err> or +CMS ERROR: <err> result codes and use verbose <err> values or +STK ERROR: <err> result codes and use numeric <err> values. The default value is 0.

Table 4-152: +CME Errors

<Parameter>	Description

<err>	Numeric format followed by verbose format: 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" 33, "command aborted" 34, "numeric parameter instead of text parameter" 35, "text parameter instead of numeric parameter" 36, "numeric parameter out of bounds" 37, "text string too short" 40, "network personalization PIN required" 41, "network personalization PUK required" 42, "network subset personalization PIN required" 43, "network subnet 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" 60, "SIM service option not supported" 100, "unknown" 103, "Illegal MS (#3)" 106, "Illegal ME (#6)" 107, "GPRS services not allowed (#7)"

<err> ***Continued***	111, "PLMN not allowed (#11)" 112, "Location area not allowed (#12)" 113, "Roaming not allowed in this location area (#13)" 132, "service option not supported (#32)" 133, "requested service option not subscribed (#33)" 134, "service option temporarily out of order (#34)" 147, "long context activation" 151, "GPRS disconnection timer is active" 149, "PDP authentication failure" 150, "invalid mobile class" 148, "unspecified GPRS error" 256, "too many active calls" 257, "call rejected" 258, "unanswered call pending" 259, "unknown calling error" 260, "no phone num recognized" 261, "call state not idle" 262, "call in progress" 263, "dial state error" 264, "unlock code required" 265, "network busy" 266, "Invalid phone number" 267, "Number Entry already started" 268, "Cancelled by user" 269, "Number Entry could not be started" 280, "Data lost" 281, "Invalid message body length" 282, "inactive socket" 283, "socket already open"

Note: +CME ERROR:280, Data lost, is sent to the terminal in extreme cases when the G30 has to transmit data to the terminal and the buffers are full (Flow control Xoff status).

This error occurs when:

- An unsolicited indication (such as RING, +CLCC and so on) encounters the Xoff status. When the flow control status returns to Xon, Error 280, Data lost, is sent to the terminal instead of the unsolicited indication.
- An initiated AT command is waiting for a response, and the response encounters the Xoff status. When the flow control status returns to Xon, the AT command is aborted (if not yet aborted) and Error 280, Data lost is sent to the terminal instead of OK (and the missing data).

Table 4-153: +CMS Errors

<Parameter>	Description
<err>	Numeric format followed by verbose format: 1, "Unassigned (unallocated) number" 8, "Operator determined barring" 10, "Call barred" 21, "Short message transfer rejected" 27, "Destination out of service" 28, "Unidentified subscriber" 29, "Facility rejected" 30, "Unknown subscriber" 38, "Network out of order" 41, "Temporary failure" 42, "Congestion" 47, "Resources unavailable, unspecified" 50, "Requested facility not subscribed" 69, "Requested facility not implemented" 81, "Invalid short message transfer reference value" 95, "Invalid message, unspecified" 96, "Invalid mandatory information" 97, "Message type non-existent or not implemented" 98, "Message not compatible with short message protocol state" 99, "Information element non-existent or not implemented" 111, "Protocol error, unspecified" 127, "Interworking, unspecified" 128, "Telematic interworking not supported" 129, "Short message Type 0 not supported" 130, "Cannot replace short message" 143, "Unspecified TP-PID error" 144, "Data coding scheme (alphabet) not supported" 145, "Message class not supported" 159, "Unspecified TP-DCS error" 160, "Command cannot be actioned" 161, "Command unsupported" 175, "Unspecified TP-Command error" 176, "TPDU not supported" 192, "SC busy" 193, "No SC subscription" 194, "SC system failure" 195, "Invalid SME address" 196, "Destination SME barred" 197, "SM Rejected-Duplicate SM" 198, "TP-VPF not supported" 199, "TP-VP not supported" 208, "SIM SMS storage full" 209, "No SMS storage capability in SIM" 210, "Error in MS" 211, "Memory Capacity Exceeded" 213, "SIM Data Download Error" 255, "an unspecified error" 300, "ME failure"

<err> ***Continued***	301, "SMS service of ME reserved" 302, "operation not allowed" 303, "operation not supported" 304, "invalid PDU mode parameter" 305, "invalid text mode parameter" 310, "SIM not inserted" 311, "SIM PIN required" 312, "PH-SIM PIN required" 313, "SIM failure" 314, "SIM busy" 315, "SIM wrong" 316, "SIM PUK required" 317, "SIM PIN2 required" 318, "SIM PUK2 required" 320, "memory failure" 321, "invalid memory index" 322, "memory full" 330, "SMSC address unknown" 331, "no network service" 332, "network timeout" 340, "no +CNMA acknowledgement expected" 500, "unknown error" 512, "network busy" 513, "invalid destination address" 514, "invalid message body length" 515, "phone is not in service" 516, "invalid preferred memory storage" 517, "user terminated"

Table 4-154: +STK Errors

<Parameter>	Description
<err>	Numeric format followed by verbose format: 700, "SIM ToolKit not available" 701, "cannot sustain both call and SIM application"

Example
AT+CMEE=0 //+CME ERROR is not used
OK
AT+VTD
ERROR
AT+CMEE=1 //Use numeric <err>
OK
AT+VTD
+CME ERROR: 1 ----------> not correspond to “operation not supported”.
AT+CMEE=2 //Use verbose <err>
OK
AT+VTD
+CME ERROR: operation not supported

4.9.3.2. +CEER, Extended Error Report

This execution command returns an extended error report containing one or more lines of information text <report>, determined by the manufacturer, providing reasons for the following errors:

- Failure in the last unsuccessful call setup (originating or answering) or the in-call modification.
- Last call release.

Typically, the text consists of a single line containing the reason for the error according to information given by GSM network, in textual format.

Command Type	Syntax	Response/Action
Set	**AT+CEER=[<n>]**	**OK**
Read	AT+CEER?	**+CEER: <n>** **OK**
Execute	AT+CEER	+CEER: <report> OK
Test	AT+CEER=?	OK

The following table shows the +CEER parameters.

Table 4-155: CEER Parameters

<Parameter>	Description
<report>	The total number of characters and line terminators (up to 2041) in the information text. The text must not contain the sequence 0<CR> or OK<CR>. Numeric format followed by verbose format: 0 No cause information available 1 Unassigned or unallocated number 3 No route to destination 6 Channel unacceptable 8 Operator determined barring 16 Normal call clearing 17 User busy 18 No user responding 19 User alerting, no answer 21 Call rejected 22 Number changed 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
<report> ***(continued)***	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 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 Interworking, unspecified

Example
AT+CEER
+CEER: "No information available"
OK
AT+CEER?
+CEER: 2
OK
AT+CEER=?
+CEER: (1-2)
OK

4.10. UI (User Interface)

4.10.1. +CRSM, Restricted SIM Access

This command provides limited access to the Elementary Files on the SIM. Access to the SIM database is restricted to the commands which are listed at <command>. All parameters of AT+CRSM are used as specified by GSM 11.11 version 8.7.0. As response to the command, the G30 sends the actual SIM information parameters and response data. Error result code "+CME ERROR" may be returned if the command cannot be transferred to the SIM, e.g. if the SIM is not inserted, or defected, or PIN1/PUK authentication required, or required input parameters not present. However, failure in the execution of the command in the SIM is reported in <sw1> and <sw2> parameters.
Some of the AT+CRSM commands require PIN/PIN2 authentication.

Command Type	Syntax	Response/Action	Remarks
Set	AT+CRSM=<command>, [<file_id> [,<P1>,<P2>,<P3> [,<data>]]]	+CRSM: <sw1>,<sw2>[,<response>] OK or: +CME ERROR: <err>	Set command transmits the SIM <command> and its required parameters to the ME. ME sends the actual SIM information parameters and response data.
Test	AT+CRSM=?	+CRSM: (list of supported <command>s), (possible <file_id>s range value), (possible <P1> range value), (possible <P2> range value), (possible <P3>range value), OK or: +CME ERROR: <err>	The test command returns the possible ranges of CRSM parameters.

The following table shows the +CRSM parameters.

Table 4-156: +CRSM Parameters

<Parameter>	Description
<command>	Integer type. Command passed on by the ME to the SIM. 176 Read BINARY 178 Read RECORD 192 Get RESPONSE 214 Update BINARY 220 Update RECORD 242 STATUS
<file_id>	Integer type. This is the identifier of a elementary data file on SIM. Mandatory for every <command> except of STATUS.
<P1>,<P2>, <P3>	Integer type. Parameters passed on by the ME to the SIM. These parameters are mandatory for every command, except GET RESPONSE and STATUS. **READ BINARY** **<P1>** Offset high (0...255) **<P2>** Offset low (0...255) **<P3>** Length (0...255) **READ RECORD** **<P1>** Rec. No. (0...255) **<P2>** Mode "02" = next record "03" = previous record "04" = absolute mode/current mode, the record number is given in P1 with P1='00' denoting the current record. **<P3>** Length (0...255) **GET RESPONSE** **<P1>** "00" **<P2>** "00" **<P3>** Length (0...255) **UPDATE BINARY** **<P1>** Offset high (0...255) **<P2>** Offset low (0...255) **<P3>** Length (0...255) **UPDATE RECORD** **<P1>** Rec. No. (0...255) **<P2>** Mode "02" = next record "03" = previous record "04" = absolute mode/current mode, the record number is given in P1 with P1='00' denoting the current record. **<P3>** Length (0...255) **STATUS**

	<P1> "00" **<P2>** "00" **<P3>** Length (0...255)
<data>	Information which shall be written to the SIM (hexadecimal character format). Mandatory for UPDATE BINARY and UPDATE RECORD.
<sw1> <sw2>	Integer character format. Information, from the SIM, 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. Responses to commands which are correctly executed: **<sw1>** **<sw2>** **Description** 144 0 Normal ending of the command 145 XX Normal ending of the command, with extra information from the proactive SIM, containing a command for the ME. Length 'XX' of the response data. 158 XX Length 'XX' of the response data given in case of a SIM data download error 159 XX Length 'XX' of the response data. Responses to commands which are postponed:

<sw1>	<sw2>	Error Description
147	0	SIM Application Toolkit is busy . Command cannot be executed at present, further normal commands are allowed.
146	0X	Command successful but after using an internal update retry routine 'X' times.
146	64	Memory problem.
148	0	No EF selected.
148	2	Out of range (invalid address).
148	4	• File ID not found. • Pattern not found.
148	8	File is inconsistent with the command
152	2	No CHV initialized
152	4	• Access condition not fulfilled. • Unsuccessful CHV verification, at least one attempt left. • Unsuccessful UNBLOCK CHV verification, at least one attempt left. • Authentication failed.
152	8	In contradiction with CHV status.
152	16	In contradiction with invalidation status.
152	64	• Unsuccessful CHV verification, no attempt left. • Unsuccessful UNBLOCK CHV verification, no attempt left. • CHV blocked. • UNBLOCK CHV blocked.

<sw1>	<sw2>	Error Description
152	80	Increase cannot be performed, Max value reached.
103	XX	Incorrect parameter P3 (NOTE: 'XX' gives the correct length or states that no additional information is given ('XX' = '00').
107	XX	Incorrect parameter P1 or P2.
109	XX	Unknown instruction code given in the command.
110	XX	Wrong instruction class given in the command.
111	XX	Technical problem with no diagnostic given.

<response>

Response of a successful completion of the command previously issued (hexadecimal character uppercase format). STATUS and GET RESPONSE return data, which gives information about the current elementary data file_id. This information includes the type of file and its size (refer to GSM 11.11). 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.

Example
AT+CRSM=176,28478,0,0,20 //READ BINARY, GID1(6F3E),0 ,0 , 20 bytes

+CRSM: 144,0, FFFFFFFFFF //Generic success code, 20 bytes of file data
FFFFFFFFFF00000000000000000000
OK

AT+CRSM=178,28474,1,4,26 //READ RECORD, ADN file(6F3A) data, 1, current, 26 bytes
+CRSM: 144,0,72656EFFFFFFFFFFFFFFFFFF06818984143243FFFFFFFFFFFFFF
//Generic success code, 26 bytes data of the 1st record
OK
AT+CRSM=192,12258 //GET RESPONSE, ICCID(2fe2)

+CRSM: 144,0,0000000A2FE204000B00BB01020000
//Generic success code, 0000-> RFU 000A->File size 2FE2-> File ID 04-> Type of the file (EF) 00->RFU 0B00BB->Access conditions (READ=0-ALW, UPDATE=B-NEVER) 01->File status 02->Length of the following data (byte 14 to the end) 00->Structure of EF (transparent) 00->Length of a record (For cyclic and linear fixed EFs this byte denotes the length of a record. For a transparent EF, this byte shall be coded '00')

OK

AT+CRSM=214,28498,0,0,8,C69018C7958C87
//UPDATE BINARY, KcGPRS(6F52), 0,0, 8 bytes , data to be write to the file

+CRSM: 152,4 //Error: access condition not fulfilled
OK

AT+CRSM=220,28474,1,4,30, 657469FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
//UPDATE RECORD, ADN file(6F3A), 1sh record, current, 30 bytes data

+CRSM: 144,0 //Generic success code
OK

AT+CRSM=242,28589 //STATUS (6fad)

+CRSM: 144,0,000060907F2002000000000000991001C080085858585
//Generic success code, 0000-> RFU 6090-> Total amount of memory of the selected directory which is not allocated to any of the DFs or EFs under the selected directory. 7F20->File_id 02-> Type of file - DF 0000000000-> RFU 09-> Length of the following data. 91001C080085858585->GSM specific data
OK

AT+CRSM=? //Test Command

+CRSM=
(176,178,192,214,220,242),(12037-28599),(0-255),(0-255),(0-255)
//Possible values

4.10.2. +CCID, Card Identification Number

This command returns the SIM card identification number (SIM file EFICCID, see GSM 11.11 Chap.10.1.1).

Command Type	Syntax	Response/Action	Remarks
Read	+CCID?	+CCID: <ID> OK or: +CME ERROR: <err>	
Execute	+CCID	+CCID: <ID> OK or: +CME ERROR: <err>	

Example

AT+CCID

+CCID: 89860018190839008096

OK

4.10.3. &V, View Configuration

Command Type	Syntax	Response/Action		Remarks
Execute	AT&V	+MSELINT = 0 ACTIVE PROFILE: ... (profile data) <CR><LF> STORED PROFILE 0: ... (profile data) <CR><LF> STORED PROFILE1: ... (profile data) OK or +CME ERROR: <err>	+MSELINT = 1 ACTIVE PROFILE: ... (profile data) STORED PROFILE 0: ... (profile data) STORED PROFILE1: ... (profile data) OK or +CME ERROR: <err>	The Execute command displays the current active configuration and stored user profiles.

Example
at+mselint=0
OK

at&v
ACTIVE PROFILE:
&C1, &D2, &K3, E1, Q0, V1, X0, &Y0, S00:000, S02:043, S03:013, S04:010, S05:008,

S07:030, S12:020, +CBST:007, 000, 001, +CRLP:061, 061, 048, 006, +CR:000, +CRC:000
STORED PROFILE 0:
&C1, &D2, &K3, E1, Q0, V1, X0, S00:000, S02:043, S03:013, S04:010, S05:008,
S07:030, S12:020, +CBST:007, 000, 001, +CRLP:061, 061, 048, 006, +CR:000, +CRC:000

STORED PROFILE 1:
&C1, &D2, &K3, E1, Q0, V1, X0, S00:000, S02:043, S03:013, S04:010, S05:008,
S07:030, S12:020, +CBST:007, 000, 001, +CRLP:061, 061, 048, 006, +CR:000, +CRC:000

OK
at+mselint=1
OK
at&v
ACTIVE PROFILE:
E1 Q0 V1 X0 &C1 &D2 &K3 &Y0
S00:000 S02:043 S03:013 S04:010 S05:008 S06:002 S07:030
S08:002 S10:014 S12:020
STORED PROFILE 0:
E1 Q0 V1 X0 &C1 &D2 &K3
S00:000 S02:043 S03:013 S04:010 S05:008 S07:030 S12:020
STORED PROFILE 1:
E1 Q0 V1 X0 &C1 &D2 &K3
S00:000 S02:043 S03:013 S04:010 S05:008 S07:030 S12:020

OK

4.10.4. &W, Store User Profile

Command Type	Syntax	Response/Action	Remarks
Set	&W[<n>]	OK or: +CME ERROR: <err>	he Set command stores the current active configuration to user profile 0 or 1.

The following table shows the &W parameters.

Table 4-157: &W Parameters

<Parameter>	Description
<n>	User's profile number: 0 Store to user's profile 0 1 Store to user's profile 1 The default value is 0.

The parameters that are set in a profile are described in the table below.

Table 4-158: Profile Parameters

Profile Parameter	Description	Parameter Range	Default Value	Length in Bits
ATE	Echo	0-1	1	1
ATQ	Result code return mode	0-1	0	1
ATV	Display result code	0-1	1	1
ATX	Select result code	0-4	0	3
AT&C	Set circuit 109 (DCD) behavior	0-2	1	2
AT&D	Set circuit 109 (DTR) behavior	0-4	2	3
AT&K	Flow control	0, 3-6	3	3
AT\Q	Set local flow control between DTE and DCE			
S0	Auto-answer	0-255	0	8
S2	Escape code character	0-255	43	8
S3	Carriage return character	0-127	13	7
S4	Line feed character	0-127	10	7
S5	Backspace character	0-32	8	6
S6	Pause before blind dialling			

S7	Wait time for carrier. Register S7 tells the data adaptor how many seconds to wait for a remote data adaptor's carrier signal before hanging up. The register value can be increased if the data adaptor does not detect a carrier within the specified time. If the data adaptor detects a remote carrier signal within the specified time, it sends a CONNECT response and enters Data mode. If it does not detect a remote carrier signal within the specified time, it sends the NO ANSWER (or 8) response, hangs up, and returns to the Command Mode.	1-255	30	8
S8	Command dial modifier time (pause)			
S10	Automatic disconnect delay			
S 12	Time, in 50ths of a second, until OK is displayed after entering command mode by an escape sequence.	0-255	20	8

Example

AT&W0

OK

AT&W1

OK

4.10.5. &Y, Default User Profile

Command Type	Syntax	Response/Action
Set	&Y[<n>]	OK or: +CME ERROR: <err>

The following table shows the &Y parameters.

Table 4-159: &Y Parameters

<Parameter>	Description
<n>	User's profile number: 0 Selects power-up configuration to user's profile 0 1 Selects power-up configuration to user's profile 1 The default value is 0.

Example
AT&Y0
OK
AT&Y1
OK

4.10.6. +CMER, Mobile Equipment Event Reporting Language

This command enables display changes and indicator state changes.

Command Type	Syntax	Response/Action	Remarks
Set	+CMER=[<mode>[,<keyp>[,<disp>[,<ind>[,<bfr>]]]]]	OK or: +CME ERROR: <err>	The Set command enables/disables an external accessory to receive event reports from the G30. In some cases, this is used to track the user activity for redisplay on a vehicle system, or to perform accessory-specific menu operations.
Read	+CMER?	+CMER: <mode>,<keyp>,<disp>,<ind>,<bfr> OK or: +CME ERROR: <err>	The Read command queries the current settings for the AT+CMER command.

Test	+CMER=?	+CMER: (list of supported <mode>s),(list of supported <keyp>s),(list of supported <disp>s),(list of supported <ind>s),(list of supported <bfr>s)	The Test command returns the possible <mode>, <keyp>, <disp>, <ind>, and <bfr> values.

The following table shows the +CMER parameters.

Table 4-160: +CMER Parameters

<Parameter>	Description
<mode>	Controls the processing of unsolicited result codes specified within this command. 0 Buffer unsolicited result codes in G30. 1 Discard unsolicited result codes when the V.24 interface is reserved for data, otherwise display them on the TE directly. 2 Buffer unsolicited result codes in ATC when the V.24 interface is reserved and flush them after reservation, otherwise display them on TE directly.
<keyp>	Not used in G30.
<disp>	Not used in G30.
<ind>	0 No indicator events reporting. 1 Indicator event reporting using result code +CIEV:<ind>,<value>. All indictor events are directed from TA to TE The default value is 0.
<bfr>	Controls the effect on buffered codes. 0 Clear buffer. 1 Buffer is flushed to the TE.

4.10.7. +CLAN, ME Language

This command handles the selection of language in the ME.

The <code> parameter is a two-letter abbreviation of the language. The language codes, as defined in ISO 639, consist of two characters, e.g. "DE", "EN" etc.

Command Type	Syntax	Response/Action	Remarks
Set	AT+CLAN=<code>	OK or: ERROR	Set command sets the selected language.
Read	AT+CLAN?	+CLAN: <code>	The read command displays the currently selected language.
Test	AT+CLAN=?	+CLAN: (list of <code>s)	Test command displays list of supported language <code>s.

The following table shows the +CLAN parameters.

Table 4-161: +CLAN Parameters

<code>	Description
DE	German
EN	English
IT	Italian
FR	French
ES	Spanish
NL	Dutch
SW	Swedish
DA	Danish
PT	Portuguese
FI	Finnish
NO	Norwegian
EL	Greek
TR	Turkish

Example
AT+CLAN?
+CLAN: "EN"
OK
AT+CLAN=?
+CLAN: "DE","EN","IT","FR","ES","NL","SW","DA","PT","FI","NO","EL","TR"
OK
AT+CLAN="DE"
OK
AT+CLAN?
+CLAN: "DE"
OK

4.10.8. +CIND, Indicator Control

This command is used to query the status of various ME indicators.

Command Type	Syntax	Response/Action	Remarks
Read	AT+CIND?	+CIND:<ind>,<ind>….	Read command returns the status of ME indicators.
Test	AT+CIND=?	+CIND :(<descr>,(list of supported <ind>s)) ,(<descr>,(list of supported<ind>s))…	Test command returns pairs, where string value <descr> is a short description of the indicator and compound value is the allowed values for the indicator.

The following table shows the +CIND parameters.

Table 4-162: +CIND Parameters

<ind>	<Parameter>	Description	<value> Range	Explanation
1	**<battchg>**	Battery indicator	0-5	0 Low battery. 5 Full battery.
2	**<signal>**	Signal strength	0-5	0 No signal. 1 Low signal strength. 5 High signal strength.
3	**<service>**	Service availability	0-1	0 Service not available. 1 Service available.
4	**<SIM present>**	SIM presence	0-1	0 SIM removed. 1 SIM inserted.
5	**<message>**	Unread message indication	0-1	0 No unread messages. 1 Unread messages exist.
6	**<call>**	Call active	0-1	0 No call active. 1 Call is active.
7	**<roam>**	Roaming indicator	0-1	0 Not roaming. 1 Roaming.

8	**<smsfull>**	SIM SMS full	0-1	0 SIM SMS storage is not full. 1 SIM SMS storage is full.
9	**<gprs>**	GPRS coverage	0-2	0 GPRS network not available. 1 GPRS network available but not registered. 2 GPRS registered.
10	**<SIM PIN>**	SIM Pin requested	0-1	0 SIM pin ready. 1 SIM pin required.

4.10.9. +CIEV, Indicator Event Reporting

When a G30 indication is changed and the <ind> parameter of the +CMER command is set to 1, the +CIEV indication is sent to the DTE.

Unsolicited Report

+CIEV: <ind>,<value>

The following table shows the +CIEV parameters.

Table 4-163: +CIEV Parameters

<ind>	<Parameter>	Description	<value> Range	Explanation
1	**<battchg>**	Battery indicator	0-5	0 Low battery. 5 Full battery.
2	**<signal>**	Signal strength	0-5	0 No signal. 1 Low signal strength. 5 High signal strength.
3	**<service>**	Service availability	0-1	0 Service not available. 1 Service available.
4	**<SIM present>**	SIM presence	0-1	0 SIM removed. 1 SIM inserted.
5	**<message>**	Unread message indication	0-1	0 No unread messages. 1 Unread messages exist.
6	**<call>**	Call active	0-1	0 No call active. 1 Call is active.
7	**<roam>**	Roaming indicator	0-1	0 Not roaming. 1 Roaming.

8	**<smsfull>**	SIM SMS full	0-1	0 SIM SMS storage is not full. 1 SIM SMS storage is full.
9	**<gprs>**	GPRS coverage	0-2	0 GPRS network not available. 1 GPRS network available but not registered. 2 GPRS registered.
10	**<SIM PIN>**	SIM Pin requested	0-1	0 SIM pin ready. 1 SIM pin required.

4.10.10. +MDSI, Motorola Deactivate SIM Card Indication

This command enables unsolicited reporting of indications of SIM deactivation and invalidation. The indications include the cause for deactivation and invalidation.

This command is a basic command, which means that the G30 will accept the command and act according to received parameters regardless of SIM presence and phone lock state.

Command Type	Syntax	Response/Action	Remarks
Set	+MDSI=<mode>	When mode is 1 and SIM was invalidated or deactivated: [+MDSI: <type>, <cause>, <type text>, <cause text>] OK +CME ERROR: <err>	The following is the available mode values for the Set command. <mode> = 1 - Defines that unsolicited +MDSI messages will be sent to the DTE. If the SIM card was invalidated or deactivated, the current status will be sent to the DTE. <mode> = 0 - No unsolicited message is sent to the DTE.
Read	+MDSI?	+MDSI: <mode> OK +CME ERROR: <err>	The Read command queries the current settings for <mode>.
Test	+MDSI=?	+MDSI: (list of supported <mode>s) OK +CME ERROR: <err>	The Test command returns the possible <mode> values.

The following table shows the +MDSI parameters.

Table 4-164: +MDSI Parameters

<Parameter>	Description
<mode>	0 Unsolicited indications off 1 Unsolicited indications on
<type>, <type text>	0 "DEACTIVATE". SIM deactivate request was sent with <cause> 1 "GSM". Invalidate SIM for GSM services was sent with <cause> 2 "GPRS". Invalidate SIM for GPRS services was sent with <cause>
<cause>, <cause text>	<cause> and <cause text> related to <type> = 0 ("DEACTIVATE"): 1 "Bad SIM" <cause> and <cause text> related to <type> = 1 ("GSM") and <type> = 2 ("GPRS"): 0 "No reject cause" 2 "IMSI unknown in HLR" 3 "Illegal MS" 4 "IMSI unknown in VLR" 6 "Illegal ME" 7 "GPRS service not allowed" 8 "GPRS and non-GPRS services not allowed" 9 "MS identity cannot be derived by the network" 11 "PLMN not allowed" 12 "Location area not allowed" 13 "Roaming not allowed in this location area" 14 "GPRS services not allowed in this PLMN" 240 "Location update failure" 241 "Combined LU failure" 242 "Authentication and ciphering reject" 243 "Authentication reject" 244 "Attach failure"

Example
AT+MDSI?
+MDSI: 0
OK
AT+MDSI=?
+MDSI: (000,001)
OK
AT+MDSI=1
OK
//Until now there was no deactivation or invalidation of SIM card.
AT+MDSI?
+MDSI: 1
OK
//SIM card does not support GPRS
+MDSI: 2, 7, "GPRS", "GPRS services not allowed"
//Insert a SIM card that is no longer subscribed
AT+CPIN="1764"
OK
AT+COPS=0
OK
//Unsolicited messages


```
+MDSI: 1, 2, "GSM", "IMSI unknown in HLR"
+MDSI: 0, 1, "DEACTIVATE", "Bad SIM"
        // Insert a good SIM card, and roam to a network that doesn't have a
GPRS roaming agreement.
        //Unsolicited messages
+MDSI: 2, 14, "GPRS", "GPRS services not allowed in this PLMN"
AT+CGATT?
+CGATT: 0
OK
```

4.11. GPRS/EDGE

4.11.1. GPRS Functionality

GSM 07.07 defines commands that a TE may use to control a GPRS ME via a non-multiplexed character-stream interface. This places certain limitations on the functionality of the interface. For example, it is not possible for the ME to send control information to the TE or for the TE to send commands to the ME whilst the interface is in the online data state, unless the layer 2 protocol itself supports this feature (GSM 07.60-12). However, G30-specific escape mechanism (DTR) is provided to enable the TE to switch the G30 into limited online command state.

The use of a multiplexed interface, (GSM 07.10), is not considered here (RS232 Multiplexer Feature). The G30-specific escape mechanism use DTR as an escape signal (following &D parameters) and designed for limited non network related commands. This specific mechanism purpose is to give the user a way to retrieve the signal strength. The time limit of consecutive DTR toggles is a minimum of 90 seconds. The G30-specific is not designed to support online command and data states both at the same time, therefore any wrong or extreme usage can cause unexpected behaviors. The basic GPRS concept is be “always connected” and there is no charge for being connected (only per real data transferred).

4.11.2. GPRS Commands

This section defines commands that a terminal may use to control a GPRS ME. GPRS MTs vary widely in functionality. A class A ME might support multiple PDP-types as well as circuit-switched data, and use multiple external networks QoS profiles. At the other extreme, a class C ME might support only a single PDP-type using a single external network, and rely on the HLR to contain the PDP context definition. A comprehensive set of GPRS-specific commands is defined below to provide the flexibility needed by the more complex ME. The commands are designed to be expandable to accommodate new PDP types and interface protocols, merely by defining new values for many of the parameters. Multiple contexts may be activated if the interface link-layer protocol is able to support them. The commands use the extended information and error message capabilities described in this specification. For MTs of intermediate complexity, most commands have simplified forms where certain parameters may be omitted. For the simplest MTs, and for backwards compatibility with existing communications software, it is possible to control access to the GPRS using existing modem-compatible commands. This "modem compatible" mode of operation is described below.

4.11.2.1. +CGCLASS, GPRS Mobile Station Class

This command is used to set the G30 to operate according to the specified GPRS mobile class. If the requested class is not supported, an ERROR or +CME ERROR response is returned. Extended error responses are enabled by the +CMEE command.

Command Type	Syntax	Response/Action +MSELINT = 0	Response/Action +MSELINT = 1	Remarks
Read	AT +CGCLASS?	+CGCLASS: <class> OK or: +CME ERROR: <err>	+CGCLASS: <class> OK or: +CME ERROR: <err>	The Read command returns the current GPRS mobile class.
Test	AT +CGCLASS=?	+CGCLASS: (list of supported <class>s) OK or; +CME ERROR: <err>	+CGCLASS: (list of supported <class>s) OK or; +CME ERROR: <err>	The Test command is used for requesting information on the supported GPRS mobile classes.

Note: Issuing GPRS actions over a poor-quality connection may cause protocol errors and harm data validity. To prevent these problems, G30 is equipped with a protection mechanism that confirms GPRS signal strength before issuing GPRS network-related commands.

The following table shows the +CGCLASS parameters.

Table 4-165: +CGCLASS Parameters

<Parameter>	Description	
<class>	+MSELINT = 0 String parameter that indicates the GPRS mobile class: B default CC CG	+MSELINT = 1 String parameter that indicates the GPRS mobile class: B default

Example
at+cgclass?
+CGCLASS: "B"
OK
at+cgclass=?
+CGCLASS: ("B","CC","CG")
OK
at+mselint=1

OK // power cycle
at+cgclass?
+CGCLASS: B
OK
at+cgclass=?
+CGCLASS: (B)

4.11.2.2. +CGDCONT, Define PDP Context

This command specifies the PDP (Packet Data Protocol) context.

Command Type	Syntax	Response/Action	Remarks
Set	AT+CGDCONT=[<cid>[,<PDP_type>[,<APN>[,<PDP_addr>[,<d_comp> [,<h_comp>]]]]]]	OK or: +CME ERROR: <err>	The Set command specifies the context identification parameter values for a PDP context. A special form of the Set command, +CGDCONT= <cid> causes the values for context number <cid> to become undefined.
Read	AT+CGDCONT?	+MSELINT = 0 +CGDCONT: <cid>, <PDP_type>, <APN>, <PDP_addr>, <data_comp>, <head_comp>[<CR><LF>+CGDCONT: <cid>, <PDP_type>, <APN>, <PDP_addr>, <data_comp>, <head_comp> OK Or: OK or: +CME ERROR: <err>	+MSELINT = 1 +CGDCONT: <cid>, <PDP_type>, <APN>, <PDP_addr>, <data_comp>, <head_comp>[<CR><LF>+CGDCONT: <cid>, <PDP_type>, <APN>, <PDP_addr>, <data_comp>, <head_comp> OK or: +CME ERROR: <err>
Test	AT+CGDCONT=?	+CGDCONT: (range of supported <cid>s), <PDP_type>, , , (list of supported <d_comp>s), (list of supported <h_comp>s) OK or: +CME ERROR: <err>	The Test command returns the values supported as a compound value. If the ME supports several PDP types, <PDP_type>, the parameter value ranges for each <PDP_type> are returned on a separate line.

The following table shows the +CGDCONT parameters.

Table 4-166: +CGDCONT Parameters

<Parameter>	Description
<cid>	Numeric parameter specifying a particular PDP context definition (PDP Context Identifier). The parameter is local to the Terminal-Mobile Terminal interface and is used in other PDP context-related commands. The Test command returns the range of permitted values (minimum value=1).
<"PDP_type"> (Packet data protocol type)	String parameter (in quotation marks) specifying the type of packet data protocol: IP Internet Protocol (IETF STD 5)
<"APN"> (Access Point Name)	String parameter (in quotation marks), 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, the subscription value is requested.
<"PDP_address">	String parameter (in quotation marks), which identifies the ME in the address space applicable to the PDP. If the value is null or omitted, a value may be provided by the terminal during the PDP startup procedure or, failing that, a dynamic address is requested. The Read form of the command continues 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 +CGPADDR command. The default value is 0.
<d_comp>	Numeric parameter that controls PDP data compression. 0 OFF 1 ON Other values are reserved. The default value is 0.
<h_comp>	Numeric parameter that controls the PDP header compression. 0 OFF 1 ON Other values are reserved. **Note:** Currently, only one data compression algorithm (V.42bis) is provided in SNDCP. If and when other algorithms become available, a command will be provided to select one or more data compression algorithms. The default value is 0.

Note: The IP address may be entered without double quotes (" ").

Example

at+mselint=1
OK


```
AT+CGDCONT=?
+CGDCONT: (1-2),("IP"),,,(0),(0,1)

OK
AT+CGDCONT?
+CGDCONT: 1,"IP","","0.0.0.0",0,0

+CGDCONT: 2,"IP","","0.0.0.0",0,0

OK
AT+CGDCONT= 1,"IP","internetg","0.0.0.0",0,0
OK
AT+CGDCONT?
+CGDCONT: 1,"IP","internetg","0.0.0.0",0,0

+CGDCONT: 2,"IP","","0.0.0.0",0,0

OK
```

4.11.2.3. +CGQMIN, Quality of Service Profile (Min Acceptable)

This command enables the terminal to specify the minimum acceptable profile which is checked by the ME against the negotiated profile returned in the Activate PDP Context Accept message.

Command Type	Syntax	Response/Action		Remarks
Set	AT+CGQMIN=[<cid>[,<precedence>[,<delay>[,<reliability.>[,<peak>[,<mean>]]]]]]	OK or: +CME ERROR: <err>		The Set command specifies a profile for the context identified by the (local) context identification parameter, <cid>. As this is the same parameter that is used in the +CGDCONT command, the +CGQMIN command is effectively an extension of the +CGDCONT command. The QoS profile consists of a number of parameters, each of which may be set to a separate value.
Read	AT+CGQMIN?	+CGQMIN: <cid>, <precedence>, <delay>, <reliability>,<peak>, <mean>[<CR><LF>+CGQMIN: <cid>, <precedence>,<delay>, <reliability.>, <peak>, <mean>[...]] OK or: +CME ERROR: <err>		The Read command returns the current settings for each defined context. That +MSELINT = 0 and the +CGDCONT command doesn't execute return only OK.
Test	AT+CGQMIN=?	+MSELINT = 0 +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) [<CR><LF>+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 or: +CME ERROR: <err>	+MSELINT = 1 +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 or: +CME ERROR: <err>	AT+CGQMIN=?

The following table shows the +CGQMIN parameters.

Table 4-167: +CGQMIN Parameters

<Parameter>	Description
<cid>	A numeric parameter that specifies a particular PDP context definition. The value is from 1 to 2.
<precedence>	A numeric parameter that specifies the precedence class.
<delay>	A numeric parameter that specifies the delay class.
<reliability>	A numeric parameter that specifies the reliability class.
<peak>	A numeric parameter that specifies the peak throughput class.
<mean>	A numeric parameter that specifies the mean throughput class.

Example:
at+mselint=0
OK
AT+CGQMIN?
OK
AT+CGQMIN=?
+CGQMIN: "IP",(0-3),(0-4),(0-5),(0-9),(0-18)

OK
at+mselint=1 //Power cycel
OK
AT+CGQMIN?
+CGQMIN: 1,0,0,0,0,0

+CGQMIN: 2,0,0,0,0,0

OK
AT+CGQMIN=?
+CGQMIN: ("IP"),(0-3),(0-4),(0-5),(0-9),(0-18,31)

OK

Example
AT+CGQMIN=?
+CGQMIN: ("IP"),(0-3),(0-4),(0-5),(0-9),(0-18)
OK
AT+CGQMIN?
+CGQMIN: 1,2,4,3,9,10
+CGQMIN: 2,2,4,3,9,10
+CGQMIN: 3,2,4,3,9,10
OK

4.11.2.4. +CGQREQ, Quality of Service Profile (Requested)

This command enables the terminal to specify a Quality of Service Profile that is used when the ME sends an Activate PDP Context Request message to the network.

Command Type	Syntax	Response/Action	Remarks
Set	AT+CGQREQ=[<cid> [,<precedence> [,<delay> [,<reliability.> [,<peak> [,<mean>]]]]]]	OK or: +CME ERROR: <err>	The Set command specifies a profile for the context identified by the (local) context identification parameter, <cid>. As this is the same parameter that is used in the +CGDCONT command, the +CGQREQ command is effectively an extension of the +CGDCONT command. The QoS profile consists of a number of parameters, each of which may be set to a separate value. A special form of the Set command, +CGQREQ= <cid>, causes the requested profile for context number <cid> to become undefined.
Read	AT+CGQREQ?	+MSELINT = 0 +CGQREQ: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean> OK Or: OK or: +CME ERROR: <err>	+MSELINT = 1 +CGQREQ: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean> [<CR><LF>] +CGQREQ: <cid>, <precedence>, <delay>, <reliability>, <peak>, <mean> OK or: +CME ERROR: <err>
Test	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 or: +CME ERROR:	The Test command returns values supported as a compound value. If the ME supports several PDP types, the parameter value ranges for each PDP type are returned on a separate line.

		<err>	

The following table shows the +CGQREQ parameters.

Table 4-168: +CGQREQ Parameters

<Parameter>	Description
<cid>	A numeric parameter that specifies a particular PDP context definition. The value is from 1 to 2.
<precedence>	A numeric parameter that specifies the precedence class.
<delay>	A numeric parameter that specifies the delay class.
<reliability>	A numeric parameter that specifies the reliability class.
<peak>	A numeric parameter that specifies the peak throughput class.
<mean>	A numeric parameter that specifies the mean throughput class.

Example

```
AT+CGQREQ=?
+CGQREQ: ("IP"),(0-3),(0-4),(0-5),(0-9),(0-18,31)
OK
AT+CGQREQ?
+CGQREQ: 1,2,4,3,9,10
+CGQREQ: 2,2,4,3,9,10
+CGQREQ: 3,2,4,3,9,10
OK
AT+CGQREQ=1,0,,0,0,0
OK
AT+CGQREQ?
+CGQREQ: 1,0,4,0,0,0
+CGQREQ: 2,2,4,3,9,10
+CGQREQ: 3,2,4,3,9,10
OK
```

Example:

```
at+mselint=0
OK
AT+CGQREQ=?
+CGQREQ: "IP",(0-3),(0-4),(0-5),(0-9),(0-18,31)
OK
```


```
AT+CGQREQ?
OK
AT+CGQREQ=1,0,,0,0,0
OK
at+mselint=1
OK
AT+CGQREQ=?
+CGQREQ: ("IP"),(0-3),(0-4),(0-5),(0-9),(0-18,31)
OK
AT+CGQREQ?
+CGQREQ: 1,0,0,0,0,0
+CGQREQ: 2,0,0,0,0,0
OK
```

4.11.2.5. +CGATT, GPRS Attach or Detach

This command attaches/detaches the ME to/from the GPRS service. When the command has completed, the ME remains in V.25ter command state. If the ME 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.

Note:

- This AT command should have the ability to start after power-up attached or detached. This should be dependency to Flex parameter (GPRS_ATTACH).
- This AT command should have the ability to automatic attach procedure when MS identify cannot be derived by the network.

Command Type	Syntax	Response/Action	Remarks
Set	AT+CGATT= [<state>]	OK or: +CME ERROR: <err>	The Set command attaches/detaches the ME to/from the GPRS service.
Read	AT+CGATT?	+CGATT: <state> OK or: +CME ERROR: <err>	The Read command returns the current GPRS service state.
Test	AT+CGATT=?	+CGATT: (list of supported <state>s) OK or: +CME ERROR: <err>	The Test command requests information on the supported GPRS service states.

Note: This command has the characteristics of both the V.25ter action and parameter commands. Therefore, it has the Read form in addition to the Execution/Set and Test forms.

The following table shows the +CGATT parameters.

<Parameter>	Description
<state>	Indicates the state of the GPRS attachment: 0 Detached. 1 Attached.

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

4.11.2.6. D*99, Request GPRS Service "D"

This command enables the ME to perform the actions necessary for establishing communication between the terminal and the external Packet Data Network (PDN).
The ITU V.25ter 'D' (Dial) command causes the ME to enter the ITU V.25ter Online Data state and together with the terminal, to start the specified layer 2 protocol. The ME returns CONNECT to confirm acceptance of the command prior to entering the ITU V.25ter Online Data state. No further commands may follow on the AT command line.
The detailed behavior after the Online Data state has been entered is dependent on the PDP type, and is described briefly. 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 protocols have terminated, either as a result of an orderly shut down of the PDP or an error, the ME enters the ITU V.25ter command state and returns the NO CARRIER final result code.
If <called address> is supported and provided, the ME automatically sets up a virtual call to the specified address after the PDP context has been activated.
If <L2P> and <cid> are supported, the +CGDCONT, +CGQREQ and other such commands may then be used in the modem initialization AT command string to set values for PDP type, APN, QoS and so on.
If <L2P> is not supported, or is supported but omitted, the ME uses a layer 2 protocol appropriate to the PDP type.
If <cid> is not supported, or is supported but omitted, the ME attempts to activate the context using one of the following:

- Any information provided by the terminal during the PDP startup procedure. For example, the terminal may provide a PDP type and/or PDP address to the ME.
- A prior knowledge, for example, the ME may implement only one PDP type.

Using the "Empty PDP type" No PDP address or APN is sent in this case and only one PDP context subscription record is present in the HLR for this subscriber.

Note: The G30 stack should be able to start PPP negotiation.
This command may be used in both normal and modem compatibility modes.

Command Type	Syntax	Response/Action
Set	ATD*<GPRS_SC> [*[<called_address>][*[<L2P>] [*[<cid>]]]]#	CONNECT or: ERROR

The following table shows the D*99 parameters.

Table 4-169: D*99 Parameters

<Parameter>	Description
<GPRS_SC> (GPRS Service Code)	Digit string (value 99) which identifies a request to use GPRS.
<called_address>	String that identifies the called party in the address space applicable to the PDP. For communications software that does not support arbitrary characters in the dial string, a numeric equivalent may be used. Also, the comma character "," may be used as a substitute for the period character ".". For PDP type OSP:IHOSS, the following syntax may be used for <called_address>:[<host>][@[<port>][@ [<protocol>]]] where <host>, <port> and <protocol> are defined in +CGDCONT, Define PDP Context For communications software that does not support arbitrary characters in the dial string, a numeric value equivalent to the hostname may be used. However, this should be avoided if at all possible.
<L2P>	String variable which indicates the layer 2 protocol to be used. For communications software that does not support arbitrary characters in the dial string, the following numeric equivalents are used: 0 NULL 1 PPP 2 PAD 3 X25 9 yyyy M-xxxx Other values are reserved and result in an ERROR response to the Set command. Note: V.250 (and certain communications software) do not permit arbitrary characters in the dial string. The <L2P> and <called_address> strings are therefore specified as containing digits (0-9) only.
<cid>:	Digit string which specifies a particular PDP context definition (See +CGDCONT, Define PDP Context

Example
ATD*99 //Try connecting to GPRS according to the first <cid>, defined in +CGDCONT

4.11.2.7. +CGPRS, GPRS Coverage

This command indicates whether there is GPRS coverage.

Note: GPRS coverage will be detected only when SIM has GPRS ability.

Command Type	Syntax	Response/Action	Remarks
Execute	AT+CGPRS	+CGPRS: <mode> OK or: +CME ERROR: <err>	The Execute command returns the mode of the GPRS coverage.
Read	AT+CGPRS?	+CGPRS: <mode> OK or: +CME ERROR: <err>	The Read command returns the mode of the GPRS coverage
Test	AT+CGPRS=?	+CGPRS: (list of supported <mode>s) OK or: +CME ERROR: <err>	

The following table shows the +GPRS parameters.

Table 4-170: +GPRS Parameters

<Parameter>	Description
<mode>	0 No GPRS coverage 1 GPRS coverage There is no parameter default value

Example
Without GPRS coverage
AT+CGPRS
+CGPRS: 0
OK
AT+CGPRS?
+CGPRS: 0
OK
With GPRS coverage
AT+CGPRS
+CGPRS: 1
OK

4.11.2.8. +CGACT, PDP Context Activate or Deactivate

This command activates/deactivates the specified PDP context(s).

Command Type	Syntax	Response/Action	Remarks
Set	AT+CGACT=[<state>[,<cid>[,<cid>[,]]]]		OK or: NO CARRIER or: +CME ERROR: <err>
Read	AT+CGACT?	+MSELINT = 0 +CGACT: <cid>, <state> <CR><LF>+CGACT: <cid>, <state> <CR><LF>+CGACT: <cid>, <state> OK Or: OK	+MSELINT = 0 +CGACT: <cid>, <state> <CR><LF>+CGACT: <cid>, <state> <CR><LF>+CGACT: <cid>, <state> OK
Test	AT+CGACT=?	+CGACT: (list of supported <state>s) OK or: +CME ERROR: <err>	The Test command requests information on the supported PDP context activation states.

The following table shows the +CGACT parameters.

Table 4-171: +CGACT Parameters

<Parameter>	Description
<state>	Indicates the activation state of the context: 0 Non-active 1 Active
<cid>	1-2 A numeric parameter that specifies a particular PDP context definition

Example
at+mselint=0

AT+CGACT=?


```
+CGACT: (0,1)
OK
AT+CGACT?
OK
AT+CGACT=1
ERROR              //GPRS network not present.

at+mselint=1
OK
AT+CGACT=?
+CGACT: (0,1)

OK
AT+CGACT?
+CGACT: 1,0

+CGACT: 2,0

OK
```

Note: In some GPRS networks, +CGACT is not supported. the ATD*99 # command can be used to establish a connection.
Activating a context can take up to 150 seconds.
Deactivating a context can take up to 40 seconds.
When aborting a +CGACT Set command, the context is closed. This can take up to 40 seconds.

4.11.2.9. CGPADDR, GPRS ADDResses

This command reads the allocated PDP addresses for the specified context identifiers.

Command Type	Syntax	Response/Action	Remarks
Set	AT+CGPADDR= [<cid>[,<cid>[,]]]	+CGPADDR:<cid>,<PDP_addr> [<CR><LF>+CGPADDR:<cid>, <PDP_addr>[…]] OK or: +CME ERROR:<err	The Set command returns a list of PDP addresses for the specified context identifiers.
Read	AT+CGPADDR?	+CME ERROR:<err>	The Read command returns an error.
Test	AT+CGPADDR=?	+CGPADDR: (list of defined <cid>s) OK or: +CME ERROR: <err>	The Test command returns the list of defined <cid>s.

The following table shows the +CGPADDR parameters.

Table 4-172: +CGPADDR Parameters

<Parameter>	Description
<cid>	A numeric parameter that specifies a particular PDP context definition. If no <cid> is specified, the addresses for all defined context are returned.
<PDP_address>	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 assigned during the last PDP context activation that used the context definition referred to by <cid>. <PDP_address> is omitted if none is available.

Example
AT+CGPADDR=?
+CGPADDR: (1,2)
OK

AT+CGPADDR=1
+CGPADDR: 1,0.0.0.0
OK

4.11.2.10. +CGCMOD, PDP Context Modify

The execution command is used to modify the specified PDP context(s) with respect to QoS profiles and TFTs. After the command has completed, the MT returns to 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.

Command Type	Syntax	Response/Action	Remarks
Set	+CGCMOD=[<cid>[,<cid>[,…]]]	OK or: ERROR	If no <cid>s are specified the activation form of the command modifies all active contexts.
Test	+CGCMOD=?	+CGCMOD: (list of <cid>s associated with active contexts)	The test command returns a list of <cid>s associated with active contexts.

The following table shows the +CGCMOD parameters.

Table 4-173: +CGCMOD Parameters

<Parameter>	Description
<cid>	A numeric parameter which specifies a particular PDP context definition (see +CGDCONT and +CGDSCONT commands).

4.11.3. STK

4.11.3.1. +STKPRO, Proactive Commands

This command displays the list of supported proactive commands. Only the test command syntax is allowed. In addition there is an unsolicited result code +STKPRO: <proactive_cmd>, … provided defined as:
+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>,<imm_resp>
+STKPRO: 34,<type>,<dcs>,<hex string>,<icon_id>
+STKPRO: 35,<type>,<dcs>,<hex string>,<max rsp len>,<min rsp len>,<default text>,<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>
+STKPRO: 38,<type>
+STKPRO: 40,<dcs>,<hex string>,<icon_id>
+STKPRO: 52, <type>, <alpha>, <icon_id>
+STKPRO: 53,<language>

Command Type	Syntax	Response/Action
Test	+STKPRO=?	+STKPRO: (list of supported <commands>s)

The following table shows the +STKPRO parameters.

Table 4-174: +STKPRO Parameters

<Parameter>	Description
<alpha>,<alpha_1>,<alpha_2>,<item_text>,<default text>	String
<dcs>	Data Coding Scheme
<default_item>	Default item (s. item_id)
<event list>	04: User activity event 05: Idle screen available event 07: Language selection 08: Browser Termination event
<fomat_mode>,<format_mode1>,<format_mode2>,<item_text>,<default text>	Formatting mode value (alignment, font size, style) coded as following: Bit7Bit6 Bit5Bit4 Bit3Bit2 Bit1Bit0 Alignment (Bit1Bit0): 0: left 1: center 2:right 3: language dependent (default) Font size (Bit3Bit2): 0: normal 1: large 2: small 3: reserved Style bold(Bit4): 0: Bold off 1: Bold on Style Italic(Bit5): 0: Italic off 1: Italic on Style Underlined(Bit6): 0: Underlined off 1: Underlined on Style Strikethrough(Bit6): 0: Strikethrough off 1: Strikethrough on <exists>,<exists1>,<exist2> 0: text formatting is deactivated 1: text formatting is activated
<hex_string>	String containing data in hexadecimal format

<icone_id >,<icon)id1>,<icon_id2>,<icon_id_list_element>	Icon identifier list object
<Interval>	Time duration in number of units
<item_id >	Item identifier (Identifier of item chosen s. GSM11.14)
<items >,<items1>,<items2>	Number of items in text formatting
<language>	2 bytes string indicating the language
<length>,<length1>,<length2>	Text formatting length.Gives the number of formatted characters or sets a default text formatting
<max rsp len>	Maximum response length
<min rsp len>	Minimum response length
<next_action>	Next action
<number>	Called party number
<proactive_cmd>	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 53: language notification
<ref_number>	Reference number

<subaddr>	Called party subaddr
<ss_data>	Data string
<start_pos>,<start_pos1>„start_pos2>	Start position of the text formatting.Set to the number of characters after the formatting shall be applied from the beginning of the SM data
<type>	Integer like command qualifier; possible value 4 meaning "language"
<text colour>	00: black 01: dark grey 02: dark red 03: dark yellow 04: dark green 05: dark cyan 06: dark blue 07: dark magenta 08: grey 09: white 10: bright red 11: bright yellow 12: bright green 13: bright cyan 14: bright blue 15: bright magenta
<tone>	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
<total items>	Total items
<unit>	0: minutes 1: seconds 2: tenth of seconds
<URL>	URL that will be loaded

Example
+STKPRO=?
STKPRO=01,05,16,17,18,19,20,21,32,33,34,35,36,37,38,40,53
OK

4.11.3.2. +STKTR, Terminal Response

This action command allows entering the response to a STK proactive command which was displayed by the unsolicited result code +STKPRO.
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>, [<reference_number>] send SS
+STKTR: 18, <result>, <add_result>, [<reference_number>] send USSD
+STKTR: 19, <result>, <add_result>,[<reference_number>] 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, <type>, <language as integer, e.g.28261> language setting
+STKTR: 40, <result>, <add_result> set up idle mode text

Command Type	Syntax	Response/Action
Set	+STKTR=<proactive_cmd>[,<type>][,<result>,<add_result>[,<reference_number>][,<last_cmd>][,<dcs>][,<hex string>]]	OK or +CME ERROR: <error>
Test	+STKTR=?	+STKTR: (list of supported <result> values)

The following table shows the +STKR parameters.

Table 4-175: +STKR Parameters

<Parameter>	Description
<add_result>	Additional result
<dcs>	Data coding scheme
<hex_string>	String in hexadecimal format
<last_cmd>	Last command

<proactive_cmd>	Decimal code indicates the command (refer to +STKPRO)
<reference_number>	Integer containing the indicated reference number; this parameter can be used only in case of <proactive_cmd> related to SMS, SS, USSD
<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, permanent problem 58: bearer independent protocol error (if class "e" is supported)
<type>	Command qualifier (usage in case of <proactive_cmd>=38)

Example
AT+STKTR=1,0
OK
+STKTR=?
+STKTR=01,05,16,17,18,19,20,21,32,33,34,35,36,37,38,40,53
OK

4.11.3.3. +STKENV, Envelope

This action command allows sending a STK envelope command to the MS.

Command Type	Syntax	Response/Action
Set	+STKENV=<envelope_cmd>,<optional_ENV_data> AT+STKENV=214,7,<language> AT+STKENV=214,8,<cause > AT+STKENV=211,<item_id>,<help_requested>	OK or +CME ERROR: <error>
Test	+STKENV=?	+STKENV: OK

The following table shows the +STKENV parameters.

Table 4-176: +STKENV Parameters

<Parameter>	Description
<cause>	00: User Termination 01: Error Termination
<envelope_cmd>	Supported envelope commands: - code 211 (hex D3): Menu selection (needs <item identifier>) - code 214 (hex D6): Event download (only one event can be included in the <event_list>)
<item_id>	Item identification
<help_requested>	Indicates help requested 1: help is requested 0: help is not requested
<language>	Currently used language in the DTE (coding see 11.14)
<optional_ENV_data>	Indicates command code related parameters - For code 211 (hexa D3): <item identifier> - For code 214 (hexa D6): <event list>

4.11.3.4. +STKPROF, Terminal Profile

This command allows reading and changing the terminal profile data. The terminal profile sent by an external STK client states the facilities relevant to SIM Application Toolkit that are supported.

Command Type	Syntax	Response/Action
Set	+STKPROF=<length>,<data>	OK or +CME ERROR: <error>
Read	+STKPROF?	+STKPROF: <length>,<data> OK
Test	+STKPROF=?	OK

The following table shows the +STKPROF parameters.

Table 4-177: +STKPROF Parameters

<Parameter>	Description
<length>	Integer type value; length in bytes that are sent to TE in <data> **Note:** <length> set to 0 forces a reset to the default terminal profile stored in the ME.
<data>	Terminal profile data coded in hex format

Example

+STKPROF=2,"1F7F"

OK

+STKPROF?

+STKPROF=2,"1F7F'

OK

4.11.3.5. +STKCC, Call Control Commands

The SIMAP call control status is displayed using the unsolicited result code +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>
The following table shows the +STKCC parameters.

Table 4-178: +STKCC Parameters

<Parameter>	Description
<cc_command>	1: set up call 2: send SS 3: send USSD 4: send SM
<res_val>	Call control result value
<alpha>	Text string
<number>	Called party number
<ton_npi>	Type of number and numbering plan
<sc_addr>	Service center address
<dest_addr>	Destination address

4.11.3.6. +STKCNF, Proactive Session Status

The SIMAP proactive session status is displayed using the unsolicited result code +STKCNF: <proactive_cmd>,<result>,<add_result>,<sw1>.
The following table shows the +STKCNF parameters.

Table 4-179: +STKCNF Parameters

<Parameter>	Description
<proactive_cmd>	Decimal code indicates the command that was finished (refer to +STKPRO)
<result>	General result code
<add_result>	Additional result code
<sw1>	Status of the last response 0: command to SIM was suppressed because of multiple terminal response or wrong client For other responses see GSM 11.11

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Mechanism	Description
Profile Download	Enables the G24 to tell the SIM what its capabilities are. (The G24 is aware of the SIM's capabilities via the SIM Service Table and EFPHASE.) .
Provide Local Information	Defined as part of the proactive SIM service, this command requests the G24 to pass local information to the SIM, for example, the mobile country and network codes (MCC + MNC) of the network on which the user is registered.
Send DTMF	Defined as part of the proactive SIM service, this command requests the G24 to send DTMF tone(s) during an established call. .
Set Up Idle Mode Text	Defined as part of the proactive SIM G24, this command supplies a text string to be used by the ME as stand-by mode text.

Launch Browser	Defined as part of the proactive SIM service, this command requests a browser inside a browser-enabled user terminal to interpret the content corresponding to a URL. .
Set Up Event List	Defined as part of the proactive SIM service, this command supplies a list of events, which the SIM wants the G24 to provide details of when these events happen. .

Command Type	Syntax	Response/Action	Remarks
Set			The Set command for +MTKR is not supported by the G24. (The G24 will return an error.)
Read		+MTKR: <profile>	The Read command displays the current STK profile.
Test			The Test command for +MTKR is not supported by the G24. (The G24 will return an error.)

Table 4-180: +MTKR Parameters

<Parameter>	Description
<profile>	Displayed in hexadecimal characters, each byte of the profile is represented by two characters: First character Higher nibble (bits 4-7) Second character Lower nibble (bits 0-3) The bits are displayed in the following order: <byte 1 higher nibble><byte 1 lower nibble><byte 2 higher nibble><byte 2 lower nibble> (and so on)

Table 4-181: Profile Structure – Byte 1 (Download)

Bit	Description
b1	Profile download
b2	SMS-PP data download
b3	Cell Broadcast data download
b4	Menu selection
b5	9EXX' response code for SIM data download error
b6	Timer expiration
b7	USSD string data object supported in Call Control
b8	Envelope Call Control always sent to the SIM during automatic redial mode

Table 4-182: Profile Structure – Byte 2 (Other)

Bit	Description
b1	Command result
b2	Call Control by SIM
b3	Cell identity included in Call Control by SIM
b4	MO short message control by SIM
b5	Handling of the alpha identifier according to reference 1 subclause 9.1.3
b6	UCS2 Entry supported

b7	UCS2 Display supported
b8	Display of the extension text

Table 4-183: Profile Structure – Byte 3 (Proactive SIM)

Bit	Description
b1	Proactive SIM: DISPLAY TEXT
b2	Proactive SIM: GET INKEY
b3	Proactive SIM: GET INPUT
b4	Proactive SIM: MORE TIME
b5	Proactive SIM: PLAY TONE
b6	Proactive SIM: POLL INTERVAL
b7	Proactive SIM: POLLING OFF
b8	Proactive SIM: REFRESH

Table 4-184: Profile Structure – Byte 4 (Proactive SIM)

Bit	Description
b1	Proactive SIM: SELECT ITEM
b2	Proactive SIM: SEND SHORT MESSAGE
b3	Proactive SIM: SEND SS

b4	Proactive SIM: SEND USSD
b5	Proactive SIM: SET UP CALL
b6	Proactive SIM: SET UP MENU
b7	Proactive SIM: PROVIDE LOCAL INFORMATION (MCC, MNC,LAC, Cell ID & IMEI)
b8	Proactive SIM: PROVIDE LOCAL INFORMATION (NMR)

Table 4-185: Profile Structure – Byte 5 (Event driven information)

Bit	Description
b1	Proactive SIM: SET UP EVENT LIST
b2	Event: MT call
b3	Event: Call connected
b4	Event: Call disconnected
b5	Event: Location status
b6	Event: User activity
b7	Event: Idle screen available
b8	Event: Card reader status

Table 4-186: Profile Structure – Byte 6 (Event driven information extensions)

Bit	Description
b1	Event: Language selection
b2	Event: Browser Termination
b3	Event: Data available
b4	Event: Channel status
b5	RFU, bit = 0
b6	
b7	
b8	

Table 4-187: Profile Structure – Byte 7 (Multiple card proactive commands)

Bit	Description
b1	Proactive SIM: POWER ON CARD
b2	Proactive SIM: POWER OFF CARD
b3	Proactive SIM: PERFORM CARD APDU
b4	Proactive SIM: GET READER STATUS (Card reader status)
b5	Proactive SIM: GET READER STATUS (Card reader identifier)
b6	RFU, bit = 0
b7	
b8	

Table 4-188: Profile Structure – Byte 8 (Proactive SIM)

Bit	Description
b1	Proactive SIM: TIMER MANAGEMENT (start, stop)
b2	Proactive SIM: TIMER MANAGEMENT (get current value)
b3	Proactive SIM: PROVIDE LOCAL INFORMATION (date, time and time zone)
b4	Binary choice in GET INKEY
b5	SET UP IDLE MODE TEXT
b6	RUN AT COMMAND (that is, class "b" is supported)

b7	2nd alpha identifier in SET UP CALL
b8	2nd capability configuration parameter (see 3GPP TS 11.14 version 8.9.0 Release 1999, subclause 9.1.6)

Table 4-189: Profile Structure – Byte 9 (Proactive SIM)

Bit	Description
b1	Sustained DISPLAY TEXT (see 3GPP TS 11.14 version 8.9.0 Release 1999, subclause 6.4.1)
b2	SEND DTMF command (see 3GPP TS 11.14 version 8.9.0 Release 1999, subclause 6.4.24)
b3	Proactive SIM: PROVIDE LOCAL INFORMATION - BCCHChannel List coding, as per 3GPP TS 11.14 version 8.9.0 Release 1999, subclause 12.29)
b4	Proactive SIM: PROVIDE LOCAL INFORMATION (language)
b5	Proactive SIM: PROVIDE LOCAL INFORMATION (TimingAdvance)
b6	Proactive SIM: LANGUAGE NOTIFICATION
b7	Proactive SIM: LAUNCH BROWSER
b8	RFU, bit = 0

Table 4-190: Profile Structure – Byte 10 (Soft keys support)

Bit	Description
b1	Soft keys support for SELECT ITEM (see 3GPP TS 11.14 version 8.9.0 Release 1999, subclause 6.4.9)
b2	Soft Keys support for SET UP MENU (see 3GPP TS 11.14 version 8.9.0 Release 1999, subclause 6.4.8)
b3	RFU, bit = 0
b4	
b5	
b6	
b7	
b8	

Table 4-191: Profile Structure – Byte 11 (Soft keys information)

Bit	Description
b1	Maximum number of soft keys available.
b2	
b3	
b4	
b5	'FF' value is reserved for future use
b6	

b7	
b8	

Table 4-192: Profile Structure – Byte 12 (Bearer independent protocol proactive commands – class "e")

Bit	Description
b1	Proactive SIM: OPEN CHANNEL
b2	Proactive SIM: CLOSE CHANNEL
b3	Proactive SIM: RECEIVE DATA
b4	Proactive SIM: SEND DATA
b5	Proactive SIM: GET CHANNEL STATUS
b6	RFU, bit = 0
b7	
b8	

Table 4-193: Profile Structure – Byte 13 (Bearer independent protocol supported bearers – class "e")

Bit	Description
b1	CSD supported by ME
b2	GPRS supported by ME

b3	RFU, bit = 0
b4	
b5	
b6	Number of channels supported by ME
b7	
b8	

Table 4-194: Profile Structure – Byte 14 (Screen height)

Bit	Description
b1	Number of characters supported down the ME display, as defined in 3GPP TS 11.14 version 8.9.0 Release 1999, subclause 5.3.1
b2	
b3	
b4	
b5	
b6	RFU, bit = 0
b7	
b8	Screen Sizing Parameters supported as defined in 3GPP TS 11.14 version 8.9.0 Release 1999, section 5.3

Table 4-195: Profile Structure – Byte 15 (Screen width)

Bit	Description
b1	Number of characters supported across the ME display, as defined in 3GPP TS 11.14 version 8.9.0 Release 1999, subclause 5.3.2
b2	
b3	
b4	
b5	
b6	
b7	
b8	Variable size fonts supported

Table 4-196: Profile Structure – Byte 16 (Screen effects)

Bit	Description
b1	Display can be resized as defined in 3GPP TS 11.14 version 8.9.0 Release 1999, subclause 5.3.3
b2	Text Wrapping supported as defined in 3GPP TS 11.14 version 8.9.0 Release 1999, subclause 5.3.4
b3	Text Scrolling supported as defined in 3GPP TS 11.14 version 8.9.0 Release 1999, subclause 5.3.5
b4	RFU
b5	
b6	Width reduction when in a menu as defined in 3GPP TS 11.14 version 8.9.0 Release 1999, subclause 5.3.6

b7	
b8	

Table 4-197: Profile Structure – Byte 17 (Bearer independent protocol supported transport interface – class "e")

Bit	Description
b1	TCP
b2	UDP
b3	RFU, bit = 0
b4	
b5	
b6	
b7	
b8	

Table 4-198: Profile Structure – Byte 18 (Reserved)

Bit	Description
b1	RFU, bit = 0
b2	
b3	
b4	
b5	
b6	
b7	
b8	

Table 4-199: Profile Structure – Byte 19 (Reserved for TIA/EIA-136 facilities)

Bit	Description
b1	Protocol Version, coded as indicated in TIA/EIA-136-123
b2	
b3	
b4	
b5	RFU, bit = 0
b6	

b7	
b8	

Command Type	Syntax	Response/Action	Remarks
Set		OK or: +CME ERROR: <err>	The Set command tells the G24 in which mode to work.
Read		+MTKE: <State>	The Read command returns the current values.
Test		+MTKE: (list of supported <state>s) OK	The Test command returns supported values as a compound value.

Table 4-200: +MTKE Parameters

<Parameter>	Description
<State>	Indicates the state of the SIM ToolKit 0 Deactivate the SIM ToolKit functionality 1 Activate the SIM ToolKit functionality The default is 0.

Cmd Type	Description	Responses
1	Provides data about the "Display text" pro-active command.	+MTKP: <ProactiveCmdType>,<Priority>,<Text>
2	Provides data about the "Get Inkey" pro-active command.	+MTKP: <ProactiveCmdType>,<ResponseType>,<HelpInfo>[,<Text>]
3	Provides data about the "Get Input' pro-active command.	+MTKP: <ProactiveCmdType>,<ResponseType> ,<SecurityMode>,<MinLen>,<MaxLen>, <HelpInfo>[,<Text>]
5	Provides data about 'Play Tone' pro-active command.	+MTKP: <ProactiveCmdType>, <ToneType>[,<TimeUnit>,<TimeInterval>],[<Text>]
9	Provides data about the 'Send SMS' pro-active command.	+MTKP: <ProactiveCmdType>[,<Text>]
10	Provides data about the 'Send SS' pro-active command.	+MTKP: <ProactiveCmdType>[,<Text>]
12	Provides data about the 'Setup call' pro-active command.	+MTKP: <ProactiveCmdType>, <Type>,<CalledNb>,<Redials>,<Text>
13	Provides data about the 'Refresh' pro-active command.	+MTKP: <ProactiveCmdType>,<RefreshType>
20	Provides data indicating the timeout (get inkey, get input and select item).	+MTKP: <ProactiveCmdType>
22	Provides a text string to display when the G24 is in idle text mode.	+MTKP=22,"<idle mode text string>"
24	Sends a DTMF string after a call has been successfully established.	+MTKP: 24,<status>
26	Displays a browser for URLs inside browser-enabled G24s.	+MTKP: <ProactiveCmdType>, <URL>,<bearers>,<proxy_Id>[,<alpha_id>]

Table 4-201: +MTKP Parameters of MTKP Field Descriptions (Cont.)

<Parameter>	Description
ProactiveCmdType=1 (Display Text)	
<Priority>	0 Normal priority of display. 1 High priority of display.
<Text>	Text information in ASCII format.
ProactiveCmdType=2 (Get Inkey)	
<ResponseType>	0 Digit (0-9, *, #,and +) 1 SMS alphabet. 2 UCS2 characters 3 Yes/No
<HelpInfo>	0 No help information available. 1 Help information is available.
<Text>	Text information in ASCII format.
ProactiveCmdType=3 (Get Input)	
<ResponseType>	0 Digit (0-9, *, #,and +) 1 SMS alphabet. 2 UCS2 characters.
<SecurityMode>	0 Security off. 1 Security on.
<SizeMin>	Minimum length of input.
<SizeMax>	Maximum length of input.
<HelpInfo>	0 No help information available. 1 Help information is available.
<Text>	Text information in ASCII format.
Values when ProactiveCmdType=5 (Play tone)	

<ToneType>	1 Dial tone. 3 Network Congestion. 4 Radio ack. 5 Tone Dropped. 6 Tone Error. 7 Tone Call waiting. 8 Alert classic. 10 Powerup. 11 Confirm. 12 Negative.
<TimeUnit>	0 Minutes. 1 Seconds. 2 Tenths of seconds.
<TimeInterval>	(1-255) Time required expressed in units.
<Text>	Text information in ASCII format.
Values when ProactiveCmdType=9 (Send SMS)	
<Text>	Text information in ASCII format.
Values when ProactiveCmdType=10 (Send SS)	
<Text>	Text information in ASCII format.
Values when ProactiveCmdType=12 (Setup Call)	
<Parameter>	0 Set up call, but only if not currently busy on another call. 1 Set up call, putting all other calls (if any) on hold. 2 Set up call, disconnecting all other calls (if any).
<CalledNb>	Called number in ASCII format.
<Redials>	0 Redial allowed. 1 Redial not allowed.
<Text>	Text information in ASCII format
Values when ProactiveCmdType=13 (Refresh)	

<RefreshType>	0 SlM initialization and full file change notification 1 File change notification 2 SIM initialization and file change notification 3 SIM initialization 4 SIM reset
Values when ProactiveCmdType=22 (Set Up Idle Mode Text)	
<idle mode text string>	Text string to display when the G24 is in idle mode.
Values when ProactiveCmdType=24 (Send DTMF)	
<alpha id>	Alpha ID of the DTMF string.
Values when ProactiveCmdType=26 (Launch Browser)	
<URL>	URL (text string of up to 100 characters)
<bearers>	0 Bearer unspecified 1 Bearer SMS (for future use) 2 Bearer CSD 4 Bearer USSD (for future use) 8 Bearer GPRS and all possible intersections (Currently only 2 bearer types are supported: CSD and GPRS. Valid bearers are: 0,2,8,10)
<proxy_Id>	Text string containing name/identity of the gateway or proxy used for connecting to the URL (max. 20 characters)
<alpha_id>	Text string identifying the current connection (max. 20 characters)

Command Type	Syntax	Response/Action	Remarks
Set	AT+MTKP=<CmdType>,<Result> [,<Data>]	OK +CME ERROR: <err>	The Set command allows the user to answer the following proactive commands: • GET_INKEY Key pressed from the user. • GET_INPUT Message entered by the user. • Enable/disable the DTMF service by the user. • Launch browser • Set up event list
Test	+ MTKP =?	+MTKP: (list of supported <CmdType>s OK or: +CME ERROR: <err>	The Test command returns the possible <CmdType> values.

Table 4-202: MTKP Command Parameters (Cont.)

<Parameter>	Description
<CmdType>	2 Response for a "Get Inkey" 3 Response for a "Get Input" 16 Response for a " Set Up Event List" 24 Response for a " Send DTMF command" 26 Response for a " Launch browser"
Values when CmdType=2 (Get Inkey)	
<Result>	0 Session ended by user. 1 Response given by the user. 2 Help information required by user.
<Data>	Key pressed by the user.
Values when CmdType=3 (Get Input)	
<Result>	0 Session ended by user. 1 Response given by the user. 2 Help information required by user.

<Data>	String of characters entered by the user.
Values when CmdType=16 (Set Up Event List)	
<Result>	5 User activity event 6 Idle Screen Available event 8 Language Selection event 9 Browser Termination event
<Data>	None User activity event None Idle Screen Available event 0 Browser Termination event (user terminated) 1 Browser Termination event (error terminated) 4 String coded as follows: Byte(s) Description Length 1 Language tag 1 2 Length=’02’ 1 3-4 Language 2
Values when CmdType=24 (DTMF service)	
<Result>	0 disable DTMF service 1 enable DTMF, short tones 2 enable DTMF, long tones
<Data>	None

Command Type	Syntax	Response/Action	Remarks
Set		OK +CME ERROR: <err>	The Set command activates and deactivates the send DTMF command.
Read		+MTKP: 24,<status>	The Read command displays the current status of the send DTMF command.

Command	Response/Action
AT+MTKP=26,<Result>[<additional info>]	OK +CME ERROR: <err>

Table 4-203: +MTKP Parameters – Response Code 26

<Parameter>	Description
<result>	0 Success 1 Failure
<additional info>	0 No specific cause can be given 1 Bearer unavailable 2 Browser unavailable 3 G24 unable to read provisioning data Additional info should be added only in case of failure.
<err>	1 Unknown result value

Table 4-204: Current Event Types (Cont.)

Event	Notes
MT Call Event	Performed by G24; no indication sent to the TE.
Call Connected Event	Performed by G24; no indication sent to the TE.
Call Disconnected Event	Performed by G24; no indication sent to the TE.
Location Status Event	Performed by G24; no indication sent to the TE.
User Activity Event	Initiated by TE and reported via +MTKP command. TE is responsible for deciding what triggers this event. Only the event occurrence is monitored by G24; no additional information is required.
Idle Screen Available Event	Initiated by TE and reported via +MTKP command. TE is responsible for deciding what triggers this event. Only the event occurrence is monitored by G24; no additional information is required.
Card Reader Status Event	Issued by message handler of SCIM_CARD_DETECT_IND_ID message. Performed by G24; no indication sent to the TE.

Language Selection Event	TE is responsible for deciding what triggers this event. +MTKP command contains a data portion with language code – a pair of alphanumeric characters (defined in ISO 639 [29]), each of which is coded on one byte using the SMS default 7-bit coded alphabet, as defined in TS 23.038, with bit 8 set to 0.
Browser Termination Event	Initiated by TE and reported via +MTKP command. The command contains a data portion that includes the cause of termination: 0 User terminated 1 Error terminated TE is responsible for deciding what triggers this event.
Data Available Event	Performed by G24; no indication sent to the TE.
Channel Status Event	Performed by G24; no indication sent to the TE.

Command Type	Syntax	Response/Action	Remarks
Set	+MTKP=16,<result>[,<Data>]	OK +CME ERROR: <err>	The Set command defines the event type.
Test	+MTKP=?	OK	

Table 4-205: Set Event List Parameters

<Parameter>	Description
<Result>	5 User Activity event 6 Idle Screen Available event 8 Language Selection event 9 Browser Termination event

<Data>	None User Activity event None Idle Screen Available event 0 Browser Termination event (User terminated) 1 Browser Termination event (Error terminated) 4 Language Selection event, with string coded as follows: Byte(s) Description Length 1 Language tag 1 2 Length=’02’ 1 3-4 Language 2

Table 4-206: Sample Language Codes (Cont.)

Code	Language
aa	Afar
ab	Abkhazian
af	Afrikaans
am	Amharic
ar	Arabic
as	Assamese
ay	Aymara
az	Azerbaijani
ba	Bashkir
be	Byelorussian
bg	Bulgarian
bh	Bihari
bi	Bislama

bn	Bengali;
bo	Tibetan
br	Breton
ca	Catalan
co	Corsican
cs	Czech
cy	Welsh
da	Danish
de	German
dz	Bhutani
el	Greek
en	English
eo	Esperanto
es	Spanish
et	Estonian
eu	Basque
fa	Persian
fi	Finnish
fj	Fiji

fo	Faroese
fr	French
fy	Frisian
ga	Irish
gd	Scots
gl	Galician
gn	Guarani
gu	Gujarati
ha	Hausa
he	Hebrew
hi	Hindi
hr	Croatian
hu	Hungarian
hy	Armenian
ia	Interlingua
id	Indonesian
ie	Interlingua
ik	Inupiak
is	Icelandic

it	Italian
iu	Inuktitut
ja	Japanese
jw	Javanese
ka	Georgian
kk	Kazakh
kl	Greenlandic
km	Cambodian
kn	Kannada
ko	Korean
ks	Kashmiri
ku	Kurdish
ky	Kirghiz
la	Latin
ln	Lingala
lo	Laothian
lt	Lithuanian
lv	Latvian,
mg	Malagasy

mi	Maori
mk	Macedonian
ml	Malayalam
mn	Mongolian
mo	Moldavian
mr	Marathi
ms	Malay
mt	Maltese
my	Burmese
na	Nauru
ne	Nepali
nl	Dutch
no	Norwegian
oc	Occitan
om	(Afan)
or	Oriya
pa	Punjabi
pl	Polish
ps	Pashto,

pt	Portuguese
qu	Quechua
rm	Rhaeto-Romance
rn	Kirundi
ro	Romanian
ru	Russian
rw	Kinyarwanda
sa	Sanskrit
sd	Sindhi
sg	Sangho
sh	Serbo-Croatian
si	Sinhalese
sk	Slovak
sl	Slovenian
sm	Samoan
sn	Shona
so	Somali
sq	Albanian
sr	Serbian

ss	Siswati
st	Sesotho
su	Sundanese
sv	Swedish
sw	Swahili
ta	Tamil
te	Telugu
tg	Tajik
th	Thai
ti	Tigrinya
tk	Turkmen
tl	Tagalog
tn	Setswana
to	Tonga
tr	Turkish
ts	Tsonga
tt	Tatar
tw	Twi
ug	Uighur

uk	Ukrainian
ur	Urdu
uz	Uzbek
vi	Vietnamese
vo	Volapuk
wo	Wolof
xh	Xhosa
yi	Yiddish
yo	Yoruba
za	Zhuang
zh	Chinese
zu	Zulu

Command Type	Syntax	Response/Action	Remarks
Execute	AT+MTKM	+MTKM: <Alpha Identifier menu> +MTKM: <Idx1>, <NoOfItems>, <Alpha Idx1>, <Help Info> [<CR><LF>+MTKM: <Idx2>, <NoOfItems>, <Alpha Idx2>, <Help Info> […]] OK	This command is sent when the customer application wants to see the SIM Toolkit Main menu.
Set	AT+MTKM=<CmdType> [,<ItemId>]	OK or: +CME ERROR: <err>	The Set command is issued when the user wants to select an item from the menu.

Table 4-207: +MTKM Parameters

<Parameter>	Description
<CmdType>	0 Session terminated 1 Item selected 2 Help information request
<ItemId>	Item identifier of the selected item

Command	Response/Action
AT+MTKM	+MTKM: [<DefaultItem>]<Alpha Identifier menu> +MTKM: <Idx1>, <NoOfItems>, <Alpha Idx1>, <Help Info> +MTKM: <Idx2>, <NoOfItems>, <Alpha Idx2>, <Help Info> […]]

Table 4-208: +MTKM Unsolicited Identification Parameters

<Parameter>	Description
<Alpha Identifier menu>	Alpha Identifier of the main menu
<DefaultItem>	Default item
<Idx>	Menu item Identifier
<NoOfItems>	Number of items in the current menu
<Alpha Idx>	Alpha identifier of items
<Help Info>	0 No help available 1 Help available

Command	Response/Action

+MTKC	+MTKC: <CCResult>[,<Number>]

Table 4-209: +MTKC Parameters

<Parameter>	Description
<CCResult>	0 Control response not allowed. 1 Control response with modification.
<Number>	Called number or SS String in ASCII format.

4.11.4. TCP/IP

4.11.4.1. +MIPCALL, Create a Wireless Link

This command sets up a PPP (Point to Point Protocol) connection with the GGSN (Gate GPRS Support Node) or with the CSD provider - depending on operation parameter value, and returns a valid dynamic IP for the G30.

Command Type	Syntax	Response/Action
Set	+MIPCALL= <Operation> [,<”APN”> [,<”User name”>, <”Password”> [,<Auth_type>]]]	OK +MIPCALL: <"local IP address"> or: ERROR: <err> +MIPCALL: 0
Read	+MIPCALL?	+MIPCALL: <status>[,<IP>]
Test	+MIPCALL=?	+MIPCALL: (list of supported <operation>s)

Note:

- The +MIPCALL command does not return the prompt to the terminal until the IP is received from the provider, or time out has occurred, therefore, no other commands can be issued in the meantime.
- The +MIPCALL command does not have a general ABORT mechanism, therefore a command cannot be issued until the previous command ends.
- In case FTP is established and MIPCALL is set to zero, this will close and disconnect the FTP connection.

- When a call exists the dynamic IP address will be returned.
  For example:
  AT+MIPCALL?
  +MIPCALL: 1,"172.17.237.80"
- In case of MUX : Each MUX channel can accept MIP command. When MIPCALL is detected on a channel, the channel is allocated for MIP operations (MIP commands on other channels are blocked). When MIPCALL=0 is detected on the channel, the channel is released and next MIPCALL can be start in some other MUX channel.

The following table shows the +MIPCALL parameters

.

Table 4-210: +MIPCALL Parameters

<Parameter>	Description
operation	0 - disconnect a link 1 - establish GPRS link
<status>	0 Disconnected 1 Connected
"APN"	APN of service provider (in quotation marks). Contact your service provider for details.
"Phone Number"	Phone number of CSD service provider (in quotation marks). Contact your service provider for details.
"User name"	User name in provider server (in quotation marks). Contact your service provider for details.
"Password"	Password for provider server (in quotation marks). Contact your service provider for details.
Local IP-address	IP address given by server after PPP negotiation.
Auth_type	1 - PAP(DFLT) 2 - CHAP

Note: The "User name" and the "Password" parameters can be up to 64 characters each. The "APN" / "Phone number" parameters can be up to 50 characters each.

Example

Establish GPRS connection with GGSN and obtain an IP:

AT+MIPCALL=1,"internet","User","Password"
OK

+MIPCALL: "123.145.167.230"

Establish CSD connection with CSD provider and obtain an IP:

AT+MIPCALL=2," 01234567890","User","Password"
OK

+MIPCALL: "234.123.253.78"

Close an active connection

AT+MIPCALL=0
OK

4.11.4.2. +MIPOPEN, Open a Socket (UDP or TCP)

This command causes the G30 module to initialize a new socket that waits for a connection from a remote machine or opens a common or TCP secured with SSL connection with a remote side (according to received parameters). Each socket allocates an accumulating buffer whose size is 1372 bytes.

Note: MIPxxx is a complete set of GPRS commands. This set should not be used with other GPRS commands, such as CGATT, CGACT, and so on.

The +MIPOPEN command returns a +MIPSTAT unsolicited event if it fails, for example, if it was rejected by the remote side.

The +MIPOPEN command returns a +MIPSSL unsolicited event(s) in case of alert(s) occurring during secure connection. See Table 4-198.

SSL connection is not supported for listening sockets.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MIPOPEN=<Socket ID>,<Source Port>,<Remote IP>,<Remote Port>,<Protocol>,<buffering mode>,<data type>	OK or: +MIPOPEN: <Socket ID>,<State>[,<Remote IP>,<Remote Port>] or: +MIPSTAT: <Socket ID>,<Status> or: ERROR: <err>	The Set command returns <Remote IP> and <Remote Port> parameters only for sockets opened in Listen mode.
Read	AT+MIPOPEN?	+MIPOPEN:[<SocketID>] for each socket that can be opened or: +MIPOPEN 0 if there are no free sockets.	The Read command returns the numbers of the sockets that can be opened.
Test	AT+MIPOPEN=?	+MIPOPEN: (list of supported <socket ID>s),(list of supported <source port>s),(list of supported<"Destination IP">s), (list of <destination port>s),(list of supported <protocol>s)	

Example
+MIPOPEN: 1 2 3 4 //All sockets closed
+MIPOPEN: 1 3 4 //Socket 2 opened

The following table shows the +MIPOPEN parameters.

Table 4-211: +MIPOPEN Parameters

<Parameter>	Description
Socket ID	A unique number that identifies a connection. Valid socket numbers - 1,2,3 and 4
Source Port	Port of source site. Port range: 1-65535 (decimal digits)
Remote IP	**IP:** IP of the remote site in the format "AAA.BBB.CCC.DDD". The range of each octet is 0-255. Value can be written in 1, 2, or 3 digits. **Host name:** of remote site. The host-name convention should meet the rules as describe in RFC-1035 section: 2.3 Conventions. Syntax is not validated, except the maximum length (255 characters).
Remote Port	Port of remote site. Port range: 1-65535 (decimal digits) for outgoing connection. Port 0 for incoming connection.
Protocol	Type of protocol stack. 0 TCP 1 UDP 2 TCP secured with SSL
State	0 Inactive 1 Active 2 SSL secured
Buffering mode	Receives data to be sent to TE or to be stored in internal buffer. 0 - sent to TE (default) 1 - stored in the internal buffer
Data type	Data type passed in socket 0 - Hexadecimal mode (default) 1 - ascii mode

Note: Telit does not recommend using port numbers below 1024. These numbers are defined to be reserved for operating systems.

Example

AT+MIPOPEN=1,1200,"123.245.213.012",1234,0 //Opening socket 1, using TCP protocol, from port 1200, targeting 123.245.213.012 port 1234, received data is sent immediately to TE and data type is Hex
+MIPOPEN=2,1300,"123.133.074.192",1242,1 //Opening socket 2, using UDP protocol, from port 1300, targeting 123.133.074.192 port 1242, received data is sent immediately to TE and data type is hex


```
AT+MIPOPEN=1,1222,"123.245.213.012",1234,0,1,1          //Opening socket 1, using TCP protocol, from port 1222,
targeting 123.245.213.012 port 1234, received data is stored in internal buffer and data type is ascii
AT+MIPOPEN:                 //Invalid command
ERROR
AT+MIPOPEN?                 //Terminal checking the free sockets
+MIPOPEN: 3 4
OK
AT+MIPOPEN=1,0,"WWW.GOOGLE.COM",80,0 //TCP
OK
+MIPOPEN: 1,1
AT+MIPOPEN=1,0,"www.google.com",80,0         //TCP
OK
+MIPOPEN: 1,1
AT+MIPOPEN=2,0,"www.google.com",80,1         //UDP
OK
+MIPOPEN: 2,1
// Listen socket over TCP:
AT+MIPOPEN=1,1100,"0.0.0.0",0,0                 // Listens to any port at any IP.
OK
```

4.11.4.3. +MIPODM, Open a Socket (UDP or TCP) in Online Data Mode

This command causes the G30 to initialize a new socket that waits for a connection from a remote machine or opens a common or TCP secured with SSL connection with a remote side (according to received parameters) and switch it to Online (raw data transfer) Data Mode and open a connection with a remote side.

Notes: MIPxxx is a complete set of GPRS commands. This set should not be used with other GPRS commands, such as CGATT, CGACT, and so on.

Online Data Mode allows the user to transfer raw data from terminal to Network and vice versa over a GPRS channel. Currently, only RS232 connection to terminal with hardware flow control is supported.

Each socket allocates an accumulating buffer whose size is 1372 bytes. When the user sends amount of data, less then buffer size, the data is being sent to Network after a spooling timeout (200 mS), otherwise the data is being sent to Network immediately.

Only one socket is allowed at the same time in Online Data Mode.

The +MIPODM command returns a +MIPSTAT <Socket ID><Error> unsolicited event if it fails. For example, if it was rejected by the remote side.

The +MIPODM command returns a +MIPSSL unsolicited event(s) in case of alert(s) occurring during secure connection establishment or in pseudo-command mode. SeeTable 4-198.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MIPODM=<Socket ID>,<Source Port>,<Remote IP>,<Remote Port>,<Protocol>	OK or: +MIPODM: <Socket ID>,<State>[,<Remote IP>,<Remote Port>] or: +MIPSTAT: <Socket ID>,<Status> or: ERROR: <err>	The Set command returns <Remote IP> and <Remote Port> parameters only for sockets opened in Listen mode.

Read	AT+MIPODM?	+MIPODM:[<SocketID>] for each socket that can be opened or: +MIPODM 0,0 if there are no free sockets.	When a socket opens in Online Data Mode, the command returns actual Socket ID value and '1' value (active). G30 will be in pseudo-command mode for receiving the command.
Test	AT+MIPODM=?	+MIPODM: (list of supported <socket ID>s),(list of supported <source port>s),(list of supported<"Destination IP">s), (list of <destination port>s),(list of supported <protocol>s)	

The following table shows the +MIPODM parameters.

Table 4-212: +MIPODM Parameters

<Parameter>	Description
Socket ID	A unique number that identifies a connection. Valid socket numbers - 1,2,3 and 4
Source Port	Port of source site. Port range: 1-65535 (decimal digits)
Remote IP	**IP** of the remote site in the format "AAA.BBB.CCC.DDD". The range of each octet is 0-255. The value can be written in 1, 2, or 3 digits. **Host-name** of remote site. The host-name convention should meet the rules as describe in RFC-1035 section: 2.3 Conventions. Syntax is not validated, except the maximum length (255 characters).
Remote Port	Port of remote site. Port range: 1-65535 (decimal digits) for outgoing connection. Port 0 for incoming connection.
Protocol	Type of protocol stack. 0 TCP 1 UDP 2 TCP secured with SSL
State	0 Inactive 1 Active 2 SSL secured

Note: Telit does not recommend using port numbers below 1024. These numbers are defined to be reserved for

operating systems.

Example

Opening socket 3 in Online Data Mode, using TCP protocol, from port 1104, designation IP 123.245.213.012, designation port 1124:

```
AT+MIPODM=3,1104,"172.90.237.221",1124,0
OK
+MIPODM: 3,1
```

Enter invalid command format:

```
AT+MIPODM
ERROR
```

Check opened in Online Data Mode socket state when G30 is pseudo-command mode:

```
AT+MIPODM?
+MIPODM: 3,1
OK
```

Listen socket over TCP:

```
AT+MIPODM=1,1100,"0.0.0.0",0,0                  // Listens to any port at any IP.
OK
+MIPODM: 1,1,122.221.32.64,1200                 // Remote side connected to the listen socket.
AT+MIPODM=3,3212,"122.1.222.134",0,0            // Listen to any port at specific IP.
OK
+MIPODM: 3,1,122.1.222.134,1222                 // Remote side connected to the listen socket.
//SSL
AT+MIPODM=2,2222,"www.google.com",443,2// TCP secured with SSL.
OK
+MIPODM: 2,2// SSL connection opened.
AT+MIPODM=3,1234,"www.xyz.com",443,2     // TCP secured with SSL.
OK
+MIPSSL: 3,10                   // SSL_BAD_CERTIFICATE  alert.
+MIPODM: 3,2
```

4.11.4.4. +MIPCLOSE, Close a Socket

Note: This command causes the G30 to free the socket accumulating buffer and to close the socket. All data stored in the accumulating buffer will be lost

Command Type	Syntax	Response/Action
Set	+MIPCLOSE = <Socket ID>	OK +MIPCLOSE: <Socket ID>[,< number_of_acknowledged_bytes >],<close_type> or: ERROR
Read	+MIPCLOSE?	+MIPCLOSE: [<socket ID>] OK (for all ACTIVE sockets) OR: +MIPCLOSE: 0 OK (if no active sockets)
Test	+MIPCLOSE=?	+MIPCLOSE: (1-4) OK

The following table shows the +MIPCLOSE parameters.

Table 4-213: +MIPCLOSE Parameters

<Parameter>	Description
<Socket_ID>	A unique number that identifies a connection. Valid socket numbers - 1, 2, 3 and 4
<number_of_acknowledged_bytes >	Total number of bytes that were acknowledged.
<close_type>	Connection close type: 0 - Connection was closed correctly. 1 - The remote side didn't reply, so connection closed by close timeout. 2 - Other (The remote side replied with RST, retransmission timeout occurred, etc.).

Example

AT+MIPCLOSE=1 //The terminal closes the opened socket

OK

+MIPCLOSE: 1,0 // Socket 1 closed. The remote side replies with FIN.

AT+MIPCLOSE=1 //The terminal closes the opened socket
OK

+MIPCLOSE: 1,1 //Socket 1 closed. The remote side did not reply, so +MIPCLOSE indication received after close timeout.

AT+MIPCLOSE=3 //The terminal closes the opened socket
OK

+MIPCLOSE: 3,1024,2 //Socket 3 closed. Ack indication enabled - 1024 bytes were acked. The remote side did reply with RST.

AT+MIPCLOSE=2 //The terminal closes the socket that wasn't opened
ERROR

AT+MIPCLOSE? //Sockets 1 and 2 are opened
+MIPCLOSE: 1,2

OK

AT+MIPCLOSE? //No opened sockets
+MIPCLOSE: 0

OK

4.11.4.5. +MIPSETS, Set Size, Timeout and Buff len for Automatic Push

This command causes the G30 to set a watermark in the accumulating buffer and set timeout. When the watermark is reached, data is pushed from the accumulating buffer into the protocol stack.
Timeout is used to define interval of time between MIPSEND command and time when data will be automatically pushed from the accumulating buffer into the protocol stack.
Data chunks between the terminal and the G30 are limited to be smaller than 80 characters (160 characters in coded form). In order to reduce the overhead of sending small amounts of data over the air, the G30 uses an accumulating buffer. The terminal can specify a watermark within the accumulating buffer size limits to indicate how much data should be accumulated. When the data in the accumulating buffer exceeds the watermark, only data equal to the watermark is sent. Data remaining in the buffer is sent with the next packet.
Arriving data to accumulating buffer triggers a start of time (defined in timeout) countdown. When counter reaches zero, data is moved into the protocol stack. If new data arrived before time is reached zero, it is re-initialized. If data in accumulating buffer reached watermark it is pushed to the accumulating buffer as usual, but if after automatic push there is some remaining data, time countdown is started.

Note: If there is data in the accumulating buffer, the +MIPSETS command will be rejected.

Command Type	Syntax	Response/Action	Remarks
Set	+MIPSETS= <Socket ID>,<Size> [,<Timeout>][,<Buff Len>]	OK or: ERROR +MIPSETS: <err>	Timeout is defined in milliseconds.
Read	+MIPSETS?	+MIPSETS: [<SocketID>,<Current Size Settings>,<Timeout>][,<Buff Len>] For all ACTIVE sockets.	
Test	+MIPSETS=?	+MIPSETS: (1-4),(list of supported <size>s),),(list of supported <Timeout>s),supported <Buff Len>s	

The following table shows the +MIPSETS parameters.

Table 4-214: +MIPSETS Parameters

<Parameter>	Description
Size	Size of the buffer 1 < size <= 1372 The default value is 1372.
Timeout	0 - 1000 0 means no timeout is used (default).
<Buf Len>	Length of received buffer that should be displayed on TE. Minimum – 80 (default) Maximum - 1300
Extended err	3 Operation not allowed

Example

AT+MIPSETS=1,340 //Asks the G30 to accumulate 340 bytes on socket 1 prior to sending (socket should be activated by the +mipopen command

+MIPSETS: 0
OK
AT+MIPSETS=1,200 //Asks the G30 to accumulate 200 bytes on socket 1 prior to sending
(socket should be activated by the +mipopen command)
+MIPSETS: 0
OK
AT+MIPSETS=2,400,,100 //Asks the G30 to accumulate 400 bytes on socket 2 prior to sending, receive buffer length is 100
+MIPSETS: 0
OK
AT+MIPSETS=?
+MIPSETS: (1-4),(1-1372),(0-1000),(80-1300)
OK
AT+MIPSETS?
+MIPSETS: 1,200,0,80 //Information provided only for active sockets
+MIPSETS: 2,400,0,100 //Information provided only for active sockets
OK
AT+MIPSETS=1,200,50 //Asks the G30 to send all accumulated data after 50 msec of receiving
data in mipsend command.
MIPSETS: 0
OK
AT+MIPSETS?
+MIPSETS: 1,200,50,80
+MISETS: 2,400,0,100
OK

4.11.4.6. +MIPSEND, Send Data

This command causes the G30 to store the data that the terminal provides in the accumulating buffer, and then send this data using an existing protocol stack when the amount of data reaches the predefined amount. When the data is sent, an unsolicited report of +MIPPUSH will be displayed. Before sending data, a valid connection must be created using the +MIPCALL and +MIPOPEN commands. Data type to be sent can be ascii or Hex type. The type is set using the +MIPOPEN command.
Telit recommends that the terminal sets the watermark in the accumulating buffer prior to this command, using the +MIPSETS command. By default, the watermark is set to 1372 bytes of data.

Command Type	Syntax	Response/Action	Remarks
Set	+MIPSEND = <Socket ID>,<Data>	ERROR +MIPSEND: <Socket ID>,<Status>,<Free Size>	Data in the +MIPSEND command is limited to 504 characters. <Status>: 0 - Success 1 - Socket is flowed off
Read	+MIPSEND?	+MIPSEND <Socket ID>,<Free Size>>[<Socket ID> <Free Size>]<CR><LF> For all ACTIVE sockets.	
Test	+MIPSEND=?	ERROR	

The following table shows the +MIPSEND parameters.

Table 4-215: +MIPSEND Parameters

<Parameter>	Description
<socket ID>	1,2,3,4 Number of valid socket
<Free Size>	Free space in current buffer. Free size is calculated from the 1372. 0 < Free Size < 1372
<Data>	- Ascii data type. User data string, using ascii chars. See notes below. - Hex data type. User data string is sent encoded with 0-F hexadecimal digits (String ends with a <CR>)

Note 1: <Data type> is set using the +MIPOPEN command.

Note 2: When <data type> is ascii mode , <cr> <lf> and <\> has special treatment.
<cr> should be replaced by the couple "\r"
<lf> should be replaced by the couple "\n"
<\> should be replaced by the couple "\\"
<"> should be replaced by the couple "\q"

Example

```
(Socket 4 was not opened using +MIPOPEN AT command)
AT+MIPSEND=4,"4444"
ERROR
AT+MIPSEND=1,"4444"
+MIPSEND: 1,1370              //1372- 2 chars 'DD' = 1370
OK
AT+MIPSEND=?
ERROR
AT+MIPSEND?
+MIPSEND: 1,1372                    //Sockets 1 and 2 were opened using + MIPOPEN AT command
+MIPSEND: 2,1372                    //Sockets 1 and 2 were opened using + MIPOPEN AT command
OK
AT+MIPSEND=2,"11223344"             //When reached the watermark
OK
+MIPPUSH: 2,0
+MIPSEND: 2,0,1372
AT+MIPOPEN=1,1111,"193.222.129.55",9115,0,0,1          // open tcp connection non buffering mode and data type
is in ascii mode. Server will echoes the data back
AT+MIPSEND=3,"123\r\n456\\\q"       // socket 3 was opened in ascii data type mode
+MIPSEND: 3,1362             // 10 chars was entered 123<cr><lf>456<\><">
AT+MIPPUSH=1
+MIPPUSH: 1,0
OK
+MIPRTCP: 1,0,123
456\"
```

4.11.4.7. +MIPPUSH, Push Data into Protocol Stack

This command causes the G30 to push the data accumulated in its accumulating buffers into the protocol stack. It is assumed that before using this command, some data should exist due to previous +MIPSEND commands.

Command Type	Syntax	Response/Action	Remarks
Set	+MIPPUSH = <Socket ID>[,<"Destination IP">,<Destination Port>]	+MIPPUSH: <Socket_ID>,<Status>[,<accumulated_sent_length>] OK Or: ERROR	Optional parameters are used only for UDP connections. If the Destination IP and Destination Port are not provided by the user, a datagram is sent to the last target (or the default target provided by the +MIPOPEN command). <accumulated_sent_length> - this parameter counts how many bytes were sent to the remote side by the G30 TCP/IP stack. When user open socket, <accumulated_sent_length> initialized to zero. The <accumulated_sent_length> value will be display only in case <is_nack_ind_req> parameter of +MIPCONF command is set to 1 or 2. Size of <accumulated_sent_length> is four octets unsigned digit (0-4294967295). <Status>: 0 - Success 1 - socket is flowed off 2 - there is no data in socket to send
Read	+MIPPUSH?	MIPPUSH:[<socket ID>]	
Test	+MIPPUSH=?	MIPPUSH=<socket ID>,<IP>,<Port>	

The following table shows the +MIPPUSH parameters.

Table 4-216: +MIPPUSH Parameters

<Parameter>	Description
Socket ID	1,2,3,4 Number of valid socket
Destination IP	IP of destination site in the format AAA.BBB.CCC.DDD. The value can be written in 1, 2 or 3 digits.
Destination Port	0-65535 Port of destination site. Written in decimal digits.

Example

AT+MIPPUSH=1 //Terminal asks the G30 to flush the buffer in socket 1 (was opened using the +MIPOPEN command)

+MIPPUSH: 0

OK

4.11.4.8. +MIPFLUSH, Flush Data from Buffers

This command causes the G30 to flush (delete) data accumulated in its accumulating buffers.

Command Type	Syntax	Response/Action
Set	+MIPFLUSH = <Socket ID>	ERROR or: +MIPFLUSH: <Socket ID> OK
Read	+MIPFLUSH?	+MIPFLUSH:[<socket ID>]
Test	+MIPFLUSH=?	+MIPFLUSH=(<Socket ID>)

The following table shows the +MIPFLUSH parameters.

Table 4-217: +MIPFLUSH Parameters

<Parameter>	Description
Socket ID	1,2,3,4 - Number of valid sockets

Example

```
AT+MIPFLUSH=2          //Socket number 2 was previously opened using the +MIPOPEN
                       command
+MIPFLUSH: 2
OK
AT+MIPFLUSH=5
ERROR
AT+MIPFLUSH?
+MIPFLUSH: 1 2
OK
```

4.11.4.9. +MIPRUDP, Receive Data from UDP Protocol Stack

This unsolicited event is sent by the G30 to the terminal when data is received from the UDP protocol stack.

Set Command Event

+MIPRUDP:<Source IP>,<Source Port><socket ID>,<Left>,<Data>

The following table shows the +MIPRUDP parameters.

Table 4-218: +MIPRUDP Parameters

<Parameter>	Description
Source IP	IP of the source.
Source Port	Port of the source.
Socket ID	1,-4 - Number of valid socket.
Left/accumulated	- Size of received data still left in protocol stack in display mode, or - Number of bytes that are accumulated in internal buffer in buffering mode. **Note:** Socket can be opened in 2 buffering modes: - Display received data immediately to TE. - Storing received data in an internal buffer.
Data	Display mode only. Data that was received from protocol stack.

Example

```
AT+MIPOPEN=1,1111,"193.222.129.55",9119,1,0  // opening in display to TE mode
+MIPOPEN: 1,1
OK
AT+MIPOPEN=2,2222,"193.222.129.55",9119,1,1  // opening in buffering mode
+MIPOPEN: 2,1
OK
AT+MIPSEND=1,"1122556677889900"  // 8 bytes
+MIPSEND: 1,0,1364
OK
AT+MIPPUSH=1                // sending data to server that shall echo the data back
+MIPPUSH: 1,0
OK
+MIPRUDP: 193.222.129.55,9119,1,0,1122556677889900      // 8 bytes were received and displayed in TE.
AT+MIPSEND=2,"21222324252627282920"                     // 10 bytes
+MIPSEND: 2,0,1362
OK
AT+MIPPUSH=2                // sending data to server that shall echo the data back
+MIPPUSH: 2,0
OK
+MIPRUDP: 193.222.129.55,9119,2,10
AT+MIPSEND=2,"3132333435"                       // 5 bytes
+MIPSEND: 2,0,1367
```


```
OK
AT+MIPPUSH=2                    // sending data to server that shall echo the data back
+MIPPUSH: 2,0
+MIPRUDP: 193.222.129.55,9119,2,15   // 5 bytes were received and 15 bytes are stored in the buffer.
```

4.11.4.10. +MIPRTCP, Receive Data from TCP Protocol Stack

This unsolicited event is sent by the G30 to the terminal when data is received from the TCP protocol stack.

Set Command Event

```
+MIPRTCP: <socket ID>,<Left>,<Data>
```

The following table shows the +MIPRTCP parameters.

Table 4-219: +MIPRTCP Parameters

<Parameter>	Description
Socket ID	1-4 - Number of valid socket.
Left	- Size of received data still left in protocol stack in display mode, or - Number of bytes that are accumulated in internal buffer in buffering mode. **Note:** Socket can be opened in 2 buffering modes: - Display received data immediately to TE. - Storing received data in an internal buffer.
Data	In display mode, data that was received from protocol stack.

Example

```
AT+MIPOPEN=1,1111,"193.222.129.55",9119,0,0    // opening in display to TE mode
+MIPOPEN: 1,1
OK
AT+MIPOPEN=2,2222,"193.222.129.55",9119,0,1  // opening in buffering mode
+MIPOPEN: 2,1
OK
AT+MIPSEND=1,"1122556677889900"                 // 8 bytes
+MIPSEND: 1,0,1364
OK
AT+MIPPUSH=1                    // sending data to server that shall echo the data back
+MIPPUSH: 1,0
OK
+MIPRTCP: 1,0, 1122556677889900  // 8 bytes were received and displayed in TE.
AT+MIPSEND=2,"21222324252627282920" // 10 bytes
+MIPSEND: 2,0,1362
OK
AT+MIPPUSH=2                    // sending data to server that shall echo the data back
+MIPPUSH: 2,0
OK
+MIPRTCP: 2,10                   // 10 bytes were received and 10 bytes only are stored in the buffer
AT+MIPSEND=2,"3132333435"                       // 5 bytes
+MIPSEND: 2,0,1367
OK
AT+MIPPUSH=2                    // sending data to server that shall echo the data back
+MIPPUSH: 2,0
+MIPRTCP: 2,15                   // 5 bytes were received and 15 bytes are stored in the buffer.
```

4.11.4.11. +MIPSTAT, Status Report

This unsolicited event is sent to the terminal indicating a change in status. Currently there are two possible sources of failure, a broken logical connection or a broken physical connection.

Note: In case of SSL secured connection, the encryption increases the amount of data and SSL protocol uses encrypted alerts, therefore the <number_of_acknowledged_bytes> parameter shows gross number of acknowledged bytes (including encrypted alert messages), which is greater than actual amount of sent user data.

Syntax

+MIPSTAT: <socket_ID>,<n>[,<number_of_acknowledged_bytes >]

The following table shows the +MIPSTAT parameters.

Table 4-220: +MIPSTAT Parameters

<Parameter>	Description
<SocketID>	A unique number that identifies a connection. Valid socket numbers - 1, 2, 3 and 4
<n>	0 - ACK indication 1 - Broken protocol stack 2 - Connection closed automatically due to non - fatal alert
<number_of_acknowledged_bytes >	Total number of bytes that were acknowledged. This parameter will be display only in case < is_nack_ind_req> parameter of +MIPCONF command ios set to 2.

Example

+MIPSTAT: 1,2

4.11.4.12. +MIPDATA, Network Incoming Data Unsolicited Indication in Pseudo-command Mode

This unsolicited event is sent to the terminal indicating a data comes from Network when G30 is in pseudo-command mode.

Note: Pseudo-command mode is a special mode, allowing the user to enter AT commands from terminal, when actually opened in Online Data Mode socket suspended. The way to suspend the socket is to enter ESC sequence from terminal. The way to resume the socket (return to Online Data Mode) is to enter ATO command from terminal.

Syntax

+MIPDATA: <Socket ID>,<Number of received data bytes>

The following table shows the MIPDATA parameters.

Table 4-221: MIPDATA Parameters

<Parameter>	Description
<Socket ID>	Identification Number of Socket: 1,2,3,4
<number of received data bytes >	Amount of data in bytes, received from Network, when G30 is in pseudo-command mode.

Example

+MIPDATA: 1,1372

4.11.4.13. +MIPXOFF, Flow Control - Xoff

This command is the unsolicited response that the G30 sends to the terminal to stop sending data when it does not have enough memory to process new +MIPSEND requests. The G30 uses the accumulating buffer prior to pushing data into the protocol stack. This memory resource is protected by a Xoff_upper watermark.

Event

+MIPXOFF: <Socket ID>

Example

+MIPXOFF: //The G30 detects that the accumulating buffer 1 has reached its Xoff watermark.

From this point, the terminal is not allowed to send data, until it receives the +MIPXON command.

4.11.4.14. +MIPXON, Flow Control - Xon

This command is the unsolicited event that the G30 sends to the terminal when it detects that it has free memory in the accumulating buffer and can process new +MIPSEND requests, after the +MIPXOFF event.

Event

+MIPXON: <Socket ID>

Example

+MIPXON: 1 //The G30 pushed the data into the protocol stack on socket 1 and is able to handle more data from the terminal.

4.11.4.15. +MIPCONF, Configure Internal TCP/IP stack

This command allows to configure TCP stack parameters, such as retransmissions number, upper and bottom limits of retransmission timeout, close delay. It can be used to configure TCP socket parameters only before socket activation. Configuration values will be stored in G30 until power circle.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MIPCONF=<socket> <retr_num>,<min_TO>,<max_TO>, <max_close_delay>,<is_nack_ind_req>	OK or: +CME ERROR: <err>	The Set updates TCP stack configuration parameters.
Read	+MIPCONF?	+MIPCONF: 1,<retr_num>,<min_TO>,<max_TO>,<max_close_delay>,<is_nack_ind_req<CR><LF> +MIPCONF: 2,<retr_num>,<min_TO>,<max_TO>,<max_close_delay>,<is_nack_ind_req<CR><LF> +MIPCONF: 3,<retr_num>,<min_TO>,<max_TO>,<max_close_delay>,<is_nack_ind_req<CR><LF> +MIPCONF: 4,<retr_num>,<min_TO>,<max_TO>,<max_close_delay>,<is_nack_ind_req>	The read command returns current settings of TCP stack parameters.
Test	+MIPCONF=?	+MIPCONF: (1-4),(1-5),(1-10),(10-600),(1-75),(0-2)	The Test command returns the possible parameters values. Time values can be inserted with resolution of 100 milliseconds. Keep alive time value resolution is in seconds.

Table 4-222: +MIPCONF Parameters

Parameter	Description
<socket >	Number of configured TCP socket (1 to 4)
<retr_num >	Number of retransmissions (1 to 5)
<min_TO >	Bottom limit to retransmit timeout (100 ms to 1 sec.)
<max_TO>	Upper limit to retransmit timeout (1 sec. to 60 sec.)
<max_close_delay>	Closing delay required by RFC 793 (1 ms to 120 ms) Default value: 8
<is_nack_ind_req>	NACK/ACK TCP indication feature. Activating this parameter enables G30 to report the user, in case of losing a TCP connection, what data was received by the remote TCP layer. 0 - feature inactive. 1 - NACK indication active. 2 - ACK indication active. • Power Up - 0 • Default value - previously set value This parameter resets after power cycle.

Example

```
AT+MIPCONF=2,5,10,600,75,2
OK
AT+MIPOPEN=2,0,"66.249.87.99",80,0
OK
+MIPOPEN: 2,1
AT+MIPSETS=2,10
+MIPSETS: 0
OK
at+mipsend=2,"474554202F20485454502F312E300D0A486F73743A207777772E676F6F676C652E
636F6D0D0A0D0A"
+MIPPUSH: 2,0,40
+MIPSEND: 2,0,1372
OK
+MIPSTAT: 2,0,40 < missing in example (need to be added)
at+mipsend=2,"474554202F20485454502F312E300D0A486F73743A207777772E676F6F676C652E
636F6D0D0A0D0A"
+MIPPUSH: 2,0,80
+MIPSEND: 2,0,1372
OK
+MIPSTAT: 2,0,80 < correct unsolicited
```

4.11.4.16. +MPING, Start Ping Execution (ICMP Protocol)

This command allows verifying IP connectivity to another remote machine (computer) by sending one

or more Internet Control Message Protocol (ICMP) Echo Request messages. The receipt of corresponding Echo Reply messages are displayed, along with round trip times.
Valid IP address must be obtained using AT+MIPCALL command prior to starting ping execution.
Only one ping request execution will be allowed at any given moment.

Command Type	Syntax	Response/Action	Remarks
Set	+MPING=<mode>[,<"Destination IP/hostname">[,<count> [,<size>[,<TTL>[,<TOS> [,<TimeOut >]]]]]]	OK or: +CME ERROR: <err>	The set command shall send a <count> Internet Control Message Protocol (ICMP) Echo Request messages to a target node defined by <"Destination IP/hostname"> parameter. If <mode> is equal 0, no parameters trailing <mode> parameter are allowed, otherwise ERROR message will be reported to DTE. If <mode> is equal 0, MS will abort sending Echo Request messages if ping request is in process, otherwise ERROR message will be reported to DTE.
Unsolicited Response		+MPING: <"Destination IP">,<type>,<code> [,<RTT>]	The receipt of corresponding ICMP Echo Reply messages will be displayed within unsolicited responses, along with round trip times.
Read	+MPING?	+MPING: <count>, <size>,<TTL>, <TOS>,<TimeOut> OK	The read command displays currently selected parameters values for +MPING set command. If ping sending procedure is currently in process then user selected parameters for AT+MPING command will be displayed, otherwise default parameter values will be displayed.
Test	+MPING=?	+MPING: (List of supported <mode>s),(Range of <count>s),(Range of <size>s),(Range of <TTL>s), (Range of <TOS>s),(Range of <TimeOut>s) ok	The test command displays all supported parameters values for +MPING set command.

The following table shows the +MPING command parameters.

Table 4-223: +MPING Command Parameters

<Parameter>	Description
<mode>	0 - Abort current ping request execution. 1 - Launch new ping request. There is no default value - appropriate ERROR will be displayed if parameter is not supplied.
<"Destination IP/hostname">	Specifies the target machine (computer), which is identified either by IP address 4 octets long in dotted decimal notation or by host name of maximum 255 (not including double quotes) characters long in dotted notation. Each octet of IP address has valid value range of 0 to 255. Host names are not case sensitive and can contain alphabetic or numeric letters or the hyphen. There is no default value - appropriate ERROR will be displayed if parameter is not supplied.
<count>	Specifies a number of Internet Control Message Protocol (ICMP) Echo Request messages to send. Valid value range is from 1 to 255. Default value: 4
<size>	Specifies the length, in bytes, of the Data field in the Echo Request messages sent. The minimum size is 0. The maximum size is 1372. Default value: 32
<TTL>	Time To Live (TTL). Specifies number of hops (hop is one step, from one router to the next, on the path of a datagram on an IP network), which the Echo Request message may be routed over. The value is set by using TTL field in IP header. Valid value range is from 1 to 255. Default value: 64
<TOS>	The Type Of Service (TOS) is for internet service quality selection. The type of service is specified along the abstract parameters precedence, delay, throughput, and reliability. These abstract parameters are to be mapped into the actual service parameters of the particular networks the datagram traverses. Minimum and maximum values for TOS are 0 and 255 respectively. Refer to RFC 791 and RFC 2474 which obsoletes RFC 791 for TOS defined values. Default value: 0

<TimeOut>	Specifies the amount of time, in milliseconds, to wait for the Echo Reply message that corresponds to a sent Echo Request message, measured after Echo Request message was sent. If the Echo Reply message is not received within the time-out, +MPINGSTAT unsolicited response, with <status> equal to 1, will be sent to DTE. Valid value range is from 500 ms to 600,000 ms (10 minutes). Default value: 4000

The following table shows the +MPING unsolicited response parameters.

Table 4-224: +MPING Unsolicited Response Parameters

<Parameter>	Description
<"Destination IP">	Specifies the message sender machine (computer), which is identified by IP address 4 octets long in dotted decimal notation. Each octet of IP address has valid value range of 0 to 255. The message sender machine (computer) may be either the target of Echo Request message (if a response was an Echo Reply message) or a gateway (router) in a path of Echo Request message passage for any other ICMP response message.
<type>	The first octet of the ICMP header is a ICMP type field, which specifies the format of the ICMP message. Refer to IETF RFC 792 for <type> valid values.
<code>	The reasons for the non-delivery of a packet are described by code field value of ICMP header. Every <type> has its own defined <code> values. Refer to IETF RFC 792 for <code> valid values.
<RTT>	Specifies Round Trip Time (RTT) measured in milliseconds. This parameter will be reported in command response only if Echo Reply message was received.

Notes:

1. Ping request is being executed from the moment the valid AT+MPING set command was received by G30 until +MPINGSTAT unsolicited report with <status> equal either to 0 or 2 is sent to DTE or ping request execution was aborted with AT+MPING=0 command. Refer to description of +MPINGSTAT unsolicited response for details.

2. In some cases, the reply message for an Echo Request message might be not an Echo Reply messages but rather some other ICMP message, which is reporting an error in datagram processing. For purpose of reporting an exact type of response for sent Echo Request message, unsolicited response includes <type> and <code>

fields.
The first octet of the data portion of the IP datagram is an ICMP <type> field. The value of this field determines the format of the remaining data. The <type> and <code> fields jointly define ICMP message type.
For example, a case when an Echo Request message encapsulated in IP datagram to be forwarded by a gateway has exceeded TTL (equal zero). In this case the gateway must discard the datagram and may return an ICMP Time Exceeded message.

Example

```
 AT+MIPCALL=1,"internet"
OK
+MIPCALL: 10.170.4.111
AT+MPING=1,"10.170.4.112"                    // Ping remote computer using default parameters
OK

+MPING: "10.170.4.112",0,0,400               //Echo Reply message received, RTT is 400 ms.

+MPING: "10.170.4.112",0,0,420

+MPING: "10.170.4.112",0,0,440
+MPING: "10.170.4.112",0,0,410
          //Ping request execution is completed. Four Echo Request
          messages were sent, and four //Echo Reply messages
          were received. Average RTT is 417 milliseconds.
+MPINGSTAT: 0,"10.170.4.112",4,4,417
```

4.11.4.17. +MPINGSTAT, Status Update for +MPING Execution

This is the unsolicited response that the G30 sends to the terminal to inform of ping execution status update and provides summary statistics of ping request when ping request execution is completed.

Command Type	Syntax	Response/Action	Remarks
Unsolicited Response		+MPINGSTAT: <status>[,<"Destination IP">,<SentMessages>, <ReceivedMessages>[,<AverageRTT>]]	The unsolicited response that the G30 sends to the terminal to inform it with ping execution status update. This response also provides a statistics summary of ping request when ping request execution is completed.

The following table shows the +MPINGSTAT unsolicited response parameters.

Table 4-225: +MPINGSTAT Unsolicited Response Parameters

<Parameter>	Description
<status>	Specifies a status of ping request execution. Defined values: 0 - The unsolicited response with this <status> will be sent to DTE upon completion of ping request. If ping request was aborted or socket connection was terminated for any reason, this unsolicited response will not be reported to DTE. 1 - The unsolicited response with this <status> will be sent to DTE if no ICMP reply message was received within timeout. 2 - The unsolicited response with this <status> will be sent to DTE if socket connection was terminated for any reason. This status essentially means that ping request execution was aborted. 3 - Flow Control OFF. The unsolicited response with this <status> will be sent to DTE if phone doesn't have enough memory to process sending an Echo Request message. 4 - Flow Control ON. The unsolicited response with this <status> will be sent to DTE if phone has enough memory to send an Echo Request message after flow control was OFF.
<"Destination IP">	Specifies the target machine (computer) for ping request, which is identified by IP address 4 octets long in dotted decimal notation. Each octet of IP address has valid value range of 0 to 255.
<SentMessages>	Specifies a total number of sent Echo Request messages.
<ReceivedMessages>	Specifies a total number of received Echo Reply messages corresponding to Echo Request messages.
<AvarageRTT>	Specifies average Round Trip Time (RTT) for this ping request. This value will be reported if and only if <ReceivedMessages> value is greater than zero. Calculation of this value comprises of accumulating all RTT values and dividing total accumulated RTT by <ReceivedMessages> value. Only an integral part of a result will be reported and any digits of a fraction part will be truncated.

Example

```
AT+MIPCALL=1,"internet"
OK
+MIPCALL: 10.170.4.111
//Ping host www.motorola.com 3 times with <TTL>=255. All other parameters are default.

AT+MPING=1,"www.motorola.com",3,,255
OK

//ICMP Echo Reply message received, RTT is 522 ms.

+MPING: "88.221.5.223",0,0,522
+MPINGSTAT: 1                // No corresponding reply within timeout.

+MPINGSTAT: 3                // Flow Control OFF.

+MPINGSTAT: 4                // Flow Control ON, a new Echo Request message is sent immediately.
+MPING: "88.221.5.223",0,0,638
//Ping request execution is completed. Statistics displayed to terminal. Three Echo Request messages were sent, and two
Echo Reply messages were received. Average RTT is 580 milliseconds.

+MPINGSTAT: 0,"88.221.5.223",3,2,580
//Ping host  www.motorola.com 1 time with <TTL>=1 and <size>=1372.
AT+MPING=1," www.motorola.com",1,1372,1
OK

//ICMP Time Exceeded message received. TTL expired in transit.

+MPING: "192.168.252.65",11,0

//Ping request execution is completed.

+MPINGSTAT: 0,"88.221.5.223",1,0
```

4.11.4.18. +MSELINT, Select Interface Feature

This command is used for setting the interface mode feature. Reset will be activated after the setting.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MSELINT=<mode>	OK or: +CME ERROR: <err>	
Read	AT+MSELINT?	+MSELINT: <mode> OK or: +CME ERROR: <err>	
Test	AT+MSELINT=?	+MSELINT: (0-1) OK or: +CME ERROR: <err>	

The following table shows the + MSELINT parameters.

Table 4-226: +MSELINT Parameters

<Parameters>	Description
<mode>	0 – today (default) 1 – G24 compatible

Example

AT+MSELINT?
+MSELINT: 0
OK

AT+MSELINT=?
+MSELINT: (0-1)
OK

AT+MSELINT=1
OK
// the module is resetting now….

4.11.4.19. +MSDNS, Set DNS IP Address

This command set/read DNS (Domain Name Server) IP address (primary/secondary) for each socket. If the user do'sn't specify DNS servers by AT+MSDNS, G30 will use default DNS from NW. The defined value(s) will be saved during disconnect PDP context (can be used in next PDP context), but will reset after power cycle.

Command Type	Syntax	Response/Action		Remarks
Set	AT+MSDNS=[<Socket_id>[,<Primary DNS server IP> [,<Secondary DNS server IP>]]]	OK or: +CME ERROR: <err>		
Read	AT+MSDNS?	+MSDNS: 1,<Primary DNS server IP>,< Secondary DNS server IP><CR><LF> +MSDNS: 2,<Primary DNS server IP>,< Secondary DNS server IP><CR><LF> +MSDNS: 3,<Primary DNS server IP>,< Secondary DNS server IP><CR><LF> +MSDNS: 4,<Primary DNS server IP>,< Secondary DNS server IP><CR><LF> +MSDNS: 5,<Primary DNS server IP>,< Secondary DNS server IP><CR><LF> <CR><LF> OK		
Test	AT+MSDNS=?	**+MSELINT = 0** +MSDNS: (List of supported <Socket_id>s),"(<IP>)","(<IP>)"	**+MSELINT = 1** +MSDNS: (List of supported <Socket_id>s),(<IP>),(<IP>)	

The following table shows the +MSDNS parameters.

Table 4-227: +MSDNS Parameters

<Parameter>	Description
<Socket_id>	A unique number that identifies a connection (provided by the terminal application). 0 - Invalid socket number 1,2,3,4 - Valid socket number 5 - Valid socket number dedicated to +MPING.
<Primary DNS server IP>, <Secondary DNS server IP>	IP of the destination site in the form“t "AAA.BBB.CCC.”DD". The range of each octant is 0-255. The value can be written in 1, 2, or 3 digits.

Example

```
AT+MSELINT=0
OK
AT+MSDNS=?
+MSDNS: (1-5),"(<IP>)","(<IP>)"

OK
AT+MSELINT=1
OK
AT+MSDNS=?
+MSDNS: (1-5),(<IP>),(<IP>)

OK

AT+MSDNS?                          // read when MIPCALL is disconnected
+MSDNS:”1,"0.0.”.”","0.0.”.0"
+MSDNS:”2,"0.0.”.”","0.0.”.0"
+MSDNS:”3,"0.0.”.”","0.0.”.0"
+MSDNS:”4,"0.0.”.”","0.0.”.0"
+MSDNS:”5,"0.0.”.”","0.0.”.0"

OK
AT+MSDNS”2,"212.150.49”1”","206.49.94.”34" //set socket 2 prim & sec DNS
OK
AT+MSDNS”4,"62.120.55”10"                  //set socket 4 prim DNS only
OK
AT+MSDNS”5,"212.150.49”1”","206.49.94.”34" //set socket 5 prim & sec DNS
OK
AT+MSDNS?                           // read when MIPCALL is disconnected
+MSDNS:”1,"0.0.”.”","0.0.”.0"
+MSDNS:”2,"212.150.49”1”","206.49.94.”34"
+MSDNS:”3,"0.0.”.”","0.0.”.0"
+MSDNS:”4,"62.120.55”1”","0.0.”.0"
+MSDNS:”5,"212.150.49”1”","206.49.94.”34"

OK
AT+MIPCALL”1,"inter”et"
OK

+MIPCALL: 10.170.7.91

AT+MSDNS?                          // read when MIPCALL is connected
+MSDNS:”1,"192.118.9.”7”","192.118.11”77"
```


```
+MSDNS:”2,"212.150.49”1”","206.49.94.”34"
+MSDNS:”3,"192.118.9.”7””,"192.118.11”77"
+MSDNS:”4,"62.120.55”1””,"192.118.11”77"
+MSDNS:”5,"212.150.49”1”","206.49.94.”34"

OK
AT+MSDNS=2                          // socket #2 set to default values
OK
AT+MSDNS?
+MSDNS:”1,"192.118.9.”7””,"192.118.11”77"
+MSDNS:”2,"192.118.9.”7””,"192.118.11”77"
+MSDNS:”3,"192.118.9.”7””,"192.118.11”77"
+MSDNS:”4,"62.120.55”1””,"192.118.11”77"
+MSDNS:”5,"212.150.49”1”","206.49.94.”34"

OK
AT+MSDNS=                           // all sockets set to default values
OK
AT+MSDNS?
+MSDNS:”1,"192.118.9.”7””,"192.118.11”77"
+MSDNS:”2,"192.118.9.”7””,"192.118.11”77"
+MSDNS:”3,"192.118.9.”7””,"192.118.11”77"
+MSDNS:”4,"192.118.9.”7””,"192.118.11”77"
+MSDNS:”5,"192.118.9.”7””,"192.118.11”77"

OK
AT+MIPCALL=0
OK

NO CARRIER

+MIPCALL: 0
AT+MSDNS?                   // read when MIPCALL is disconnected
+MSDNS:”1,"0.0.”.”","0.0.”.0"
+MSDNS:”2,"0.0.”.”","0.0.”.0"
+MSDNS:”3,"0.0.”.”","0.0.”.0"
+MSDNS:”4,"0.0.”.”","0.0.”.0"
+MSDNS:”5,"0.0.”.”","0.0.”.0"

OK
```

4.11.4.20. +MIPCSC, Motorola Control Secured Connection

This AT command is used to configure the SSL feature behavior in case of non - fatal alerts. For each non - fatal alert, user should decide if the secure connection should be closed automatically or not.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MIPCSC=<SocketID>,<n>	OK or: +CME ERROR: <err>	The Set command is used for setting the SSL connection behavior in case of non - fatal alerts.
Read	AT+MIPCSC?	+ MIPCSC: 1,<n> + MIPCSC: 2,<n> + MIPCSC: 3,<n> + MIPCSC: 4,<n> OK	The Read command returns the current SSL connection behavior in case of non - fatal alerts.
Test	AT+MIPCSC=?	+ MIPCSC: (1-4),(0- 2047) OK	The Test command returns the possible range of values.

The following table shows the +MIPCSC parameters.

Table 4-228: +MIPCSC Parameters

<Parameter>	Description
<SocketID>	A unique number that identifies a connection. Valid socket numbers - 1, 2, 3 and 4

<n>	b11 . . . b5 b4 b3 b2 b1 Bitmap parameter that represents SSL feature behavior configuration. Every 1 bit indicates whether each alert will cause automatically connection termination or not. Bit value 1 indicates automatically connection termination, 0 indicates that connection will not be terminated in case of such an alert. b1 represents the first alert; b2 represents the 2nd alert, and so on. Values range: 0 - 2047 The list of alerts to configure: 1 - SSL_BAD_CERTIFICATE For more information about alerts see Table 4-198.

Notes: This command allows configuring SSL feature behavior for each socket separately.

This command can be used to configure SSL feature behavior before socket activation or when a socket in active state.

In case of receiving the alert, defined by user as source for closing the connection, the connection is closed and +MIPSTAT: <SocketID>,2 unsolicited report sent to TE.

Configuration value <n> is not stored into non volatile memory (NVM) therefore after power recycle it should be reconfigured.

Example

```
AT+MIPCSC=?
+MIPCSC: (1-4),(0-2047):

OK

AT+MIPCSC?
+MIPCSC: 1,0
+MIPCSC: 2,0
+MIPCSC: 3,0
+MIPCSC: 4,0

OK

AT+MIPOPEN=1,1111,www.xyz.com,443,2        // Connect to site using SSL protocol
OK
+MIPSSL: 1,10                  // SSL_BAD_CERTIFICATE alert received.
+MIPOPEN: 1,2                  // Connection established despite of receiving alert.

AT+MIPCSC=2,1                  // 1 = 00000000001 (binary), so in case of
// SSL_BAD_CERTIFICATE  alert,
// connection would be closed automatically.
OK
AT+MIPCSC?
+MIPCSC: 1,0
+MIPCSC: 2,1
+MIPCSC: 3,0
+MIPCSC: 4,0
OK
AT+MIPOPEN=2,2222,www.xyz.com,443,2        // connect to site using SSL protocol
OK
+MIPSSL: 2,10                  // SSL_BAD_CERTIFICATE  alert received.
+MIPSTAT: 2,2                  // Connection closed automatically due to received alert.
```

4.11.4.21. +MIPSSL, SSL Alerts Unsolicited Report

This unsolicited event is sent to the terminal indicating an errors, warnings or alerts that occurred during SSL connection.

Note: The +MIPSSL alerts are not sent to TE in ODM mode.

Syntax

+MIPSSL: <Socket_ID>,<Alert_ID>

The following table shows the +MIPSSL parameters.

Table 4-229: +MIPSSL Parameters

<Parameter>	Description
<Socket_ID>	1,2,3,4 - Identification Number of Socket.
<Alert_ID>	Alert ID. All alerts are described in Table 4-198.

The following table shows the +MIPSSL Alerts.

Table 4-230: +MIPSSL Alerts

Alert ID	Alert Name	Description
10.	SSL_BAD_CERTIFICATE	A certificate was corrupt, contained signatures that did not verify correctly, etc.

Example

+MIPSSL: 2,10 // While opening the SSL connection for socket 2, server certificate was received, but was not accepted because the certificate was corrupt, contained signatures that did not verify correctly, etc..

4.11.4.22. +MIPRTCPGET, Receive Data from TCP Protocol Stack Buffer

This command gets the oldest data received from TCP stack and was stored in the internal buffer in G30.
G30 holds 4 buffers associate with 4 concurrent TCP/UDP connections; each can hold up to 1300 byte.
When TCP data arrives from a connection, this data is stored in the relevant buffer.
MIPRTCPGET command retrieves the requested number of bytes from the requested buffer (connection) and displays it on TE, and then it updates the index of data for the next request.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MIPRTCPGET=<ConId>,<NumOfBytes>	+MIPRTCPGET: <ConId>, <DataLengthLeft>, <requested data> OK	The Set command instructs the G30 to retrieve <NumOfBytes> bytes from the internal buffer associated with requested <Connection Id>.
Read	AT+MIPRTCPGET?	+MIPRUDPGET: <ConId>,<Accumulated buffer length>	Read command shows all connection id's with their accumulated buffer length.
Test	AT+MIPRTCPGET=?	+MIPRTCPGET: (list of supported <ConId>s),(range of requested data) OK	The Test command returns list of connection id's.

Note: RTCP/UDPGET buffer can accumulate a maximum of 1300 bytes, so maximum <NumOfBytes> value can be 1300.

The following table shows the +MIPRTCPGET parameters.

Table 4-231: +MIPRTCPGET Parameters

<Parameter>	Description
<Con Id>	1..4 - associated to MIPOPEN command.
<NumOfBytes>	1..1300 - number of bytes for retrieve from RTCP/UDPGET buffer.
<DataLengthLeft>	Indicates the length of data left on 'RTCP/UDPGET' buffer that wasn't yet retrieved. This value is after reduction of the present data displayed.
<Requested data>	Requested data as received by TCP stack.

Example

```
AT+MIPRTCPGET=?
+MIPRUDPGET: (1-4),(1-1300)

OK
AT+MIPSEND=1,"1122556677889900"                 // 8 bytes
+MIPSEND: 1,0,1364

OK
AT+MIPSEND=2,"21222324252627282920"          // 10 bytes
+MIPSEND: 2,0,1362

OK
AT+MIPPUSH=1     // sending data to server that shall echo the data back
+MIPPUSH: 1,0

OK
+MIPRTCP: 1,8,      // 8 bytes were received - unsolicited response
AT+MIPPUSH=2     // sending data to server that shall echo the data back
+MIPPUSH: 2,0

OK
+MIPRTCP: 2,10,     // 10 bytes were received - unsolicited response
AT+MIPRTCPGET?
+MIPRTCPGET: 1,8
+MIPRTCPGET: 2,10
+MIPRTCPGET: 3,0
+MIPRTCPGET: 4,0

OK
AT+MIPRTCPGET=1,5
+MIPRTCPGET: 1, 3, 1122556677          // 5 bytes are displayed, 3 bytes left

OK
AT+MIPRTCPGET=1,5          // 3 last bytes displayed, buffer 1 is empty
+MIPRTCPGET: 1, 0, 889900

OK
```


```
AT+MIPRTCPGET=1,5          // no data to be retrieved, buffer 1 is empty
+MIPRTCPGET: 1, 0

OK
AT+MIPRTCPGET=2,10         // 10 bytes are displayed, 0 data left on buffer 2
+MIPRTCPGET: 2, 0, 21222324252627282920

OK
AT+MIPRTCPGET=2,10         // no data to be retrieved, buffer 2 is empty
+MIPRTCPGET: 2, 0

OK
```

4.11.4.23. +MIPRUDPGET, Receive Data from UDP Protocol Stack Buffer

This command gets the oldest data received from UDP stack and was stored in the internal buffer in G30.
G30 holds 4 buffers associate with 4 concurrent TCP/UDP connections; each can hold up to 1300 byte.
When UDP data arrives from a connection, it is stored in the relevant buffer.
MIPRUDPGET command retrieves the requested number of bytes from the requested buffer (connection) and displays it on TE, and then it updates the index of data for the next request.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MIPRUDPGET=<ConId>,<NumOfBytes>	+MIPRUDPGET: <ConId>, <DataLengthLeft>, <requested data> OK	The Set command instructs the G30 to retrieve <NumOfBytes> bytes from the internal buffer associated with requested <Connection Id>.
Read	AT+MIPRUDPGET?	+MIPRUDPGET: <ConId>,<Accumulated buffer length>	Read command shows all connection id's with their accumulated buffer length.
Test	AT+MIPRUDPGET=?	+MIPRUDPGET: (list of supported <ConId>s),(range of requested data) OK	The Test command returns list of connection id's.

Note: RTCP/UDPGET buffer can accumulate a maximum of 1300 bytes, so maximum <NumOfBytes> value can be 1300.

The following table shows the +MIPRUDPGET parameters.

Table 4-232: +MIPRUDPGET Parameters

<Parameter>	Description
<Con Id>	1..4 - associated to MIPOPEN command.
<NumOfBytes>	1..1300 - number of bytes for retrieve from RTCP/UDPGET buffer.
<DataLengthLeft>	Indicates the length of data left on 'RTCP/UDPGET' buffer that wasn't yet retrieved. This value is after reduction of the present data displayed.
<Requested data>	Requested data as received by UDP stack.

Example

```
AT+MIPRUDPGET=?
+MIPRUDPGET: (1-4),(1-1300)

OK
AT+MIPSEND=1,"1122556677889900"  // 8 bytes
+MIPSEND: 1,0,1364

OK
AT+MIPSEND=2,"21222324252627282920" // 10 bytes
+MIPSEND: 2,0,1362

OK
AT+MIPPUSH=1    // sending data to server that shall echo the data back
+MIPPUSH: 1,0

OK
+MIPRUDP: 1,8,     // 8 bytes were received - unsolicited response

AT+MIPPUSH=2    // sending data to server that shall echo the data back
+MIPPUSH: 2,0

OK
+MIPRUDP: 2,10,    // 10 bytes were received - unsolicited response

AT+MIPRUDPGET?
+MIPRUDPGET: 1,8
+MIPRUDPGET: 2,10
+MIPRUDPGET: 3,0
+MIPRUDPGET: 4,0

OK
AT+MIPRUDPGET=1,5
+MIPRUDPGET: 1, 3, 1122556677         // 5 bytes are displayed, 3 bytes left

OK
AT+MIPRUDPGET=1,5         // 3 last bytes displayed, buffer 1 is empty
+MIPRUDPGET: 1, 0, 889900
```

OK
at+miprudpget=1,5 // no data to be retrieved, buffer 1 is empty
+MIPRUDPGET: 1, 0

OK
AT+MIPRUDPGET=2,10 // 10 bytes are displayed, 0 data left on buffer 2
+MIPRUDPGET: 2, 0, 21222324252627282920

OK
AT+MIPRUDPGET=2,10 // no data to be retrieved, buffer 2 is empty
+MIPRUDPGET: 2, 0

OK

4.12. FTP (File Transfer Protocol)

4.12.1. Session Commands

4.12.1.1. +FTPOPEN, Open FTP Connection Between G30 (FTP client) and Remote FTP Server

This command causes G30 to open a FTP connection with a remote FTP server, based on given parameters.

Notes:

- Only one FTP connection can be in progress at the same time.
- FTP connection is based on two TCP sockets: one of them configured for Online Data Mode.
- Online Data Mode connection is prohibited when FTP connection is in progress and vice versa.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPOPEN=<"destination_ip/url">,<"username">,<"password">[,<"account">,<source_control_port>,<destination_control_port>,<source_data_port>]	OK +FTPOPEN: <connection_status> Or: ERROR: <error_code>	Command execution result (connection status) return to the user as an unsolicited response: **1** - connection succeeded **0** - connection failed
Read	+FTPOPEN?	+FTPOPEN: <connection_status> OK	Returns FTP connection status: **1** - connection succeeded **0** - connection failed
Test	+FTPOPEN=?	+FTPOPEN: (<destination_ip/url>),(<username>),(<password>)[,(<account>),(range of supported port's),(range of supported port's),(range of supported port's)] OK	Returns command format.

The following table shows the +FTPOPEN parameters.

Table 4-233: +FTPOPEN Parameters

<Parameter>	Description	Range
destination_ip/url[1]	IP or URL of remote FTP site.	IP address in dotted decimal notation form: XXX.XXX.XXX.XXX.
		URL: ASCII chars, max length is **255** octets.
username[2]	Username for FTP login procedure.	ASCII chars, max length is **255** octets.
password[3]	Password for FTP login procedure.	ASCII chars, max length is **255** octets.
account[4]	User Account for FTP login procedure.	ASCII chars, max length is **255** octets.
source_control_port[5]	Port for FTP control connection on source side.	Number in **0-65535** range.
destination_control_port[5]	Port for FTP control connection on remote side.	Number in **0-65535** range.
source_data_port[6]	Port for FTP data connection on source side.	Number in **0-65535** range.

Notes:

[1] Mandatory parameter.

[2] Mandatory parameter. Use "anonymous" user name for anonymous connection.

[3] Mandatory parameter. For anonymous connection use "**guest**" or valid e-mail address or an empty string ("").

[4] Optional parameter, default value is empty string ("").

[5] Optional parameter, default value is 21.

[6] Optional parameter, default value is 20.

Example
The first example illustrates FTP connection open success case.

AT+FTPOPEN="someftpsite.com","anonymous","qwerty@somemail.com",,,,
OK
+FTPOPEN: 1

The second example illustrates FTP connection open error case, because another FTP connection is already opens. The AT+CMEE=2 command enables verbose error report.

AT+CMEE=2
OK

AT+FTPOPEN="someftpsite.com","anonymous","qwerty@somemail.com",,,,
OK

+FTPOPEN: 1

AT+FTPOPEN="anotherftpsite.com","anonymous","qwerty@somemail.com",,,,
+CME ERROR: FTP session is active

4.12.1.2. +FTPCLOSE, Close Established FTP Connection Between G30 (FTP client) and Remote FTP Server

This command causes G30 to close FTP connection, when no data transfer occurred at that same time. When data transfer is in progress, use DTR line for closing FTP connection.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPCLOSE	OK +FTPCLOSE: <connection_status> Or: ERROR: <error_code>	Command execution result return to the user as an unsolicited response: **1** - connection succeeded **0** - connection failed
Read	+FTPCLOSE?	ERROR	Not supported
Test	+FTPCLOSE=?	ERROR	Not supported

Example
The first example illustrates FTP connection close success case.
AT+FTPCLOSE
OK
+FTPCLOSE: 1
The second example illustrates FTP connection close error case, because no FTP connection was open. The AT+CMEE=2 command enables verbose error report.
AT+CMEE=2
OK
AT+FTPCLOSE
+CME ERROR: FTP session is inactive

4.12.1.3. +FTPINFO, FTP Unsolicited Indication Enable/Disable

This command causes the G30 to enable or disable FTP unsolicited indication to the user.

FTP unsolicited indication is used for debugging the FTP session and, when the indication is enabled, the G30 will show the user all FTP commands sent to the remote site and all FTP responses received from the remote side.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPINFO=<indication>	OK Or: ERROR: <error_code>	Enables/disables FTP unsolicited indication: **0** - Indication disabled **1** - Indication enabled When indication is enabled, G30 will send the user all FTP commands and responses using the following unsolicited response format: +FTPINFO: <data>
Read	+FTPINFO?	+FTPINFO: <indication> OK	Returns FTP indication status: **0** - Indication disabled **1** - Indication enabled
Test	+FTPINFO=?	+FTPINFO: (range of supported <indication_status>s) OK	Return command format.

To set the G30 to ACTIVE FTP mode you need to use AT+FTPINFO=89
In order to make it passive issue AT+FTPINFO=88

Note: By default G30 works in passive mode.

The following table shows the +FTPINFO parameters.

Table 4-234: +FTPINFO Parameters

<Parameter>	Description	Range
Indication status	FTP unsolicited indication status.	Numeric in **0-1** range.

Example
The example illustrates FTP connection open success case, when FTP unsolicited indication is enabled.

AT+FTPINFO=1
OK

AT+FTPOPEN="someftpsite.com","anonymous","qwerty@somemail.com",,,,
OK

+FTPINFO: 220-

+FTPINFO: 220-Welcome to someftpsite.com!

+FTPINFO: 220-

+FTPINFO: 220 someftpsite.com FTP server (SecureMb FTP Version 1.0) ready.

+FTPINFO: USER anonymous

+FTPINFO: 331 Guest login ok, send your complete e-mail address as password.

+FTPINFO: PASS qwerty@somemail.com

+FTPINFO: 230 Guest login ok, access restrictions apply.

+FTPOPEN: 1

4.12.1.4. +FTPCWD, Change Working Directory

This command causes the G30 to request the remote FTP server to change the working directory in accordance to a given name.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPCWD=<directory_name>	OK +FTPCWD: <result> Or: ERROR: <error_code>	**<directory_name>** parameter consists of the directory name as well as the directory path (optional). The command execution result return to the user as an unsolicited response: **0** - operation failed **1** - operation succeeded
Read	+FTPCWD?	ERROR	Not supported
Test	+FTPCWD=?	+FTPCWD: (<"directory name">) OK	Returns command format.

The following table shows the +FTPCWD parameters.

Table 4-235: +FTPCWD Parameters

<Parameter>	Description	Range
Directory name	Name of directory to be changed on the remote side.	String, max length is **255** octets.

Example
The first example illustrates change in working directory success case.

AT+FTPCWD="data"
OK
+FTPCWD: 1
The second example illustrates change working directory fail case; because the given directory name was not found on the remote server.

AT+FTPCWD="user"
OK
+FTPCWD: 0
The third example illustrates change working directory fail case; because no FTP connection was open. The AT+CMEE=2 command enables verbose error report.

AT+CMEE=2
OK
AT+FTPCWD="data"
+CME ERROR: FTP session is inactive

4.12.1.5. +FTPMKD, Make Directory

This command causes the G30 to request the remote FTP server to create a new directory in accordance to a given name.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPMKD=<directory_name>	OK +FTPMKD: <result> Or: ERROR: <error_code>	**<directory_name>** parameter consists of the directory name as well as the directory path (optional). The command execution result return to the user as an unsolicited response: **0** - operation failed **1** - operation succeeded
Read	+FTPMKD?	ERROR	Not supported
Test	+FTPMKD=?	+FTPMKD: (<"directory name">) OK	Returns command format.

The following table shows the +FTPMKD parameters.

Table 4-236: +FTPMKD Parameters

<Parameter>	Description	Range
Directory name	Name of directory to be created on the remote side.	String, max length is **217** octets.

Example

The first example illustrates make new directory success case.

AT+FTPMKD="somedir"
OK

+FTPMKD: 1

The second example illustrates make new directory fail case, because the directory name already present on the remote server.

AT+FTPMKD="somedir"
OK

+FTPMKD: 0

4.12.1.6. +FTPRMD, Remove Directory

This command causes the G30 to request the remote FTP server to remove a directory in accordance to a given name.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPRMD=<directory_name>	OK +FTPRMD: <result> Or: ERROR: <error_code>	**<directory_name>** parameter consists of the directory name as well as the directory path (optional). The command execution result return to the user as an unsolicited response: **0** - operation failed **1** - operation succeeded
Read	+FTPRMD?	ERROR	Not supported
Test	+FTPRMD=?	+FTPRMD: (<"directory name">) OK	Returns command format.

The following table shows the +FTPRMD parameters.

Table 4-237: +FTPRMD Parameters

<Parameter>	Description	Range
Directory name	Name of directory to be removed on the remote side.	String, max length is **255** octets.

Example

The first example illustrates remove directory success case.

AT+FTPRMD="somedir"
OK

+FTPRMD: 1

The second example illustrates remove directory fail case, because the directory name was not found on the remote server. FTP unsolicited indication enabled.

AT+FTPINFO=1
OK

AT+FTPRMD="somedir"
OK

+FTPINFO: RMD 1

+FTPINFO: 550 1: No such file or directory.

+FTPRMD: 0

4.12.1.7. +FTPPWD, Print Working Directory

This command causes G30 to request the remote FTP server to return the working directory name.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPPWD	OK ... +FTPPWD: <result>[,<directory_name>] or ERROR: <error_code>	**<directory_name>** parameter consists of the directory name as well as the directory path (optional). The command execution result return to the user as an unsolicited response: **0** - operation failed **1** - operation succeeded **2** - text message follows **<directory_name>** parameter follows only when **<result> = 2**
Read	+FTPPWD?	ERROR	Not supported
Test	+FTPPWD=?	ERROR	Not supported

Example

The example illustrates print working directory success case.

AT+FTPPWD
OK

+FTPPWD: 2, "/home/somedir" is current directory.
+FTPPWD: 1

4.12.1.8. +FTPCDUP, Change Directory Up

This command causes the G30 to request the remote FTP server to change the working directory up.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPCDUP	OK ... +FTPCDUP: <result> or ERROR: <error_code>	The command execution result return to the user as an unsolicited response: **0** - operation failed **1** - operation succeeded
Read	+FTPCDUP?	ERROR	Not supported
Test	+FTPCDUP=?	ERROR	Not supported

Example

The example illustrates change working directory up success case.

AT+FTPCDUP
OK

+FTPCDUP: 1

4.12.1.9. +FTPDEL, Delete File

This command causes the G30 to request the remote FTP server to delete a file, in accordance to a given name.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPDEL=<file_name>	OK ... +FTPDEL: <result> or ERROR: <error_code>	**<file_name>** parameter consists of the file name as well as the file path (optional). The command execution result return to the user as an unsolicited response: **0** - operation failed **1** - operation succeeded
Read	+FTPDEL?	ERROR	Not supported

Test	+FTPDEL=?	+FTPDEL: (<"file name">) OK	Return command format

The following table shows the +FTPDEL parameters.

Table 4-238: +FTPDEL Parameters

<Parameter>	Description	Range
File name	Name of file to be deleted on the remote side.	String, max length is **255** octets.

Example
The example illustrates delete file success case.

AT+FTPDEL="somefile"
OK

+FTPDEL: 1

4.12.1.10. +FTPREN, Rename File

This command causes the G30 to request the remote FTP server to rename a file, in accordance with a given parameters.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPREN=<file_name_from>, <file_name_to>	OK ... +FTPREN: <result> or ERROR: <error_code>	**<file_name_from>** and **<file_name_to>** parameters consists of the file name as well as the file path (optional). The command execution result return to the user as an unsolicited response: **0** - operation failed **1** - operation succeeded
Read	+FTPREN?	ERROR	Not supported
Test	+FTPREN=?	+FTPREN: (<"file name from">), (<"file name to">) OK	Return command format

The following table shows the +FTPREN parameters.

Table 4-239: +FTPREN Parameters

<Parameter>	Description	Range
File name from	**Old** name of file to be renamed on the remote side.	String, max length is **255** octets.
File name to	**New** name of file to be renamed on the remote side.	String, max length is **255** octets.

Example

The first example illustrates rename file success case.

AT+FTPREN="somefile.name","anotherfile.name"
OK

+FTPREN: 1

The second example illustrates rename file fail case, because the file name was not found on the remote server. FTP unsolicited indication enabled.

AT+FTPINFO=1
OK

AT+FTPREN=" somefile.name","anotherfile.name"
OK

+FTPINFO: RNFR somefile.name

+FTPINFO: 550 somefile.name: No such file or directory.

+FTPREN: 0

4.12.1.11. +FTPLIST, Request List

This command causes the G30 to request the remote FTP server to send a list, in accordance with a given parameter.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPLIST [=<file/directory name>]	OK ... +FTPLIST: <result> <list of directory/files> ... +FTPLIST: <result> or ERROR: <error_code>	Parameter consists of the file/directory name as well as the file/directory path (optional). The command execution result return to the user as an unsolicited response: **0** - operation failed **1** - operation succeeded **2** - data follows
Read	+FTPLIST?	ERROR	Not supported
Test	+FTPLIST=?	+FTPLIST: (<"file/directory name">) OK	Return command format

Notes:

- Parameter is optional. When +FTPLIST command without a parameter is entered, G30 requests the remote side to return the last requested list.
- The command execution result returns to the user as an unsolicited response (command mode), as well as a list in data mode.
- When +FTPLIST command is executed, a requested list is being sent to the user when G30 is in data mode, immediately after +FTPLIST: 2 unsolicited response, but before +FTPLIST: 1 unsolicited response.

The following table shows the +FTPLIST parameters.

Table 4-240: +FTPLIST Parameters

<Parameter>	Description	Range
File/directory name	Name of file or directory on the remote side for list request.	String, max length is **255** octets.

Example

The first example illustrates get list for specific file success case.

```
AT+FTPLIST="somefile.name"
OK

+FTPLIST: 2
-rw-rw-r--    1 1001       0 Mar 26  2006 somefile.name

+FTPLIST: 1
```

The second example illustrates get list for all files success case.

```
AT+FTPLIST="*.*"
OK

+FTPLIST: 2
-rw-rw-r--    1 1001  129886 Mar 23 06:20 somefile1.name
-rw-rw-r--    1 1001    4968 Jan  8 07:57 somefile2.name
-rw-rw-r--    1 1001   23948 Jan  8 07:32 somefile3.name
-rw-rw-r--    1 1001    0 Feb  7 01:56 somefile4.name
-rw-rw-r--    1 1001  204673 Jan 10 02:28 somefile5.name
-rw-rw-r--    1 1001   9348 Jul 19  2006 somefile6.name

+FTPLIST: 1
```

4.12.1.12. +FTPSTAT, Request Status

This command causes the G30 to request the remote FTP server to send status, in accordance with a given parameter.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPSTAT[=<file/directory name>]	OK ... +FTPSTAT: <result>[,<status>] or ERROR: <error_code>	Parameter (optional) consists of directory name as well as directory path (optional). The command execution result return to the user as an unsolicited response: **0** - operation failed **1** - operation succeeded **2** - text message follows **<status>** parameter follows only when **<result>=2**
Read	+FTPSTAT?	ERROR	Not supported
Test	+FTPSTAT=?	+FTPSTAT: (<"file/directory name">) OK	Return command format

Note: Parameter is optional. When +FTPSTAT command without a parameter is entered, G30 requests the remote side to return a general system status.

The following table shows the +FTPSTAT parameters.

Table 4-241: +FTPSTAT Parameters

<Parameter>	Description	Range
File/directory name	Name of file or directory on the remote side for status request.	String, max length is **255** octets.

Example

When the user enters +FTPSTAT command without parameters, the last requested status within actual FTP connection returns. When there is first status request within actual FTP connection, the remote server returns general FTP connection status, like in the following example:

The first example illustrates +FTPSTAT command without parameter first time (for actual FTP connection) use. In this case general FTP connection status returns.

```
AT+FTPSTAT
OK

+FTPSTAT: 2, SecureMb FTP Version 1.0
+FTPSTAT: 2, Connected to name.provider.com (255.255.255.255)
+FTPSTAT: 2, Logged in as anonymous
+FTPSTAT: 2, TYPE: ASCII, FORM: Nonprint; STRUcture: File; transfer MODE: Stream
+FTPSTAT: 2, No data connection
+FTPSTAT: 2, 0 data bytes received in 0 files
+FTPSTAT: 2, 0 data bytes transmitted in 0 files
+FTPSTAT: 2, 0 data bytes total in 0 files
+FTPSTAT: 2, 30 traffic bytes received in 0 transfers
+FTPSTAT: 2, 535 traffic bytes transmitted in 0 transfers
+FTPSTAT: 2, 614 traffic bytes total in 0 transfers
+FTPSTAT: 1
```

The second example illustrates using +FTPSTAT command with a parameter containing a name of actually present on remote server file. In this case, the specific file status is returned.

```
AT+FTPSTAT="somefile.name"
OK

+FTPSTAT: 2,-rw-rw-r-- 1 1001 653793 May  2 03:33 somefile.name
+FTPSTAT: 1
```

The third example illustrates using +FTPSTAT command with a parameter containing a name of file, which does not exist on the remote server file. In this case, the remote server returns "No such file or directory" string and command is finished successfully.

```
AT+FTPSTAT="anotherfile.name"
OK

+FTPSTAT: 2,/bin/ls: anotherfile.name: No such file or directory
+FTPSTAT: 1
```

The fourth example illustrates using +FTPSTAT command with a parameter containing an illegal file name. In this case, the remote server returns error and FTP connection is closed by the remote side.

```
AT+FTPSTAT="."
```

OK

+FTPSTAT: 0

+FTPCLOSE: 1

The fifth example illustrates using +FTPSTAT command for receiving the status of all files in the actual working directory.

AT+FTPSTAT="*.*"
OK

+FTPSTAT: 2,-rw-rw-r-- 1 1001 129886 Mar 23 06:20 somefile1.name
+FTPSTAT: 2,-rw-rw-r-- 1 1001 4968 Jan 8 07:57 somefile2.name
+FTPSTAT: 2,-rw-rw-r-- 1 1001 23948 Jan 8 07:32 somefile3.name
+FTPSTAT: 2,-rw-rw-r-- 1 1001 0 Feb 7 01:56 somefile4.name
+FTPSTAT: 2,-rw-rw-r-- 1 1001 204673 Jan 10 02:28 somefile5.name
+FTPSTAT: 2,-rw-rw-r-- 1 1001 9348 Jul 19 2006 somefile6.name
+FTPSTAT: 2,-rw-rw-r-- 1 1001 653793 May 2 03:33 somefile7.name
+FTPSTAT: 2,-rw-rw-r-- 1 1001 645120 Mar 25 04:27 somefile8.name
+FTPSTAT: 2,-rw-rw-r-- 1 1001 0 Mar 26 2006 somefile9.name
+FTPSTAT: 1

4.12.1.13. +FTPSYST, Request Remote FTP Server Operating System Type

This command causes the G30 to request the remote FTP server to send the operating system type.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPSYST	OK ... +FTPSYST: <result>[,<system>] or ERROR: <error_code>[3]	The command execution result return to the user as an unsolicited response: **0** - operation failed **1** - operation succeeded **2** - text message follows **<system>** parameter follows only when **<result>=2**
Read	+FTPSYST?	ERROR	Not supported
Test	+FTPSYST=?	ERROR	Not supported

Example
The example illustrates the command execution.

AT+FTPSYST
OK

+FTPSYST: 2, UNIX Type: L8
+FTPSYST: 1

4.12.1.14. +FTPNOOP, No Operation

This command causes the G30 to request the remote FTP server to do nothing (possible use for PING).

Command Type	Syntax	Response/Action	Remarks
Set	+FTPNOOP	OK ... +FTPNOOP: <result> or ERROR: <error_code>	The command execution result return to the user as an unsolicited response: **0** - operation failed **1** - operation succeeded
Read	+FTPNOOP?	ERROR	Not supported
Test	+FTPNOOP=?	ERROR	Not supported

Example
The example illustrates the command execution.

AT+FTPNOOP
OK

+FTPNOOP: 1

4.12.1.15. +FTPSTOR, Store File On Remote FTP Server

This command causes the G30 to request the remote FTP server to store a file sent by the G30.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPSTOR=<file_name>, [<file_type>]	OK ... +FTPSTOR: <result> or ERROR: <error_code>	**<file_name>** parameter consists of the file name as well as the file path (optional). **<file_type>** parameter is optional. Default value is **1** (binary). The command execution result return to the user as an unsolicited response: **0** - operation failed **1** - operation succeeded **2** - data connection (ODM) enabled
Read	+FTPSTOR?	ERROR	Not supported
Test	+FTPSTOR=?	+FTPSTOR: (<"file name">)[,(0-1)] OK	Return command format

Notes:

The user can send a file to the G30 only when the G30 returns <result> = 2. In this case, the G30 switches to Online Data Mode and all data sent to RS232 transfers as-is to the remote server.

Important: Before transferring to the remote side, data file is converted (encoded), see "FTP Connection". When end-of-file is reached, G30 switches back to Command Mode and return <result> = 1 (success case).

In any stage of file transfer, an error can occur. In this case, G30 switches to Command Mode and <result> = 0 is returned to the user.

The following table shows the +FTPSTOR parameters.

Table 4-242: +FTPSTOR Parameters

<Parameter>	Description	Range
File name	Name of file to be stored on the remote side.	String, max length is **255** octets.
File type	Type of file (ASCII or Binary).	Numeric, in the range of **0-1** (0 = ASCII, 1 = Binary).

Example

The example illustrates the command execution. Requested file type is binary.

AT+FTPSTOR="somefile.name",1

+FTPSTOR: 2

The user sends a file with <end-of-file> here
+FTPSTOR: 1

4.12.1.16. +FTPRETR, Retrieve a File From a Remote FTP Server

This command causes the G30 to request the remote FTP server to send a file to the G30.

Command Type	Syntax	Response/Action	Remarks
Set	+FTPRETR=<file_name>, [<file_type>]	OK ... +FTPRETR: <result> or ERROR: <error_code>	**<file_name>** parameter consists of the file name as well as the file path (optional). **<file_type>** parameter is optional. Default value is **1** (binary). The command execution result return to the user as an unsolicited response: **0** - operation failed **1** - operation succeeded **2** - data connection (ODM) enabled
Read	+FTPRETR?	ERROR	Not supported
Test	+FTPRETR=?	+FTPRETR: (<"file name">)[,(0-1)] OK	Return command format

Notes:

The user can store a file, received from G30, immediately after G30 returns <result> = 2. In this case G30 switches to Online Data Mode and all data, received from the RS232 is the requested file.

Important: The user converts (decode) the received data file for end-of-file detect, see "FTP Connection". When the remote FTP server closes data connection, G30 switches back to Command Mode and returns <result> parameter = 1 (success case).

In any stage of file transfer, an error can occurred. In this case, G30 switches to Command Mode and <result> = 0 is returned to the user.

In case of <result> = 0 (operation failed) the FTP connection is closed (+FTPCLOSE: 0).

The following table shows the +FTPRETR parameters.

Table 4-243: +FTPRETR Parameters

<Parameter>	Description	Range
File name	Name of file to be retrieved from the remote side.	String, max length is **255** octets.
File type	Type of file (ASCII or Binary).	Numeric, in the range of **0-1** (0 = ASCII, 1 = Binary).

Example

The example illustrates the command execution. Requested file type is binary.

```
AT+FTPRETR="somefile.name",1

+FTPRETR: 2
....
....
....
<ETX>
+FTPRETR: 1
```

4.13. RS232 Multiplexer Feature

The MUX provides multiple logical communication channels between the DTE and G30 over one physical RS232 connection. This service enables the DTE device to run multiple applications (such as GPRS, CSD, SMS and voice calls) while communicating simultaneously with the G30.

4.13.1. MUX Details

4.13.1.1. Protocol Versions

3G TS27.010 v.3.3.0 (2000-03)

4.13.1.2. System Overview

The MUX service in the G30 provides multiple virtual channels for the DTE that can communicate simultaneously with the G30. This service is available when MUX software entities exist on both the DTE and the G30. These MUX entities communicate with each other and provide data connection management, which includes establishment, control, release and data transfer between matching channels in the DTE and G30.

Note: MUX over 232 is a software module. No PCB hardware changes are required at either the G30 or DTE side.

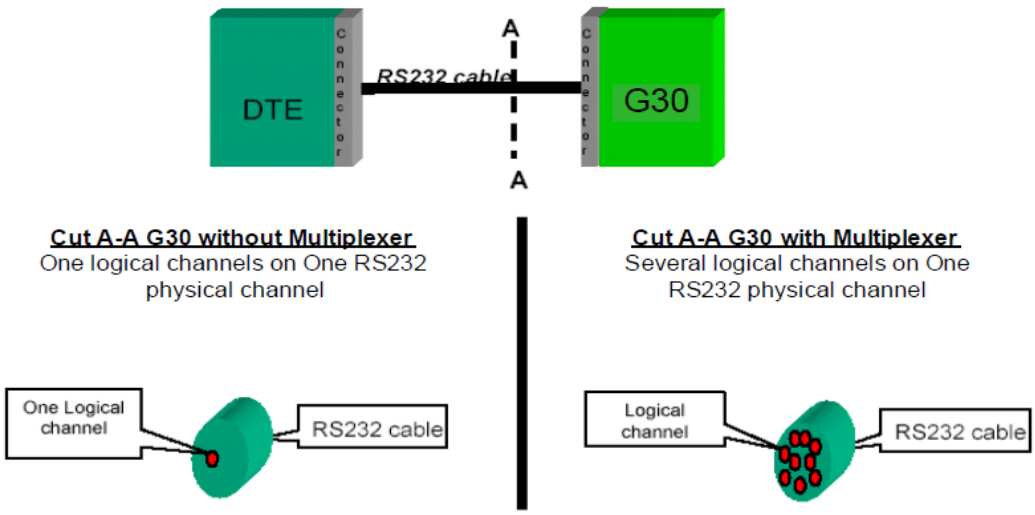

Figure 4-13: G30 with and without MUX

4.13.1.3. Product Architecture

The following figure shows the former architecture (PREMUX).

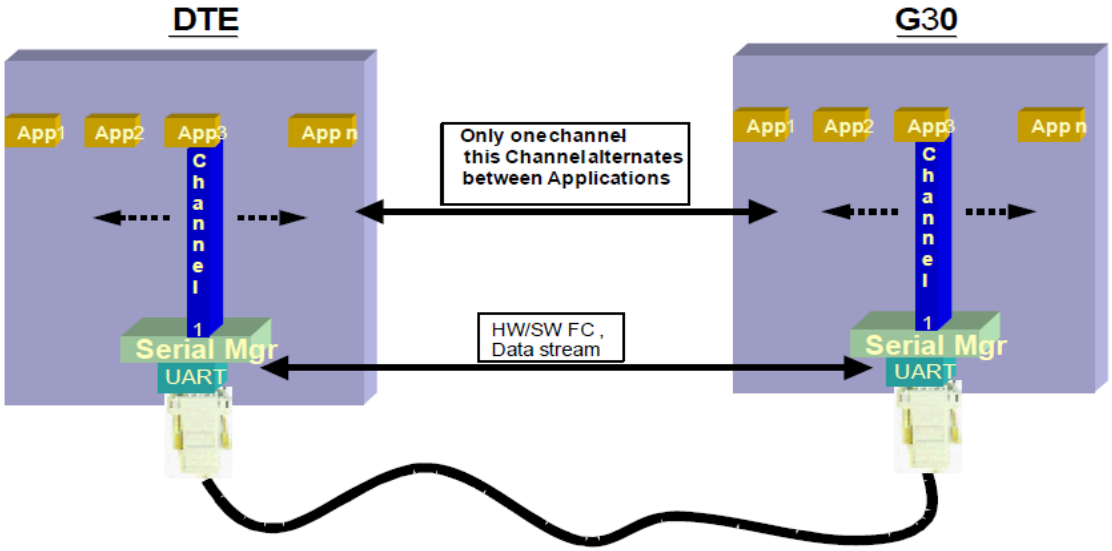

Figure 4-14: PREMUX Architecture

The following figure shows the current product architecture (MUX).

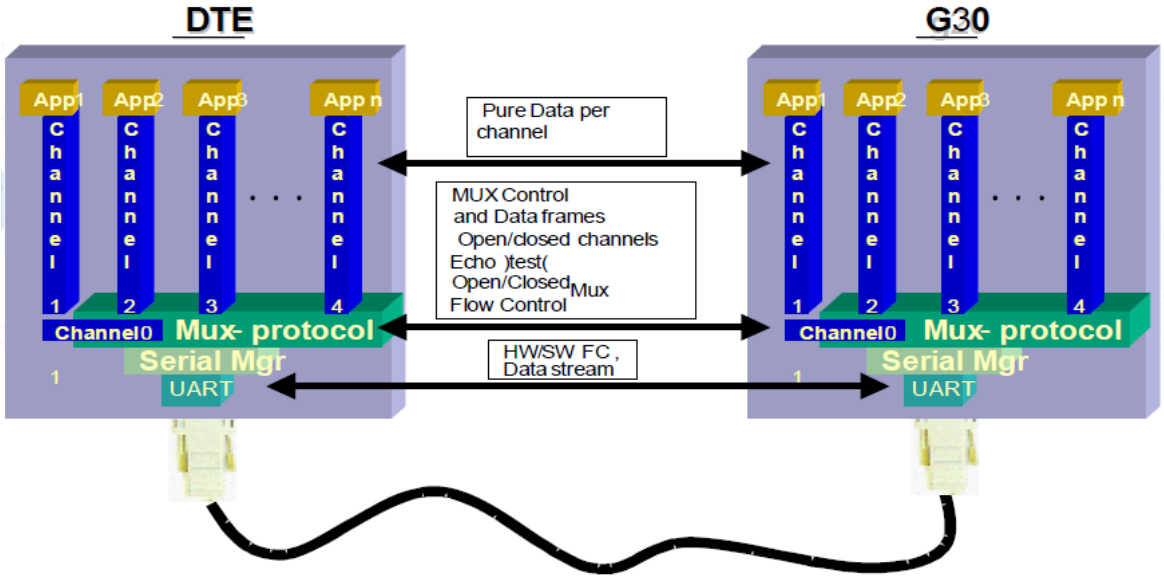

Figure 4-15: Current MUX Architecture

4.13.1.4. MUX States Overview

The G30 MUX module has three states:

- PREMUX
- MUX-Init
- MUX

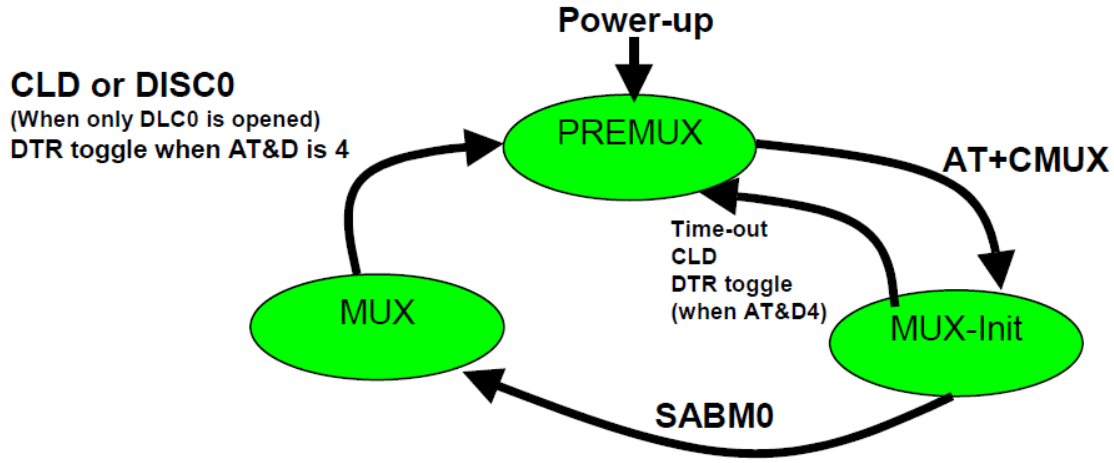

Figure 4-16: MUX States

PREMUX State

Once the GRLC logical communication channel between the DTE and G30 has been established, the RS232 cable is connected and the DTE device is ready to communicate.

MUX-Init State

This is an in-between state during which the G30 and DTE move from PREMUX to MUX.

Note: In this state there are no G30 indications or AT commands such as RING indicator (RI), and so on.

MUX State

In this state, the DTE and G30 communicate with the MUX 27.010 protocol stack over RS232.

4.13.1.5. Supported 27.010 Protocol Services

The following table lists the services defined in the 27.010 protocol that are supported by the MUX feature.

Service	Description
Start Up	Used to start the multiplexer operation over the serial channel.
DLC Establishment Services	Used to open virtual multiplexer channels.
Data Services	
Power Control Services	Includes both sleep and wakeup services. This service will be supported in future versions.
DLC Release Services	Used to disconnect a DLC exclude control channel (DLCO).
Close Down Services (CLD, DISCO, Exception situations)	Used to terminate multiplexer operation on the serial channel and resume GRLC operation (returns to PREMUX state).
Control Services	Includes services at the MUX entity level and at the specific DLC level. MUX Entity Level services (channel 0): Test Service used to test the communication link between two MUX entities. Specific DLC Level services (all DLC except 0): 1. A specific DLC HW modem status is reflected by logical (SW) means. A Modem Status Command (MSC) is used to control specific DLC modem signals, as a substitute for the HW lines in PREMUX. Initial values are expected to mirror the HW values in PREMUX. Note: The MSC break signal, RTS and CTS are not supported. 2. "Non Supported Command" response: NSC frame
Unsupported Control Services	PN, RPN, RLS, SNC (27.010 options)

4.13.1.6. UART Flow Control

The following sections describe UART flow control in the MUX.

4.13.1.6.1. UART Hardware Flow Control

G30 supports automatic UART hardware flow control.

4.13.1.6.2. UART Software Flow Control

Software flow control at the physical UART level is not supported in MUX.

4.13.1.7. MUX Software Flow Control Per Channel

The MUX feature supports software flow control per channel at basic mode, according to 3G TS 27.010 V3.3.0.

4.13.1.8. MUX UART Port Speed

Auto baud rate detection is disabled in the MUX. To set the UART baud rate, the G30 uses the <port speed> parameter in +CMUX command. If the parameter is absent, the MUX uses the same baud rate that was in PREMUX state.

4.13.2. +CMUX, MUX Startup Command

This command is used to enable/disable the GSM MUX multiplexing protocol stack. When the G30 receives a valid +CMUX command, it returns OK and changes its state to MUX-Init. If the parameters are left out, the default value is used.

Table 4-244: +CMUX Parameters

Command Type	Syntax	Response/Action	Remarks
Set	+CMUX=<mode>[,<subset>[,<port_speed>[,<N1>[,<T1>[,<N2>[,<T2>[,<T3>[,<k>]]]]]]]	+CME ERROR: <err>	The Set command requests the G30 to open the MUX stack with various parameters. This command works only in PREMUX state.
Read	+CMUX?	+CMUX: <mode>, [<subset>], <port_speed>,<N1>, <T1>, <N2>, <T2>, <T3>+CME ERROR: <err>	The Read command displays the current mode and settings. This command works only in MUX state.
Test	+CMUX=?	+CMUX: (list of supported <mode>s),(list of supported<subset>s),(list of supported <port_speed>s),(list ofsupported <N1>s),(list of supported <T1>s),(list ofsupported <N2>s),(list of supported <T2>s),(list ofsupported <T3>s),(list of supported <k>s) ofsupported <T3>s),(list of supported <k>s)	The Test Command displays a list of supported modes and parameters. This command works in both PREMUX and MUX states.

Note: Due to non-ERM, the <k> parameter is not supported.

4.13.3. MUX Customer Open Source Code Packet

The MUX is provided with an open source code packet to help speed the development process and reduce the incompatible interpretations of the protocol specifications (please contact customer care team for the MUX packet source).

When implementing the MUX feature, the user should have the MUX entity installed with the product. The following two MUX integration options are available to the user:

- MIP (Mux Integration Packet): The user receives the source code, which is provided by Telit, with known APIs for the MUX. The MIP is a Telit open source code packet for the GSM 27.010 protocol with API functions provided for the user.
- MUI (Mux User Implementation): The GSM 27.010 protocol is implemented by the user. The MUI is the user implementation device for the GSM 27.010 protocol.

4.13.4. APIs

There are five API user integrations, as follows:

- Open service
- Close service
- Sending Data service
- Receiving Data service
- MUX service test, MSC, FC and so on (refers only to the control channel)

4.13.5. MUX Channels (Information Data Link Control - IDLC)

The following sections describe the MUX channels.

4.13.5.1. Basic MUX Channel Definitions

- Each MUX channel functions as a regular RS232 connection that follows ETSI 07.07 and ITU V.25 standards. However, there are some limitations, as described in this paragraph.
- The G30 IDLC channel switches to Data mode as specified in ETSI 07.07 [4].
- When the MUX protocol layer releases the IDLC channel, any GPRS/DATA session or established call is hung up. Only active voice calls remain connected.
- AT command requests by an IDLC may result in an ERROR, while in PREMUX state the same request would never have returned an ERROR. This may happen because the addressed resource in the G30 is busy with a second IDLC request. For example, if two channels send the AT+CLIP? command, which addresses the GSM engine, only one channel receives the +CLIP: response, while the other receives an ERROR.

4.13.5.2. Channel Priorities

The control channel has the highest priority. All other IDLCs have the same priority.

Note: All control frames are processed before any other channels. IDLC frame validation is also performed after all control frames are processed.

4.13.5.3. Multiple Channel Configuration

The configurations listed below are recommended to achieve maximum use of parallel channels with minimum conflicts.

4.13.5.3.1. Two Channel Configuration

- DLC1 – Data channel dedicated to CDS

- DLC2 – ACCH (AT command channel; includes all AT commands except CDS related commands)

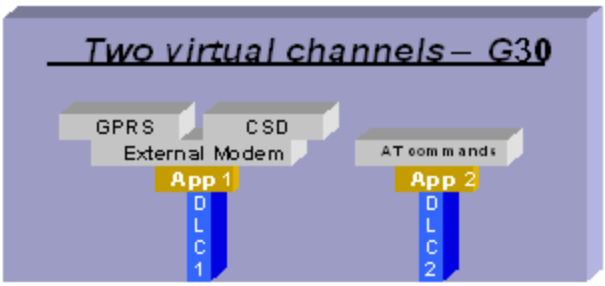

Figure 4-17: Two-channel Configuration

Note: Between data sessions, DLC1 is IDLE (in command mode).

4.13.5.3.2. Four-channel Configuration

- DLC1 – GRLC or Logger
- DLC2 – ACCH
- DLC3 – CSD
- DLC4 – GPRS

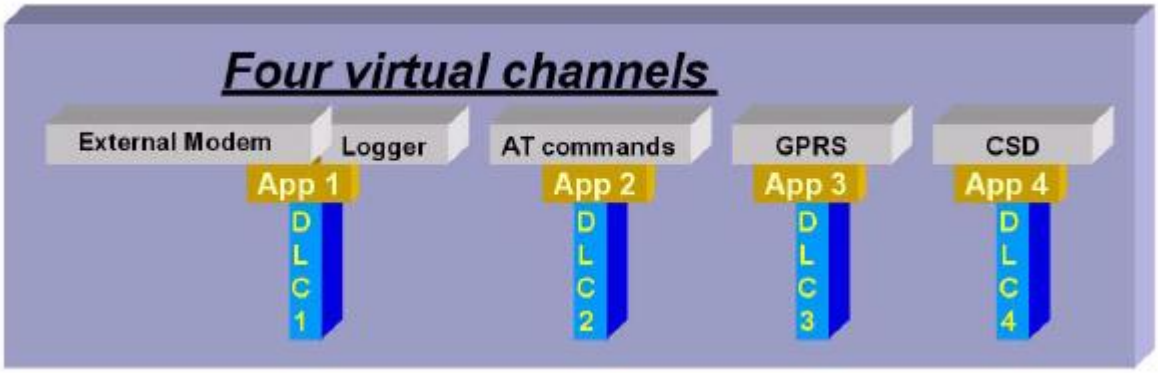

Figure 4-18:Four-Channel Configuration

Note: Between sessions, the Data and GPRS channels are IDLE (in command mode).

DLC1 Explanation:
An external host interface is used as a regular G30 RS232 channel, without MUX capabilities. It is highly recommended to enable this channel when the others are in IDLE state. One purpose of adding this channel is to give outside users who cannot see the other three channels, which are used as internal channels, the option of using the product (such as a Palm computer with a built-in G30) as purely a modem, without its other benefits. Such a product could also use this channel as the G30 logger channel.
The purpose of the additional UART is to have a DTE processor bypass, enabling an external device (such as a PC, and so on) to be connected to this UART for receiving G30 services. When this UART is available, it can be used for Logger debugging by doing the following:

1. Connecting the additional UART to a PC COM port.
2. Sending the +CLOG command.
3. Receiving the log data into a binary file.

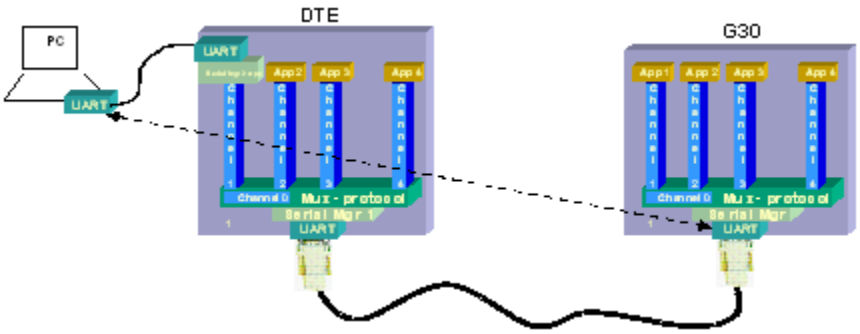

Figure 4-19: Using the Additional UART

Note: In this configuration, the DTE device might try to request multiple CDS services simultaneously. For example, it may try to establish CSD sessions in DLC1 and in DLC4. Such attempts will not work and will have unpredictable corresponding effects.

4.13.5.4. Multiple Channel Definitions

The following table provides various multiple channel definitions.

Table 4-245: Multiple Channel Definitions

Term	Description
Command response	A response to a command is delivered back to the channel from which the command was sent.
Unsolicited indication	Unsolicited indications are sent only to the channel that enabled them. Enabling indications where it is not allowed may cause unexpected results.
AT+CMUX command	Any G30 IDLC receiving an AT+CMUX command returns an ERROR response – +CMEE: "operation not allowed".
Common settings for all channels	Settings that are not stored in the IDLC modem profile, but that are set in one of the G30 components. Any modification to these settings overrides the previous settings in all the other channels. For example, Database settings (phonebook, Flex, audio settings, network (SIM) settings, and so on. For this reason, parallel commands are not recommended in more than one channel.

4.13.5.5. GPRS Definitions

- A GPRS session is suspended when a voice/CSD call is connected to the G30. The GPRS session is resumed when the voice/CSD call is disconnected. The voice/CSD call can be dialed when the GPRS session is either in online DATA mode or online COMMAND mode.
- A GPRS session cannot be started (ERROR returned) when there is an active or established Voice/CSD call.
- Simultaneous GPRS sessions of any kind (internal and/or external) are not supported.

Note: While G30 is operating network-related AT commands, such as SMS or Supplementary Services, GPRS session behavior will be the same as for Voice/CSD call, but for brief moments only.

4.13.5.6. IDLC Modem Profile in MUX State

Definitions

- Modem profile – G30 modem settings such as s-registers and flex values.
- GRLC profile – GRLC (PREMUX) settings such as s-registers and flex values.
- GRLC default profile – GRLC (PREMUX) settings on power up.
- When a new channel is established (open IDLC) its modem profile will be the GRLC default profile.
- When the G30 returns to PREMUX state from either MUX or MUX-INIT states, its modem profile is the GRLC default profile.
- The two requirements above have an exception regarding the UART configuration – the settings for UART port speed and flow control (AT&K and AT+CBAUD/AT+IPR). These settings are set in PREMUX state only, and will be kept unchanged until the G30 returns to PREMUX state. If an IDLC tries to change the settings it receives an OK

response, but the real value is NOT changed. When the G30 is in MUX state, these two settings have either the values that were defined in PREMUX, or the value set by the AT+CMUX command. If a value was set with the AT+CMUX command, it is retained even after returning to PREMUX state.

4.14. M2M

4.14.1. M2M Command

4.14.1.1. +M2M, Enable/Disable M2M Feature

This command is used to enable/disable the M2M feature.

Command Type	Syntax	Response/Action	Remarks
Set	AT+M2M=<M2M_State>	OK or: +CME ERROR: <err>	The SET command is used for Enable/Disable the M2M feature. (If disabled, G30 behaves in basic mode).
Read	AT+ M2M?	+M2M: < M2M_State> OK or: +CME ERROR: <err>	The READ command returns the current M2M_state (Enabled or Disabled).
Test	AT+ M2M=?	+M2M: (0-1) OK or: +CME ERROR: <err>	The Test command returns the possible value's range.

The following table shows the +M2M parameters.

Table 4-246: +M2M Parameters

<Parameter>	Description
<M2M_State>	0 Disabled 1 Enabled **The default value**: M2M_State shall be flex parameter - Default: "Enabled" for premium models. "Disabled" for basic models. On Power -p - as previously saved in FLEX bytes.

4.15. Firmware Update Over the Air (FOTA)

4.15.1. FOTA Session Highlights in G30

FOTA session is supported in two modes: Automatic and Non-automatic:

- Automatic mode: After SW update package download was completed, G30 will immediately initiate a SW update procedure which may take a few minutes. G30 will power up and ready for operation after a SW update procedure has finished.
- Non-automatic mode: Host will monitor unsolicited indications. After SW update package download was completed host can decide when to initiate a SW update procedure by executing a command "AT+MFOTAINSTL". Also, host may query whether there's a SW update package ready for installation by executing a command "AT+MFOTAINSTL?". Note that a SW update procedure will be initiated automatically after G30 was reseted even if a host didn't execute a command "AT+MFOTAINSTL".
  Telit strongly recommends to enable FOTA session unsolicited indication reports that convey a FOTA session progress.

4.15.2. +MFOTAWSCFG, Set the Web-Session Default Entry

This command specify a particular PDP context definition to be used when web session need to be initiated.
This command is a non-basic command, which means that the G30 rejects the command with an appropriate error message when the SIM is not present and/or the phone is in lock state.
AT+ MFOTAWSCFG setting will be stored in NVM and the last setting will be available after power up.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MFOTAWSCFG = <Context ID>	OK or: +CME ERROR: <err>	The set command configures the Web-Session default entry.
Read	AT+MFOTAWSCFG?	+MFOTAWSCFG: <Context ID> OK	The read command returns the current setting.
Test	AT+MFOTAWSCFG=?	+MFOTAWSCFG:(list of supported < context ID>s OK	Test command returns the supported context ID's.

The following table shows the +MFOTAWSCFG parameters.

Table 4-247: +MFOTAWSCFG Parameters

<Parameter>	Description	Remark
<context ID>	Numeric parameter specifying a particular PDP context definition (PDP Context Identifier). The parameter is local to the Terminal-Mobile Terminal interface and is used in other PDP context-related commands.	The Test command returns the range of permitted values (default value = 1). Stored in NVM.

4.15.3. +MFOTACNFG, Set the FOTA Session as Automatic/Non-Automatic

This command enables to set the FOTA session mode as Automatic/Non-Automatic (i.e. Transparent/Non-Transparent).
Default value is Automatic FOTA session.
Upon the receiving of the AT+MFOTACNFG command, the module will perform the following
tasks:

1. Validate OMA status is "idle" and FOTA session is not active. If not, the module will respond to a command with a CME error "operation not allowed".
   Otherwise - store the appropriate parameter in NVM and return OK to DTE.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MFOTACNFG= <FOTA session mode>	OK or: +CME ERROR: <err>	The set command sets new FOTA session mode.
Read	AT+MFOTACNFG?	+MFOTACNFG: < FOTA session mode > OK	The read command returns the current FOTA session mode.
Test	AT+MFOTACNFG=?	+MFOTACNFG: (list of < FOTA session mode > OK	Test command returns the supported FOTA session modes.

The following table shows the +MFOTACNFG parameters.

Table 4-248: +MFOTACNFG Parameters

<Parameter>	Description	Remark
< FOTA session mode >	0 - Non-automatic FOTA session 1 - Automatic FOTA session (default)	"Automatic FOTA Session" enables G30 to contact and establish a secure connection with FOTA server , download a FOTA Update Package and perform a SW update immediately upon a download completion without any direct user interaction. If " Non-automatic FOTA Session" is selected, then G30 will contact and establish a secure connection with FOTA server and download a FOTA Update Package. A host is on control when to trigger a SW update.

4.15.4. +MFOTAINSTL, Install the FOTA Update Package

If update package was downloaded prior to execution of this command then the module will start update installation, otherwise the module will reply with CME error: "operation not allowed".

This command is a basic command.

Command Type	Syntax	Response/Action	Remarks
Execute	AT+MFOTAINSTL	OK or: +CME ERROR: <err>	Install FOTA Update Package.
Read	AT+MFOTAINSTL?	+MFOTAINSTL: <UP> OK	Read whether there's a SW package ready for installation.

The following table shows the +MFOTAINSTL parameters.

Table 4-249: +MFOTAINSTL Parameters

<Parameter>	Description	Remark
<UP>	0 - Update Package is not available 1 - Update Package is available	

4.15.5. +MFOTAIND, Send Unsolicited FOTA Indications to the DTE

When set, the module will send all the indications mentioned.
By default, FOTA unsolicited information report is disabled.
This command is a basic command.

Command Type	Syntax	Response/Action	Remarks
Set	AT+MFOTAIND=<ind>	OK or: +CME ERROR: <err>	The set command enables/disables unsolicited indications.
Read	AT+MFOTAIND?	+MFOTAIND: <ind> OK	The read command returns current <ind> value.
Test	AT+MFOTAIND =?	+MFOTAIND: (list of <ind>s OK	
Unsolicited Report	+MFOTAIND	+MFOTAIND: <FOTA indication>	FOTA information reports during FOTA process.

The following table shows the +MFOTAIND parameters.

Table 4-250: +MFOTAIND Parameters

<Parameter>	Description	Remark
<ind>	0 - Disable FOTA unsolicited informational report. 1 - Enable FOTA unsolicited informational report.	The default value is 0. Enables the Module to indicate the DTE a FOTA process progress.
<FOTA indication>	1 - DM session started 2 - DM session aborted, xx (failure reason.) 3 - DM session completed 4 - FUMO no update package available 5 - FUMO update package available 6 - SW download started 7 - SW download aborted, xx (failure reason) 8 - SW download completed 9 - SW installation started 10 - SW update completed 11 - SW update failed ,xx (failure reason.) 12 - Bootstrap completed. 13 - Bootstrap failed.	

Table 4-251: Failure Reason 1

<value>	Failure reason description
1	Authentication failure.
2	Network communication failure.
3	DM tree node operation failure.
4	File storage access failure.
5	NIA SMS message error.
6	Session process failure.

Table 4-252: Failure Reason 2

<value>	Failure reason description
2	Error in a run parameter.
3	No valid UPI found.
4	Future use.
11	Expected length error.
12	Expected length error.
13	Structural error.
14	Signature error.
15	Foreign key not signed.
16	Not for current version.
17	Non-compatible UPI.
18	Update for UPI does not match its version.
19	Update for UPI does not match its version.
30	Given RAM is not enough.
31	Does not behave as RAM.
32	New version is too big.
33	Flash writing failure.
34	Flash erasing failure.

35	Flash reading failure.
36	Memory allocation failure.
40	Can not restore new.
41	Signature error of new.
42	Foreign key not signed.
43	One API function is not declared.
205	File does not exist.
206	RO or no access rights.
207	File does not exist.
208	No access rights.
209	Cannot resize file.
210	Cannot read specified size.
211	Cannot close file handle.
300	Bad operation number for FS update.
301	Bad operation number for FW update.
302	Unsupported compression.
303	Can not apply reverse update for delta not generated as reverse delta.
304	Number of backup buffers given to UPI does not match number in delta file.
305	Sector size mismatch between UPI and delta.
306	UPI was not compiled to support reverse update.

307	UPI was not compiled to support IFS on compressed images.
308	UPI was not compiled to support IFS.
309	Image verified is not source image.
310	In scout only operation we should do only verify of image
311	There is not enough RAM to run with operation=2.
312	Delta file too long - corrupted.
313	Mismatch between deletes sig and delta deletes buffers signature.
314	Number of fragments in section is not 1.
315	Overhall number of backup sects too big.
316	Delta file is corrupt: signature mismatch between delta header signature and calculated signature.
317	Source file size mismatch from file on device to delta file size.
318	File signature does not match signature.
319	Signature for the target buffer does not match the one stored in the delta file.
320	Too many dirty buffers.
321	UPI version mismatch between UPI and delta.
322	Scout version mismatch between UPI and delta.

5. Using the Commands

5.1. Setting Up the G30 (Power On and Initial Actions)

There are three phases of connectivity for the G30:

- Init General.
  In this phase, the G30 is asked to provide basic information which ensures that the phone is functioning properly.
- Enabling the SIM.
- Registering the SIM on a network in order to see that wireless access is functioning properly.
  After these three phases are completed, G30 is ready for action and you can send/receive voice calls, circuit switched data and GPRS.
  The following figures show the phone state transactions:

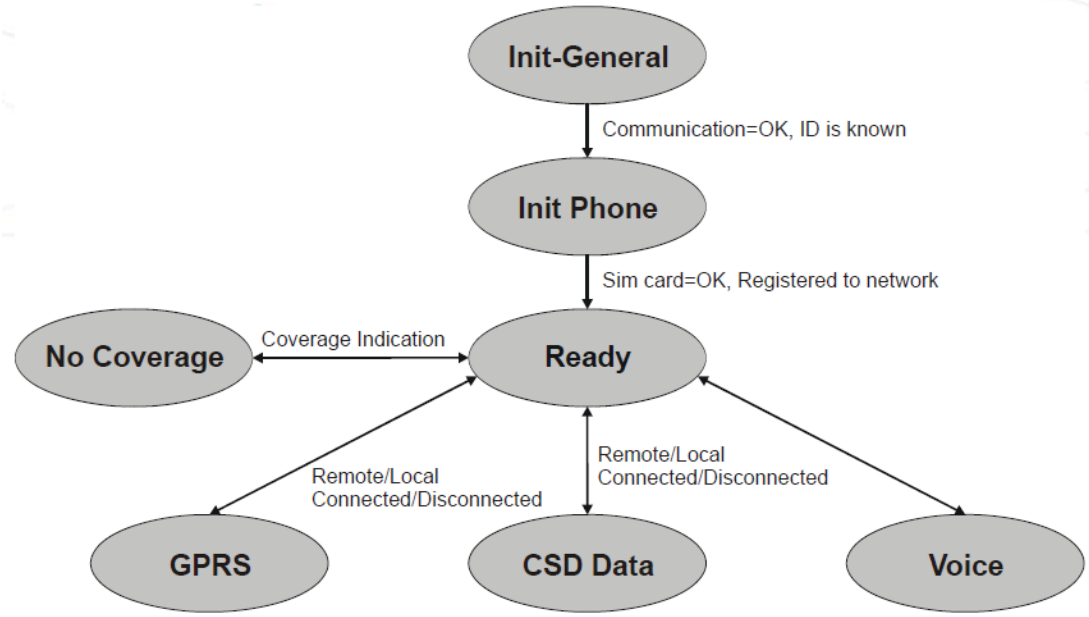

Figure 5-1:Phone State Transactions

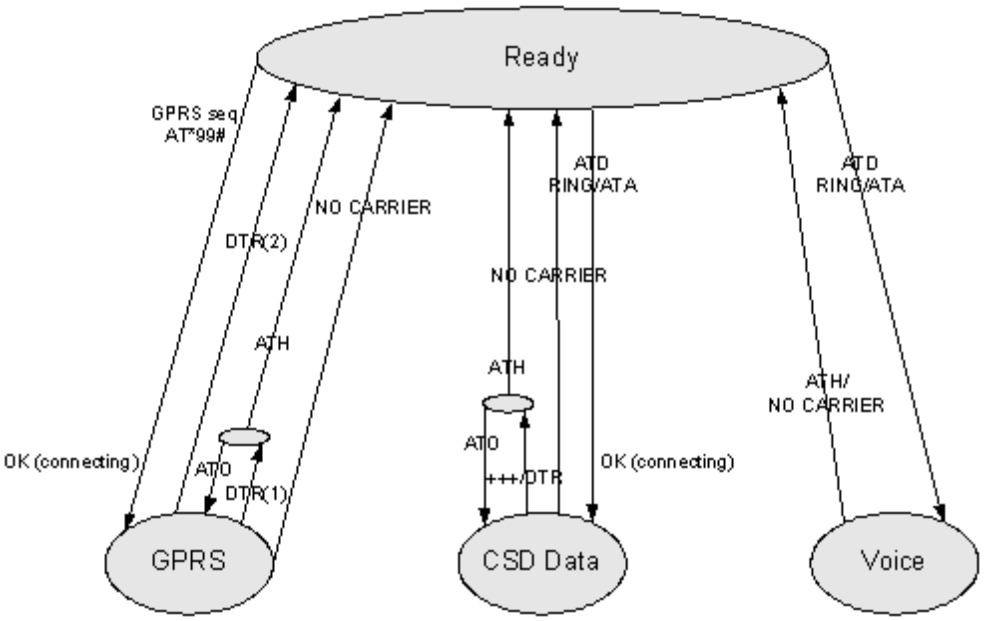

Figure 5-2: Detailed Phone State Transactions

5.2. Recommended G30 Initialization after Powerup

This flow chart provides a recommended workflow for initializing the G30 after startup. The following sections explain this workflow in detail.

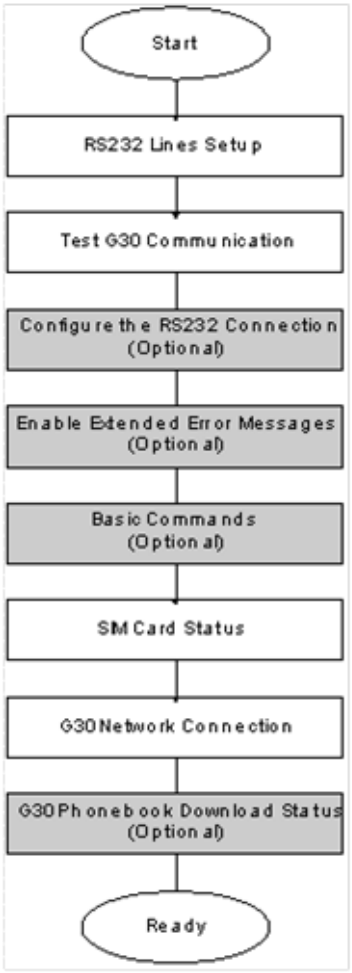

Figure 5-3: Recommended G30 Initialization Workflow

5.2.1. RS232 Lines Setup

There is no dynamic detection. Upon power up, the hardware is detected. For a pin description, refer to the G30 Developer's Kit Manual: 6802986C48.

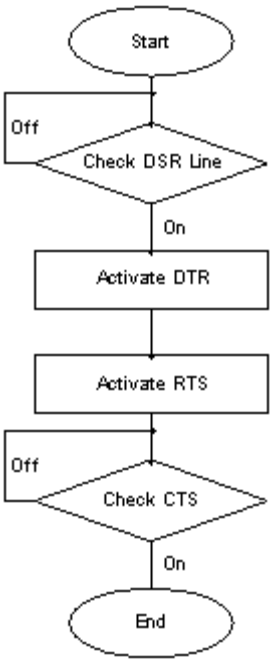

Figure 5-4: RS232 Lines Setup

5.2.2. Test G30 Communication

This is a preliminary step. During this step, the ability to communicate with the G30 using AT commands is tested.

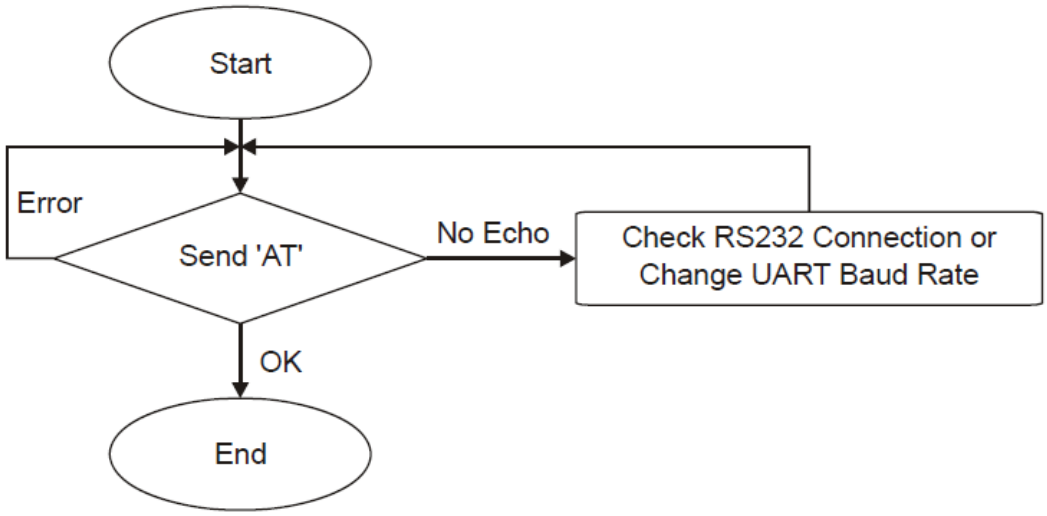

Figure 5-5: Test G30 Communication

Communication example:

```
AT
ATE1      //By default, the echo should be enabled
AT
OK        //Confirm that G30 replies with OK
```


5.2.3. Basic Configuration

These are optional steps. If required, specific RS232 pin behavior can be selected. Extended error notification is recommended for debugging and field-support purposes.

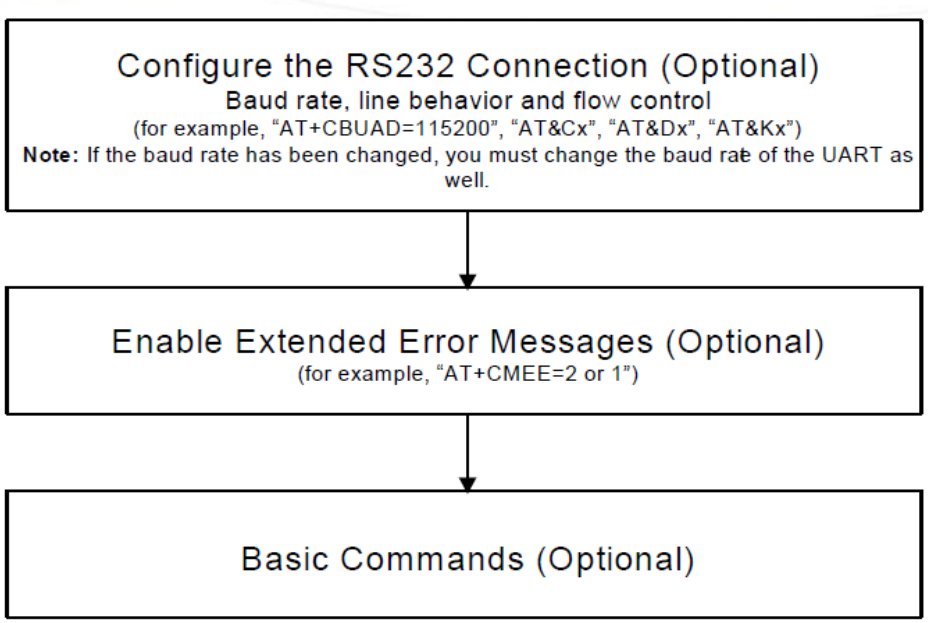

Figure 5-6: Basic Configuration

1. Baud setting example:
   AT+CBAUD=6 //Setting baud rate for 19200
   OK
   AT+CBAUD=19200 //Same as issuing this command
   OK
2. RS232 HW lines configuration: &C(DCD), &D(DTR), &K(flow-control).
   Default settings should be:
   AT&C1
   OK
   AT&D2
   OK
   AT&K3
   OK
3. Modem IDs (optional): +CGMI,+CGMM,+CGMR,+CGSN
   AT+CGMI
   +CGMI: "Motorola"
   OK
   AT+CGMM
   +CGMM: "GSM900","GSM1800","GSM1900","GSM850","MODEL=G30"
   OK
   AT+CGMR
   +CGMR: "G30_G_00.01.00D"
   OK
   AT+CGSN //Read the IMEI number of the G30
   +CGSN: 448954035283579
   OK
4. Error messages (optional): +CMEE, +CEER
   AT+CMEE=2 //Enable +CME ERROR: error messages verbose string
   OK

5.2.4. SIM Card Status

To enable the module to transfer from basic commands to full operational mode, a SIM card must be ready and the PIN enabled.

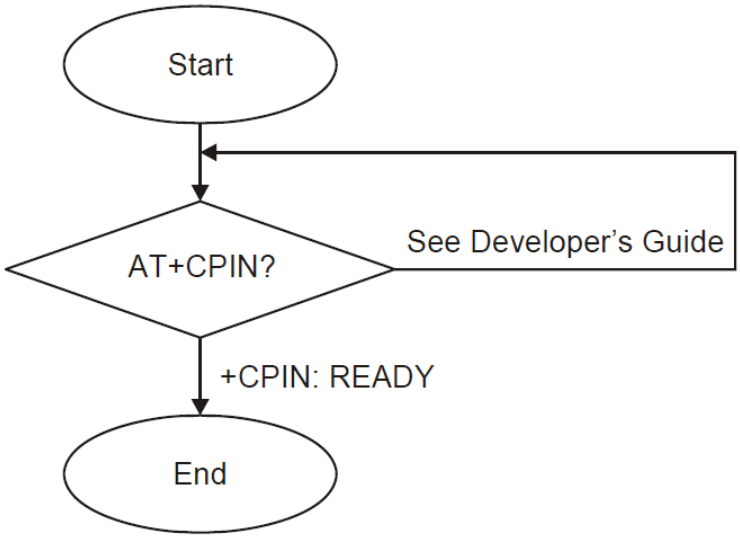

Figure 5-7: SIM Card Status

Note: For a full description of SIM states, see "+CPIN, Enter PIN for Unlocking SIM Card or Enter PUK for Unblocking SIM Card".

The following steps are part of the SIM card status step:

1. Check SIM security: AT+CPIN?
2. Confirm that the result is +CPIN: READY
3. If the SIM PIN is required, then the following response appears: +CPIN: SIM PIN.
4. Unlock the SIM, if needed: AT+CPIN="XXXX".
   Note: XXXX is the PIN password (4-8 digits long).
5. If the SIM PUK/PUK2 is required, then the following response appears: +CPIN: SIM PUK/PUK2.
6. Unblock the SIM, if needed: AT+CPIN="YYYYYYYY", "ZZZZ".

Note: YYYYYYYY is the PUK/PUK2 password (4-8 digits long).
ZZZZ is the new defined PIN/PIN2 password (4-8 digits long).

5.2.5. G30 Network Connection

In this step, the G30 detects existing networks (the user must register to a specific network).

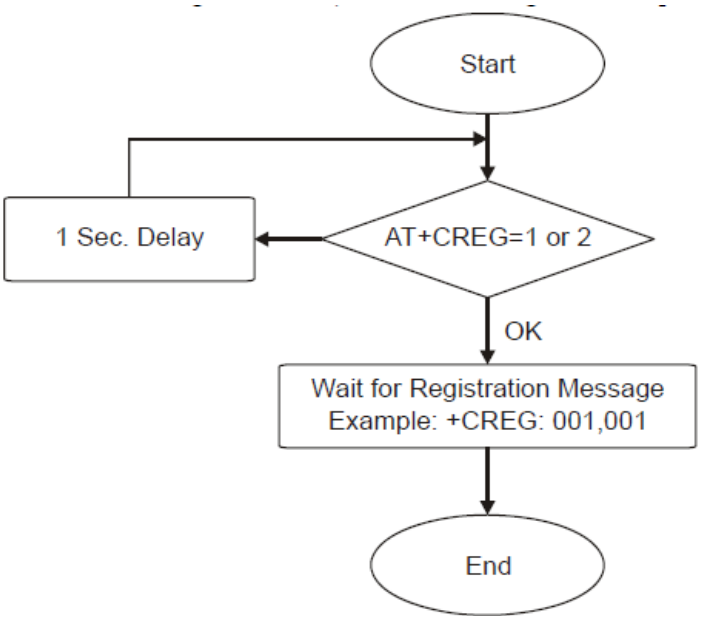

Figure 5-8: G30 Network Connection

1. Registration and call indications example: +CREG, +CLCC
   AT+CREG=2
   OK
   AT+CLCC=1
   OK
2. Get available networks example: +COPS
   AT+COPS=? //To read all possible operators
   +COPS:(002,"ILORANGE","ORANGE","42501"), //G30 answer example
   (000,"AT&T Wireless", "AT&T","31038"),
   (001,"IL Cellcom","Cellcom","42502"),
   (003,"IL-77","IL-77","42577"),,(000,001,002,003,004),
   (000,001,002)
3. Get registration messages example: +CREG
   AT+CGREG=1
   OK
   +CREG: 001 //G30 example output when it is registered on the home network
   Get GSM registration status: +CREG
   AT+CREG=2 //Get unsolicited GSM registration reports
   +CREG: 001,2648, 988b
4. Get GPRS registration status example: +CGREG
   AT+CREG=2 //Get unsolicited GPRS registration reports
   +CGREG: 001,2648,988b

5.3. SMS

Managing Stored Messages in the G30 Memory

```
AT+CMGF=1          // move to TEXT mode
OK
AT+CMGL="ALL"  //List all messages in memory storage
+CMGL: 225,"STO UNSENT","054565132"
<Message body>
+CMGL: 223,"STO UNSENT","4565029"              //Example of G30 response
<Message body>
+CMGL: 222,"STO SENT","054565029"
<Message body>
+CMGL: 221,"STO SENT","054565132"
<Message body>
+CMGL: 220,"STO UNSENT",""
<Message body>
OK
AT+CMGL="STO UNSENT"  //List all messages of a certain type (for example, stored
unsent messages)
+CMGL: 225,"STO UNSENT","054565132"
<Message body>
+CMGL: 223,"STO UNSENT","4565029"
<Message body>
+CMGL: 220,"STO UNSENT",""
<Message body>
OK
AT+CMGR=225      //Read any message from the list using its index
+CMGR: "STO UNSENT","054565132"
<Message body>
OK
AT+CMGR=9
+CMGR: "REC UNREAD","+97254565132",,"05/02/18,"21:22:23+08"
<Message body>
OK
AT+CSDH=1
OK
AT+CMGR=9
+CMGR: "REC UNREAD","+97254565132",,"05/02/18,"21:22:23+08",145,4,0,0,"+ 97254120032",145,<messsage
length>
<Message body>
OK
```

5.3.1. Setting the Notification Indication for Incoming Messages (Using AT+CNMI)

```
AT+CNMI=1,1        //To receive indications of new incoming MT messages, the second
parameter of +CNMI should be set to 1
OK
+CMTI: "SM",4      //When a new MT message is received, the unsolicited response
+CMTI will be displayed, denoting the message index
AT+CMGR=4          //Use the new message index to read it
+CMGR: "REC UNREAD","+97254565132",,"05/02/13,07:15:36+08"
<message body>
OK
AT+CMGD=4          //Delete the message after reading it
OK
```

5.3.2. Another Possible Option for Setting the CNMI Notification Indication

AT+CNMI=1,2 //To have new incoming MT messages displayed on the terminal, the second parameter of +CNMI should be set to 2
OK
+CMT: "+97254565132","03/3/24,15:38:55"
<message contents> //When a new MT message is received, the unsolicited response +CMT is displayed along with the message
AT+CNMA //To acknowledge receipt of a message, use the AT+CNMA command within 60 seconds of the +CMT unsolicited response
OK

The acknowledged message is not saved in the database. If the +CMT unsolicited response is not acknowledged within 60 seconds, the new message is saved in database.

5.3.3. Setting TEXT Mode Parameters (Using AT+CMGW and AT+CMGS)

AT+CSMP?
+CSMP=17,167,0,0
OK
AT+CMGW="0544565034"
> text is entered <ctrl z>
+CMGW: 141
OK
AT+CSDH=1
OK
AT+CMGR=141
+CMGR: "STO UNSENT","0544565034",,,129,17,0,0,167,"+ 97254120032",145,<messsage length>
<message body>
AT+CSMP= 1,256,0,0
+CMS ERROR: numeric parameter out of bounds

5.3.4. Writing, Saving and Sending Messages (Using AT+CMGW and AT+CMSS)

Writing messages into the database, with or without destination address. In TEXT mode, the header parameters will be set according to CSMP settings:

AT+CMGW //Writing a message without destination address
> message text <ctrl z>
+CMGW: 142
OK
AT+CMGW="054565132" //Writing a message with destination address
> message text <ctrl z>
+CMGW: 143
OK
:
AT+CMSS=143 //Send a message to the destination address with which it was stored, using the message index
OK
AT+CMSS=143,"054565029" //Send a message to a destination address, regardless of the destination address with which it was stored (if any), using the message index
OK
AT+CMSS=3,"054565029" //In this way, received messages (stored in the inbox) can also be sent
OK
AT+CSMP=25,"05/03/15,21:22:23+08"
OK
AT+CMGW="0544565034"
A<CTRL+Z>
+CMGW: 129
OK


```
AT+CMGR=129
+CMGR: "STO UNSENT", "0544565034",,129,25,0,0,"05/03/15,21:22:23+08","+972521100059",145,1
A
OK
AT+CMGF=0
OK
AT+CMGR=129
+CMGR: 2,,1
07917952120100951 9FF0A8150446505430000503051122232800141
AT+CMGW=24
> 07917952120100951 9000c917952428650290000AABBAABBAABB010441424344
+CMGW: 146
OK
```

5.3.5. Sending Messages (Using AT+CMGS)

Sends an SM from the G30 to the network in TEXT mode, the header parameters will be set according to CSMP settings. In text mode (+CMGF=1):

```
AT+CMGS="054565028" //Writing a message to be sent to specified destination address
>This is the message body <CTRL+Z>      //<CTRL+Z> ends the prompt text mode and returns to
regular AT command mode
+CMGS: 238          //Message successfully sent. Returns the Message Reference
OK
AT+CMGS="+97254565028",145          //Writing a message to be sent to specified destination address
>message text <CTRL/Z>
+CMGS: 239          //Message successfully sent . Returns the Message Reference
OK
```

5.3.6. Deleting Messages (Using AT+CMGD)

```
AT+CMGD=179     //Delete a message using its index
OK
AT+CMGR=179     //The message index is now empty
+CMS ERROR: invalid memory index
```

Delete a group of messages. Note that deletion of a number of messages may take a short time.

```
AT+CMGD=1, 1    //Delete all read messages
OK
AT+CMGD= 1,2    //Delete all read and sent messages
OK
AT+CMGD= 1,3    //Delete all read, sent and unsent messages
OK
AT+CMGD= 1,4    //Delete all messages
OK
```

5.4. Call Control

The following figure is a detailed view of the states the G30 goes through for Voice and CSD Data.. Note that between the time the OK is received and the actual connection occurs, call state alerts are received.

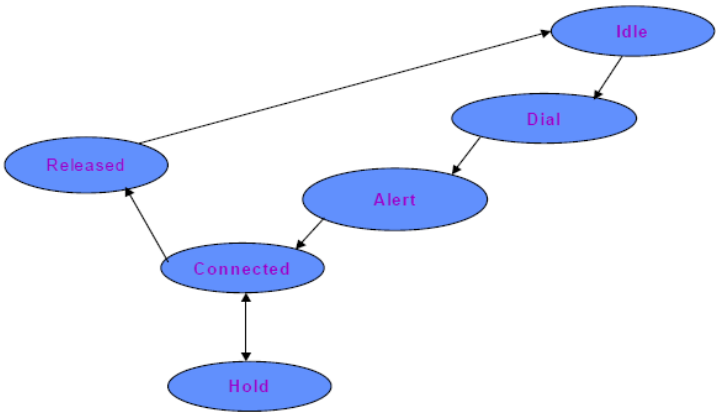

Figure 5-9: Call States

5.4.1. Dialing Using ATD

```
atd+44 34 56 78;       // VOICE call; number includes international access code
OK
OK
atd17085763400;      //Second VOICE call
OK
OK          //Call to 44345678 is being put on hold
ath         //Hang up active call
NO CARRIER
OK
AT+CHLD=0          //Hang up held call
NO CARRIER
OK
atd+44 34 56 78       //DATA call
...
OK          //Move to online Data state
            //ESC sequence back to the Command state. +++ is sent from the terminal (+++ is not displayed)
ath         //Hang up data call
NO CARRIER
OK          //Data call terminated
AT+FCLASS=1
OK
atd035659260,345,22;              //VOICE call with tones sent after connecting
OK
OK
3 4 5       //Sent as DTMF tones
...         //Pause
2 2         //Sent as DTMF tones
ath         //Voice call is hung up
NO CARRIER
OK
            //Comma is ignored; 035659260 is dialed
OK
```

5.4.2. Dialing the Last Number Example

```
atd035658278;
OK
OK
ath
NO CARRIER
OK
atdl          //Last called number is "035658278"
ATDL: "035658278"
OK            //DATA call
atdl;
ATDL: "035658278"
OK
OK            //VOICE call
atdl          //Last called number is "035658278,123,78;"
ATDL: "035658278"
OK            //DATA call
```

5.4.3. Voice Call Manipulations

5.4.3.1. Call Waiting

```
AT+CCWA=1          //Enabling the call waiting on G30
OK
atd9311234567;      //Originate a voice call
OK
OK            //Voice call connected
(...conversation...)
+CCWA: "+358317654321",145,1,"Bob" //Call-waiting indication received by the G30; Bob is calling
+CCWA: "+358317654321",145,1,"Bob"
AT+CHLD=0          //Release the waiting call
OK
NO CARRIER         //Current call is still active
```

5.4.3.2. Call Forwarding

```
AT+CCFC=1,3,"0545658278"  //Network register UC forward-to of all classes
OK
AT+CCFC=1,1        //Network activate UC forward-to of all classes
OK            //At this point, the G30 will not receive any calls; all calls will be
              forwarded by the network to phone number 0545658278
AT+CCFC=1,2        //Interrogate reason unconditional of all classes
+CCFC: 1,1,"0545658278",129          //Class voice - UC forwarding is activated
+CCFC: 2,1,"0545658278",129          //Class data - UC forwarding is activated
OK
```

5.4.3.3. Conference Call

```
atd051632601;      //Dialing the first member of the conference
OK
OK
AT+CHLD=2          //Call hold, switch command
OK                 //Active call switched to hold
atd035659260;      //Calling the second member of the conference
OK
OK
(Dual call state: one call on hold; 2nd is active.)
AT+CHLD=3          //Call link command
OK            //Held call is linked to active call
(Active conference of two calls)
AT+CLCC            //Verifying call state through CLCC
              //(Verifying call state is optional.)
```


```
+CLCC: 1,0,0,0,1,"051632601",129,""
+CLCC: 2,0,0,0,1,"035659260",129,""
ath          //Hang up the conference call
NO CARRIER   //First member dropped
NO CARRIER   //Second member dropped
OK
```

5.5. Data Call

5.5.1. Switching Modes (Data Mode/Command Mode)

```
atd054565190          //Calling the remote modem
OK
aaaaaaaaaaaa          //Receiving binary data from remote side (G30 is in Data mode)
//Sending escape sequence +++ to G30 (the remote side does not treat +++ as escape)
OK          //G30 is in Command mode
ati3        //Issuing an AT command
Motorola Mobile Phone
OK
ato                   //Switching back to Binary mode
OK
fffffff     //Receiving binary data from remote side
fghhgatfhgfhfhghhfhfhfhgfhffhgfgfhgfhgfhhh
            //Sending escape sequence +++ to the G30
ath         //Hang up the CSD call (return to Command mode)
OK
NO CARRIER
```

5.6. GPRS

When using the GPRS, it is recommended to implement a "keep alive" mechanism.
The G30 memory resources should not be used as a buffer for the user, the user maintains its own memory and flow control in its own application. The G30 has finite limited resources such as network related, SIM card and phone memory. In general the user should use a single resource at a time. As an example, when G30 GPRS network resources are in an active session, user should not manually detach from the network or place a CSD call etc.

Note: The basic GPRS concept is be “always connected” and there is no charge for being connected (only per real data transferred). GPRS users are advised to connect the GPRS network once in the beginning of a session and remain connected rather then to toggle from online to offline and back in a high rate. In specific cases when this is needed, contact customer care for advice and knowledge base.

5.6.1. Establishing GPRS PDP Context

When using the GPRS network for any IP data, you must be attached to the GPRS network before activating PDP context.

5.6.1.1. Activating a Saved Profile in G30

```
AT+CGATT=1          //By default, after power-up, the G30 attaches to the GPRS network, if possible (if the network and
SIM allow)
AT+CGATT?           //Check your connection status
AT+CGDCONT=1,"IP","RTY","123.32.45.9"          //Context definition example
```

5.6.1.2. Two Ways to Activate PDP Context

Each of the two main ways in which to activate PDP context are described below.

5.6.1.2.1. Using the GPRS Wizard Application

1. Double-click the button predefined as the dialer for this provider to automatically establish PDP context. If the G30 was not previously attached to GPRS, it will be attached automatically.
2. Setup configuration.
3. Enter into the wizard, the parameters provided by your operator.
4. Set definitions to allow your http/ftp browser to use the G30 as a port to the Internet.
5. Usage:
   - Open the network connection dialer Manager.
   - Double-click the dialer icon to select and activate the provider of your choice (multiple providers may be displayed in the list).
   - After dialing, your temporary IP address, the GPRS DATA session message will be displayed.
   - Minimize the GPRS wizard window and use your http/ftp browser (Internet Explorer, Netscape).

– Bear in mind that the AT command AT+CGACT is not supported in all countries with GPRS. A GPRS connection is also possible with ATD*99#. See the following section for more information.

– The above list is only for the AT command level. PPP information (DNSs) is not shown here.

5.6.1.2.2. Using the ATD* Command Set

Request GPRS service 'D':
ATD*99***(CID)#
The CID (Context ID) includes the APN (defined by the AT+CGDCONT command) to which you want to be connected. This depends on the ability of the SIM card to be attached to the different networks.
The format ATD*99# may also be used. In this case, the G30 will first try to activate a non-empty (predefined) CID. If the attempt fails, the G30 will try the next CID, and so on.

Note: When buffering the terminal message, data in the G30 (both inbound and outbound data), the following apply:

- Turning off the G30 clears any buffered data.
- Removing power from the G30 clears any buffered data.
- Whenever the terminal drops the PPP connection with the G30, via LCP terminate, the buffered data is cleared.
- Whenever the G30 drops the PPP connection with the terminal, with LCP terminate, the buffered data is cleared. LCP termination triggers the termination of the data in the G30 buffer.
- Whenever the G30 drops the PPP connection with the terminal, without an LCP terminate, the buffered data is cleared. Dropping the DTR also clears the buffer.
- When the network sends a deactivation message or a detached message, the G30 buffer is cleared.
- When the G30 transfers data in the uplink and GPRS coverage is lost, the data may flow-off. If the mobile has lost coverage and is unable to send the packets from the terminal to the network, the buffers will continue to store the packets until the buffers are full. The terminal will then be flowed off and the packets will be stored until they can be sent to the GPRS network.
- The amount of time that takes before the user is notified is specified in the T3312 timer that is located in the

mobile side. The default delay time of T3312 is 54 minutes, as per the GSM 0408 specification. After 54 minutes, the G30 deactivates the PDP session.

5.7. Sleep Mode

Note: The notation of TXD and RXD are from the perspective of the terminal unless otherwise specified.

The terminal should activate Sleep mode by sending ATS24=n (n - number of seconds). To disable Sleep mode, send ATS24=0.

Example of G30 Entering Sleep Mode
Terminal-TX: ATS24=n
Terminal-TX: ATxxx
Terminal-Wakeup-In=Inactive //n seconds passed since last command (and other conditions met)
G30-CTS=Inactive //G30 enters Sleep mode
Example of Terminal Wake G30 Sleep Mode
Terminal-Wakeup-In=Active
G30-CTS=Active //G30 exits Sleep mode
Terminal-TX: ATxxx //30 mseconds passed since Terminal-Wakeup-In became active
Example of G30 Wake Terminal Up
G30-CTS=Active //G30 internal event occurred. Incoming call is pending
//G30 exits Sleep mode
G30-Wakeup-Out=Active
G30-TX: RING //T mseconds passed since Terminal-Wakeup-Out became active (T is defined by ATS102.)
The figure below shows a Sleep mode example when S24 > 0.

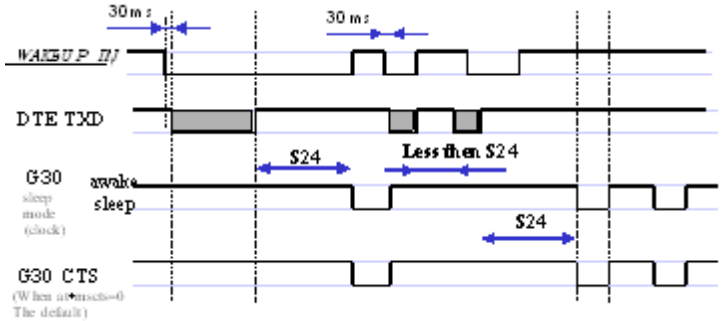

Figure 5-10: Sleep Mode when S24 > 0

5.8. TCP/IP

5.8.1. TCP Data Transfer Example

AT+MIPCALL=1,"orange","test","test"
OK
+MIPCALL: 172.17.242.86


```
AT+MIPOPEN=1,1222,"123.245.213.012",1234,0    //Opening socket 1 using TCP protocol, from port 1222,
targeting 123.245.213.012 port 1234
OK
+MIPOPEN: 1,1
AT+MIPOPEN?      //Terminal checking the status of socket to be opened (socket 1 opened OK)
+MIPOPEN:  2 3 4
+MIPSETS=1,340    //Asking the G30 to accumulate 340 bytes on socket 1 prior to sending
+MIPSETS: 0
OK
AT+MIPSETS?
+MIPSETS: 1 340
OK
AT+MIPSEND=1,"444444"     //Sent coded "DDD" string
+MIPSEND: 1,1497               //Free storage in the accumulating buffer
OK
```

Note: This step can be repeated several times until the buffer is full or until the amount of data reaches 340 bytes and data pushed into the stack.

```
AT+MIPSEND?      //Checking the size remaining (optional)
+MIPSEND: 1 1497
OK
+MIPPUSH=1        //Terminal asks G30 to flush the buffer in socket 1
+MIPPUSH:  0
+MIPCLOSE=1       //Terminal closes the socket
+MIPCLOSE: 1
OK
+MIPCALL=0        //Terminal hangs up the link
OK
```

5.8.2. TCP Raw Data Transfer Example (Online Data Mode)

```
// create a wireless link:
AT+MIPCALL=1,"internetg"
OK

+MIPCALL: 172.17.242.86
// open a socket in Online Data Mode:
AT+MIPODM=1,1204,"123.245.213.12",1205,0
OK

+MIPODM: 1,1

// send a data from terminal to G30 via RS232 communication port:
GPRS is the new packet-oriented data service for GSM. Soon it will be possible
to take advantage of the features provided by GPRS for Internet Access like fast connection set-up, volume based
charging etc…

// switch G30 to pseudo-command mode:
+++
OK

// check socket status
AT+MIPODM=?
+MIPODM 1,1

OK
// receive incoming from Network data indication (18 bytes of data comes):
+MIPDATA 1,18
// restore Online Data Mode and receive incoming from Network 18 bytes of data:
ATO
OK
CONNECT
abcdefghijklmnopqr
// switch G30 to pseudo-command mode:
```


```
+++
OK
// close the socket:
AT+MIPLOSE=1
+MIPCLOSE: 1
OK
// close the link:
AT+MIPCALL=0
+MIPCALL=0
NO CARRIER
OK
```

5.8.3. Multi-point Data Transfer Example

```
AT+MIPCALL=1,"orange","test","test"
OK
+MIPCALL: 172.17.242.86
AT+MIPOPEN=1,1001,"172.17.238.44",1001,0
OK
+MIPOPEN: 1,1
AT+MIPOPEN=2,1111,"172.17.238.44",1111,0
OK
+MIPOPEN: 2,1
+MIPSETS=1,200    //Asking the G30 to accumulate 200 bytes on socket 1 prior to sending
+MIPSETS: 0
OK
+MIPSETS=2,400    //Asking the G30 to accumulate 400 bytes on socket 2 prior to sending
+MIPSETS: 0
OK
+MIPSEND=1,"444444"
+MIPSEND:1,1497
OK
+MIPSEND=2,"DD"              //Passing data to the G30 socket 2
+MIPSEND:2,1499
OK
+MIPPUSH=1          //Terminal asks the G30 to flush the buffer in sockets 1 and 2
+MIPPUSH:0
+MIPPUSH=2
+MIPPUSH:0
+MIPCLOSE=1         //Terminal closes sockets 1 and 2
+MIPCLOSE:1
OK
+MIPCLOSE=2
+MIPCLOSE:2
OK
+MIPCALL=0          //Terminal hangs up the link
OK
+MIPSETS=1,120    //Asking the G30 to accumulate 120 bytes on socket 1 prior to sending
+MIPSETS: 0
OK
+MIPSEND=1,"444444"          //Passing 3 bytes of data to the G30 socket 1
```

Note: Size remaining in socket 1 buffer is 1497 bytes.

```
+MIPSEND:1,1497
+MIPPUSH=1          //At this point, the terminal can decide on flushing the remainder to the stack
```

5.8.4. Error in Reopening a Valid Socket

```
AT+MIPCALL=1,"orange","test","test"
OK
+MIPCALL:123.145.167.230
+MIPOPEN=1,1222,"123.245.213.012",1234,0        //Opening socket 1 using TCP protocol, from port 1222, targeting
123.245.213.012 port 1234
```


```
OK
+MIPOPEN:1,1
+MIPOPEN?          //Terminal checking the status of socket to be ready
+MIPOPEN: 2 3 4
MIPOPEN=1,12,123.245.213.012,234,0   //Terminal tries to reopen socket 1
ERROR
```

5.9. Audio

Scenarios for Setting Up Handset Mode or Handsfree Mode

Handset Mode

```
AT+MAPATH=1,1  //Set the input path through the microphone
AT+MAPATH=2,1,3          //Set voice and feedback tones through the speaker
AT+MAPATH=2,2,4          //Set alerts to go through the headset speaker
```

5.9.1.1. Handsfree Mode

```
AT+MAPATH=1,1  //Set the input path through the microphone
AT+MAPATH=2,1,7          //Set all tones through the speaker
```

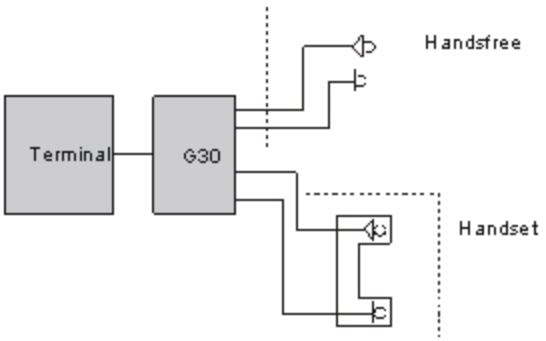

Figure 5-11: Handset or Handsfree Setup

6. Tools

6.1. Tools Overview

This chapter describes the PC flashing tools provided by the application. PC flashing tool is a PC-based software application that enables users to reprogram G30 modules through an RS232 interface.

Note: When using a PC with maximum UART COMM port speed of 115200 baud rate, A USB to UART converter cable may be used to speed up communication and reduce programming time of the G30, up to a speed of 230400 baud rate.

6.2. PC Driver

6.2.1. Overview

The G30 can be used as a PC external modem for performing GPRS packet data connections. The network connection application is recommended for GPRS packet data connections.

7. Appendix A: Reference Tables

This appendix contains the following sections:

- AT Commands Alphabetical Summary, below
- Character Set Table CS1: (GSM -> UCS-2)
- Character Set Table CS6: (UCS-2 Full Table)
- Character Set Table CS7: (IRA table)

Note: Character Set Table CS6: (UCS-2) is provided on CD due to its size.

7.1. AT Commands Alphabetical Summary

The following table contains an alphabetical list of all the G30 AT commands.

Table 7-1: AT Commands (Alphabetical)

AT Command	Description	Page
\Q	This command controls the operation of local flow control between DTE and DCE used when data are sent or received.	on page 4-238
&C	This command determines how the state of the DCD line relates to the detection of the received line signal from the distant end.	on page 4-228
&D	This command determines how the G30 responds when the DTR (Data Terminal Ready) status is changed from ON to OFF during the online data state.	on page 4-230
&F	This command restores the factory default configuration profile.	on page 4-319
&K	This command configures the RTS/CTS flow control.	on page 4-227
&V	This command displays the current active configuration and stored user profiles.	on page 4-347
&W	This command stores the user profile.	on page 4-348
&Y	This command displays the default user profile.	on page 4-351
+CACM	This command resets the Advice of Charge accumulated call meter value in the SIM file, EFACM.	on page 4-112
+CALM	This command handles the selection of the G30's alert sound mode.	on page 4-275

+CAMM	This command sets the Advice of Charge accumulated call meter maximum value in the SIM file, EFACMmax.	on page 4-113
+CAOC	This command displays information about the cost of calls.	on page 4-109
+CBAND	This command allows switching from automatic band selection to selection of one or more (up to four) bands.	on page 4-318
+CBAUD	This command sets the baud rate.	on page 4-224
+CBC	This command queries the battery charger connection.	on page 4-223
+CBM	The +CBM unsolicited response is sent to the TE upon receipt of a new cell broadcast message if +CNMI parameter <bm> is set to 2.	on page 4-157
+CBMI	he +CBMI unsolicited response is sent to the TE upon receipt of a new S Cell Broadcast messages.	on page 4-158
+CBST	This command handles the selection of the bearer service and the connection element to be used when data calls are originated.	on page 4-95
+CCFC	This command controls the call-forwarding supplementary service.	on page 4-90
+CCID	This command returns the SIM card identification number.	on page 4-346
+CCLK	This command reads/sets the G30's current date and time settings.	on page 4-131
+CCWA	This command controls the Call Waiting supplementary service, including settings and querying of the network by the G30.	on page 4-85
+CCWE	This command allows the sending of an unsolicited report when enabled.	on page 4-117
+CDS	The +CDS unsolicited response is sent to the TE upon receipt of a new mobile-terminated SM if the +CNMI parameter <ds> is set to '1'.	on page 4-160
+CDSI	The +CDSI unsolicited response is sent to the TE upon receipt of a new SMS-STATUS-REPORT SM, if the +CNMI parameter <ds> is set to '2'.	on page 4-159
+CEER	This command returns an extended error report containing one or more lines of information text, determined by the manufacturer, providing the reasons for the call-clearing errors.	on page 4-338

+CFSN	This command displays the factory serial number.	on page 4-71
+CFUN	This command shuts down the phone functionality of smart phones and PDAs with phone capabilities.	on page 4-233
+CGACT	This command activates/deactivates the PDP Context.	on page 4-373
+CGATT	This command attaches the G30 to the GPRS network.	on page 4-368
+CGCLASS	This command sets the GPRS mobile station class.	on page 4-360
+CGCMOD	The execution command is used to modify the specified PDP context(s) with respect to QoS profiles and TFTs. After the command has completed, the MT returns to V.250 online data state.	on page 4-376
+CGDCONT	This command specifies the PDP (Packet Data Protocol) context.	on page 4-361
+CGMI	This command displays manufacturer identification.	on page 4-67
+CGMM	This command displays the model identification.	on page 4-67
+CGMR	This command displays the revision identification.	on page 4-68
+CGPADDR	This command reads the allocated PDP addresses for the specified context identifiers.	on page 4-375
+CGPRS	This command indicates whether there is GPRS coverage.	on page 4-372
+CGQMIN	This command sets the minimum acceptable quality of service profile.	on page 4-364
+CGQREQ	This command displays the requested quality of service profile.	on page 4-366
+CGREG	This command enables/disables the GPRS network status registration unsolicited result code.	on page 4-196
+CGSMS	This command handles the selection of the service or service preference used by the G30 to send mobile-originated SMS messages.	on page 4-183
+CGSN	This command displays the product serial number identification.	on page 4-69

+CHLD	This command controls the Call Hold and Multiparty Conversation supplementary services.	on page 4-88
+CHUP	This command causes the G30 to hang up the current GSM call.	on page 4-97
+CIEV	An unsolicited indication regarding various phone indications that is sent to the DTE when the <ind> parameter of the +CMER command is set to 1.	on page 4-356
+CIMI	This command displays the International Mobile Subscriber Identity number.	on page 4-71
+CIND	This command is used to query the status of various ME indicators.	on page 4-355
+CLAC	This command displays a list of all the AT commands supported by the G30.	on page 4-73
+CLAN	This command handles the selection of language in the ME.	on page 4-353
+CLCC	This command displays a list of all current G30 calls and their statuses, and also enables/disables the unsolicited indication of the call list.	on page 4-103
+CLCK	This command locks, unlocks or interrogates a G30 or a network facility <fac>.	on page 4-305
+CLIP	This command controls the Calling Line Identity (CLI) presentation to the terminal when there is an incoming call.	on page 4-83
+CLIR	This command enables/disables the sending of caller ID information to the called party, for an outgoing call.	on page 4-93
+CLVL	This command sets the volume of the internal loudspeaker (which also affects the key feedback tone) of the G30.	on page 4-262
+CMEE	This command enables/disables the use of result code +CME ERROR: <err> as an indication of an error relating to the functionality of the G30.	on page 4-332
+CMER	This command enables display changes and indicator state changes.	on page 4-351
+CMGD	This command deletes messages from the G30 memory.	on page 4-182
+CMGF	This command handles the selection of message formats.	on page 4-139

+CMGL	This command displays a list of SMS messages stored in the G30 memory.	on page 4-161
+CMGR	This command reads selected SMS messages from the G30 memory.	on page 4-166
+CMGS	This command sends an SM from the G30 to the network.	on page 4-183
+CMGW	This command writes and saves messages in the G30 memory.	on page 4-176
+CMSS	This command selects and sends pre-stored messages from the message storage.	on page 4-175
+CMT	The +CMT unsolicited response is sent to the TE upon receipt of a new SMS-DELIVER SM if the +CNMI parameter <mt> is set to 2.	on page 4-155
+CMTI	This unsolicited message, including the SMS message index, is sent upon the arrival of an SMS message.	on page 4-154
+CMUT	This command mutes/unmutes the currently active microphone path by overriding the current mute state.	on page 4-263
+CMUX	This command is used to enable/disable the GSM MUX multiplexing protocol stack.	on page 4-486
+CNMA	This command acknowledges the receipt of a +CMT response.	on page 4-152
+CNMI	This command sends an unsolicited indication when a new SMS message is received by the G30.	on page 4-149
+CNUM	This command displays up to five strings of text information that identify the G30.	on page 4-73
+COLP	This command refers to the GSM supplementary service COLP, Connected Line Identification Presentation, which enables a calling subscriber to get the connected line identity (COL) of the called party after setting up a mobile-originated call.	on page 4-127
+COPS	This command enables accessing the network registration information, as well as select and register the GSM network operator.	on page 4-199
+CPAS	This command displays the current activity status of the G30, for example, call in progress, or ringing.	on page 4-102
+CPIN	This command is only relevant for phones that use SIM cards. It unlocks the SIM card when the proper SIM PIN is provided, and unblocks the SIM card when the proper SIM PUK is provided.	on page 4-297

+CPLS	This command is used to select PLMN list in the SIM/USIM.	on page 4-207
+CPMS	This command handles the selection of the preferred storage area for messages.	on page 4-138
+CPOL	This command is used to edit the list of preferred operators located in the SIM card.	on page 4-203
+CPUC	This command sets the parameters of the Advice of Charge-related price per unit and currency table found in the SIM file, EFPUCT.	on page 4-114
+CPWD	This command sets a new password for the facility lock.	on page 4-302
+CR	This command controls whether or not the extended format of an outgoing call is displayed or not.	on page 4-116
+CRC	This command controls whether to present the extended format of the incoming call indication.	on page 4-82
+CREG	This command enables/disables the network status registration unsolicited result code.	on page 4-196
+CRING	This unsolicited event indicates the type of incoming call.	on page 4-82
+CRLP	This command displays the Radio Link Protocol parameters.	on page 4-192
+CRSL	This command handles the selection of the incoming call ringer and alert tone (SMS) sound level on the alert speaker of the G30.	on page 4-261
+CRSM	This command provides limited access to the Elementary Files on the SIM.	on page 4-341
+CRTT	This command plays one cycle of a ring tone, stops the cycle in the middle, and sets the ring tone to be used.	on page 4-278
+CSCA	This command handles the selection of the SCA and the TOSCA.	on page 4-140
+CSCB	This command handles the selection of cell broadcast message types and data coding schemes received by the G30.	on page 4-185
+CSCS	This command selects the G30 character set.	on page 4-69
+CSDH	This command shows the Text Mode parameters.	on page 4-146

+CSIM	This command allows a direct control of the SIM by an distant application on the TE.	on page 4-308
+CSMP	This command sets the Text Module parameters.	on page 4-144
+CSMS	This command handles the selection of the SMS message service type.	on page 4-135
+CSQ	This command displays the signal strength received by the G30.	on page 4-192
+CSSN	This command handles the enabling and disabling of supplementary service-related, network-initiated, notifications.	on page 4-118
+CSVM	This command handles the selection of the number to the voice mail server.	on page 4-129
+CTZR	This command enables and disables the time zone change event reporting.	on page 4-133
+CTZU	This command enables and disables automatic time zone update via NITZ.	on page 4-133
+CUSD	This command allows control of Unstructured Supplementary Service Data (USSD), according to GSM 02.90.	on page 4-121
+FMI	This command displays manufacturer identification.	on page 4-67
+FMM	This command displays the model identification.	on page 4-67
+FMR	This command displays the revision identification.	on page 4-68
+FTPCDUP	This command causes the G30 to request the remote FTP server to change the working directory up.	on page 4-469
+FTPCLOSE	This command causes G30 to close FTP connection.	on page 4-462
+FTPCWD	This command causes the G30 to request the remote FTP server to change the working directory.	on page 4-464
+FTPDEL	This command causes the G30 to request the remote FTP server to delete a file.	on page 4-469
+FTPINFO	This command causes the G30 to enable or disable FTP unsolicited indication to the user.	on page 4-462

+FTPLIST	This command causes the G30 to request the remote FTP server to send a list.	on page 4-472
+FTPMKD	This command causes the G30 to request the remote FTP server to create a new directory.	on page 4-465
+FTPNOOP	This command causes the G30 to request the remote FTP server to do nothing.	on page 4-477
+FTPOPEN	This command causes G30 to open a FTP connection with a remote FTP server.	on page 4-460
+FTPPWD	This command causes G30 to request the remote FTP server to return the working directory name.	on page 4-468
+FTPREN	This command causes the G30 to request the remote FTP server to rename a file.	on page 4-470
+FTPRETR	This command causes the G30 to request the remote FTP server to send a file to the G30.	on page 4-479
+FTPRMD	This command causes the G30 to request the remote FTP server to remove a directory.	on page 4-466
+FTPSTAT	This command causes the G30 to request the remote FTP server to send status.	on page 4-473
+FTPSTOR	This command causes the G30 to request the remote FTP server to store a file.	on page 4-478
+FTPSYST	This command causes the G30 to request the remote FTP server to send the operating system type.	on page 4-476
+GCAP	This command displays the overall capabilities of the G30.	on page 4-227
+GMI	This command displays manufacturer identification.	on page 4-67
+GMM	This command displays the model identification.	on page 4-67
+GMR	This command displays the revision identification.	on page 4-68
+GSN	This command requests the product serial number identification.	on page 4-69

+ICF	This command determines the local serial port start/stop (asynchronous) character framing used by the DCE when accepting DTE commands and transmitting information text and result codes.	on page 4-234
+IFC	This command controls the operation of the local flow control between the terminal and the G30.	on page 4-236
+IPR	This command is responsible for setting and saving the request baud rate.	on page 4-225
+M2M	This command is used to enable/disable the M2M feature.	on page 4-491
+MADCM	This command intends to query and monitor the G30 three ADC's values.	on page 4-248
+MADIGITAL	This command switches between analog and digital audio modes.	on page 4-273
+MAFEAT	This command controls the algorithm features: Sidetone and Hands free (echo cancel, noise suppression, and agc).	on page 4-272
+MAHF	This command controls the algorithm features: Hands free (echo cancel, noise suppression, and agc).	on page 4-291
+MAHFD	This command controls the algorithm features: Hands free Default (echo cancel, noise suppression, and agc).	on page 4-290
+MAI2SY	This command switches between PCM and I2S audio modes.	on page 4-294
+MAMUT	This command controls the muting/unmuting of all input paths (MIC, HDST_MIC, DIGITAL_RX).	on page 4-271
+MAPATH	This command sets/requests the active input accessory, and the output accessory for each feature.	on page 4-266
+MATONE	This command starts/stops the tone play.	on page 4-283
+MAVOL	This command determines a volume setting for a particular feature in a particular accessory.	on page 4-269
+MCELL	This command displays information about the Cellular Network.	on page 4-208
+MCI	This command returns neighbor cell information.	on page 4-219

+MCST	This command displays the current state of the call processing, and also enables/disables the unsolicited indication of any change in the call processing state.	on page 4-106
+MCWAKE	This command displays reports on the status of the GPRS/GSM coverage.	on page 4-231
+MDBF	This command change the digital audio filters parameters for a specific downlink path.	on page 4-288
+MDC	This command enables you to select the desired messages to be displayed upon connection of a voice call with a remote party.	on page 4-98
+MDSI	This command enables unsolicited reporting of indications of SIM deactivation and invalidation.	on page 4-357
+MFOTACNFG	This command enables to set the FOTA session mode as Automatic/Non-Automatic.	on page 4-492
+MFOTAIND	When set, the module will send all the indications mentioned in Table 4-250: +MFOTAIND Parameters	on page 4-495
+MFOTAINSTL	If update package was downloaded prior to execution of this command then the module will start update installation, otherwise the module will reply with CME error: "operation not allowed".	on page 4-494
+MFOTAWSCFG	This command specify a particular PDP context definition to be used when web session need to be initiated.	on page 4-493
+MGAUTH	This command enables Authentication Protocol setting.	on page 4-218
+MGGIND	This command configures the service indicator on pin #16 in LGA or 49 of the 70 pin connector to be GPRS or GSM.	on page 4-232
+MHUP	This command Hung UP call(s) and report specific cause to the NW.	on page 4-99
+MIOC	This command defines the G30 8 GPIO pins data value.	on page 4-241
+MIOD	This command defines the G30 8 GPIO pins configuration.	on page 4-243
+MIPCALL	This command creates a wireless PPP connection with the GGSN or CSD service provider and returns a valid dynamic IP for the G30.	on page 4-420
+MIPCLOSE	This command causes the G30 module to free the socket accumulating buffer and disconnect the G30 from a remote side.	on page 4-427

+MIPCONF	This command allows to configure TCP stack parameters, such as retransmissions number, upper and bottom limits of retransmission timeout, close delay.	on page 4-440
+MIPCSC	This AT command is used to configure the SSL feature behavior in case of non - fatal alerts.	on page 4-452
+MIPDATA	This unsolicited event is sent to the terminal indicating a data comes from Network when G30 is in pseudo-command mode.	on page 4-439
+MIPFLUSH	This command causes the G30 module to flush (delete) data accumulated in its accumulating buffers.	on page 4-435
+MIPODM	This command causes the G30 to initialize a new socket in Online Data Mode and open a connection with a remote side.	on page 4-424
+MIPOPEN	This command causes the G30 module to initialize a new socket and open a connection with a remote side.	on page 4-422
+MIPPUSH	This command causes the G30 module to push the data accumulated in its accumulating buffers into the protocol stack.	on page 4-433
+MIPRTCP	This unsolicited event is sent to the terminal when data is received from the TCP protocol stack.	on page 4-437
+MIPRTCPGET	This command gets the oldest data received from TCP stack and was stored in the internal buffer in G30.	on page 4-455
+MIPRUDP	This unsolicited event is sent to the terminal when data is received from the UDP protocol stack.	on page 4-436
+MIPRUDPGET	This command gets the oldest data received from UDP stack and was stored in the internal buffer in G30.	on page 4-457
+MIPSEND	This command causes the G30 to transmit the data that the terminal provides, using an existing protocol stack.	on page 4-431
+MIPSETS	This command causes the G30 to set a watermark in the accumulating buffer. When the watermark is reached, data is pushed from the accumulating buffer into the protocol stack.	on page 4-429
+MIPSSL	This unsolicited event is sent to the terminal indicating an errors, warnings or alerts that occurred during SSL connection.	on page 4-454
+MIPSTAT	This unsolicited event is sent to the terminal indicating a change in link status.	on page 4-438

+MIPXOFF	This unsolicited event is sent to the terminal to stop sending data.	on page 4-439
+MIPXON	This unsolicited event is sent to the terminal when the G30 has free memory in the accumulating buffer.	on page 4-440
+MJDC	This command enables/disables the Jamming Detection feature.	on page 4-221
+MMAD	This command reads and monitors digital value from a specified ADC.	on page 4-247
+MMGL	This command displays a list of SMS messages stored in the G30 memory.	on page 4-161
+MMGR	This command reads selected SMS messages from the G30 memory.	on page 4-166
+MMICG	This command handles the selection of microphone gain values.	on page 4-276
+MMICV	This command handles the selection of microphone voltage values of 1st channel MIC port.	on page 4-277
+MPCMC	This command defines whether the PCM clock is generated continuously or not, when the module is in digital audio mode.	on page 4-252
+MPING	This command allows to verify IP connectivity to another remote machine (computer) by sending one or more Internet Control Message Protocol (ICMP) Echo Request messages.	on page 4-441
+MPINGSTAT	This is the unsolicited response that the G30 sends to the terminal to inform of ping execution status update and provides summary statistics of ping request when ping request execution is completed.	on page 4-445
+MRICS	This command allows configuring the behavior of RI line in a case of SMS arrival.	on page 4-187
+MRST	This command enables customer software to perform a power off to the G30 unit.	on page 4-240
+MSCTS	This command defines the behavior of the CTS line when the G30 is in Sleep mode.	on page 4-331
+MSDNS	This command set/read DNS (Domain Name Server) IP address (primary/secondary) for each socket.	on page 4-449
+MSMPD	This command enables/disables polling for SIM insertion event feature.	on page 4-256

+MSTART	This command enables/disables the two types of reports during the power on process.	on page 4-321
+MTRACE	This command switches the trace tool On/Off.	on page 4-321
+MTSM	This command measures the current temperature sensor value in Celsius degrees.	on page 4-253
+MUBF	This command change the digital audio filters parameters for a specific uplink path.	on page 4-286
+MTTY	This command is used to enable/disable the TTY (Tele Typewriter) support in the G30.	on page 4-100
+STKCC	The SIMAP call control status is displayed using the unsolicited result code +STKCC.	on page 4-385
+STKCNF	The SIMAP proactive session status is displayed using the unsolicited result code +STKCNF.	on page 4-386
+STKENV	This action command allows sending a STK envelope command to the MS.	on page 4-383
+STKPRO	This command displays the list of supported proactive commands.	on page 4-377
+STKPROF	This command allows reading and changing the terminal profile data.	on page 4-384
+STKTR	This action command allows entering the response to a STK proactive command which was displayed by the unsolicited result code +STKPRO.	on page 4-381
+TPIN	This command queries the number of remaining SIM PIN/PUK entering attempts.	on page 4-301
+VTD	This command handles the selection of tone duration.	on page 4-281
+VTS	This command transmits a string of DTMF tones when a voice call is active.	on page 4-282
A	This command answers an incoming call, placing the G30 into the appropriate mode, as indicated by the RING message.	on page 4-81
A/	This command repeats the last command entered on the terminal.	on page 4-296
AT	This command checks the AT communication and only returns OK.	on page 4-296

D	This command places a voice call on the current network, when issued from an accessory device.	on page 4-77
D*99	This command enables the ME to perform the actions necessary for establishing communication between the terminal and the external PDN.	on page 4-370
DL	This command places a voice call to the last number dialed.	on page 4-78
E	This command defines whether the G30 echoes the characters received from the user, (whether input characters are echoed to output).	on page 4-312
H	This command hangs up, or terminates a particular call.	on page 4-79
I	This command displays various G30 information items.	on page 4-72
O	This command returns a phone to the Online Data mode and issues a CONNECT or CONNECT <text> result code.	on page 4-96
Q	This command determines whether to output/suppress the result codes.	on page 4-310
READY	This unsolicited notification indicates UART is ready.	on page 4-240
RING	This unsolicited event is received when an incoming call (voice, data or fax) is indicated by the cellular network.	on page 4-82
S100	ATS100 is a terminal minimum time limit for entering sleep mode.	on page 4-329
S102	This command sets the value of the delay before sending data to the terminal.	on page 4-328
S24	This command activates/disables the Sleep mode.	on page 4-326
S94	This S-parameter represents the Boolean status, On/Off, of the sidetone feature.	on page 4-264
S96	This S-parameter represents the Boolean status, On/Off, of the echo cancelling feature in the handsfree.	on page 4-265
S97	This command indicates whether an antenna is physically connected to the G30 RF connector.	on page 4-239

Sn	This command reads/writes values of the S-registers, and includes registers 1-49, 94, 96 (Audio) and 102 (Sleep mode).	on page 4-314
V	This command determines the response format of the data adapter and the contents of the header and trailer transmitted with the result codes and information responses.	on page 4-309
X	This command defines the data adaptor response set, and the CONNECT result code format.	on page 4-313
Z	This command resets the default configuration.	on page 4-320

7.2. Character Set Table CS1: (GSM -> UCS-2)

The following table shows the conversion between the GSM and UCS-2 character sets.

Symbol	GSM	(GSM23.038)
UCS-2	(ISO 10646-1)	@
0x00	0x0040	£
0x01	0x00A3	$
0x02	0x0024	¥
0x03	0x00A5	è
0x04	0x00E8	é
0x05	0x00E9	ù
0x06	0x00F9	ì
0x07	0x00EC	ò
0x08	0x00F2	Ç
0x09	0x00C7	LF
0x0A	0x000A	Ø

0x0B	0x00D8	ø
0x0C	0x00F8	CR
0x0D	0x000D	Å
0x0E	0x00C5	å
0x0F	0x00E5	Ä
0x10	0x0394	_
0x11	0x005F	Ö
0x12	0x03A6	Ã
0x13	0x0393	Ë
0x14	0x039B	Ù
0x15	0x03A9	Đ
0x16	0x03A0	Ø
0x17	0x03A8	Ó
0x18	0x03A3	È
0x19	0x0398	Î
0x1A	0x039E	1)
0x1B	0x258A	Æ
0x1C	0x00C6	æ
0x1D	0x00E6	ß
0x1E	0x03B2	É

0x1F	0x00C9	SP
0x20	0x0020	!
0x21	0x0021	"
0x22	0x0022	#
0x23	0x0023	¤
0x24	0x00A4	%
0x25	0x0025	&
0x26	0x0026	'
0x27	0x0027	(
0x28	0x0028	)
0x29	0x0029	*
0x2A	0x002A	+
0x2B	0x002B	,
0x2C	0x002C	-
0x2D	0x002D	.
0x2E	0x002E	/
0x2F	0x002F	0
0x30	0x0030	1
0x31	0x0031	2
0x32	0x0032	3

0x33	0x0033	4
0x34	0x0034	5
0x35	0x0035	6
0x36	0x0036	7
0x37	0x0037	8
0x38	0x0038	9
0x39	0x0039	:
0x3A	0x003A	;
0x3B	0x003B	<
0x3C	0x003C	=
0x3D	0x003D	>
0x3E	0x003E	?
0x3F	0x003F	¡
0x40	0x00A1	A
0x41	0x0041	B
0x42	0x0042	C
0x43	0x0043	D
0x44	0x0044	E
0x45	0x0045	F
0x46	0x0046	G

0x47	0x0047	H
0x48	0x0048	I
0x49	0x0049	J
0x4A	0x004A	K
0x4B	0x004B	L
0x4C	0x004C	M
0x4D	0x004D	N
0x4E	0x004E	O
0x4F	0x004F	P
0x50	0x0050	Q
0x51	0x0051	R
0x52	0x0052	S
0x53	0x0053	T
0x54	0x0054	U
0x55	0x0055	V
0x56	0x0056	W
0x57	0x0057	X
0x58	0x0058	Y
0x59	0x0059	Z
0x5A	0x005A	Ä

0x5B	0x00C4	Ö
0x5C	0x00D6	Ñ
0x5D	0x00D1	Ü
0x5E	0x00DC	§
0x5F	0x00A7	¿
0x60	0x00BF	a
0x61	0x0061	b
0x62	0x0062	c
0x63	0x0063	d
0x64	0x0064	e
0x65	0x0065	f
0x66	0x0066	g
0x67	0x0067	h
0x68	0x0068	i
0x69	0x0069	j
0x6A	0x006A	k
0x6B	0x006B	l
0x6C	0x006C	m
0x6D	0x006D	n
0x6E	0x006E	o

0x6F	0x006F	p
0x70	0x0070	q
0x71	0x0071	r
0x72	0x0072	s
0x73	0x0073	t
0x74	0x0074	u
0x75	0x0075	v
0x76	0x0076	w
0x77	0x0077	x
0x78	0x0078	y
0x79	0x0079	z
0x7A	0x007A	ä
0x7B	0x00E4	ö
0x7C	0x00F6	ñ
0x7D	0x00F1	ü
0x7E	0x00FC	à
0x7F	0x00E0	

7.3. Character Set Table CS6: (UCS-2 Full table)

Character Set Table CS6: (UCS-2) is provided on CD due to its size.

7.4. Character Set Table CS7: (IRA table)

The following table shows the conversion for the IRA character set.

Decimal	Octal	Hex	Binary	Value	Description
000	000	000	00000000	NUL	(Null char.)
001	001	001	00000001	SOH	(Start of Header)
002	002	002	00000010	STX	(Start of Text)
003	003	003	00000011	ETX	(End of Text)
004	004	004	00000100	EOT	(End of Transmission)
005	005	005	00000101	ENQ	(Enquiry)
006	006	006	00000110	ACK	(Acknowledgment)
007	007	007	00000111	BEL	(Bell)
008	010	008	00001000	BS	(Backspace)
009	011	009	00001001	HT	(Horizontal Tab)
010	012	00A	00001010	LF	(Line Feed)
011	013	00B	00001011	VT	(Vertical Tab)
012	014	00C	00001100	FF	(Form Feed)
013	015	00D	00001101	CR	(Carriage Return)

014	016	00E	00001110	SO	(Shift Out)
015	017	00F	00001111	SI	(Shift In)
016	020	010	00010000	DLE	(Data Link Escape)
017	021	011	00010001	DC1	(XON) (Device Control 1)
018	022	012	00010010	DC2	(Device Control 2)
019	023	013	00010011	DC3	(XOFF)(Device Control 3)
020	024	014	00010100	DC4	(Device Control 4)
021	025	015	00010101	NAK	(Negative Acknowledgement)
022	026	016	00010110	SYN	(Synchronous Idle)
023	027	017	00010111	ETB	(End of Trans. Block)
024	030	018	00011000	CAN	(Cancel)
025	031	019	00011001	EM	(End of Medium)
026	032	01A	00011010	SUB	(Substitute)
027	033	01B	00011011	ESC	(Escape)
028	034	01C	00011100	FS	(File Separator)
029	035	01D	00011101	GS	(Group Separator)

030	036	01E	00011110	RS	(Request to Send)(Record Separator)
031	037	01F	00011111	US	(Unit Separator)
032	040	020	00100000	SP	(Space)
033	041	021	00100001	!	(exclamation mark)
034	042	022	00100010	"	(double quote)
035	043	023	00100011	#	(number sign)
036	044	024	00100100	$	(dollar sign)
037	045	025	00100101	%	(percent)
038	046	026	00100110	&	(ampersand)
039	047	027	00100111	'	(single quote)
040	050	028	00101000	(	(left/opening parenthesis)
041	051	029	00101001	)	(right/closing parenthesis)
042	052	02A	00101010	*	(asterisk)
043	053	02B	00101011	+	(plus)
044	054	02C	00101100	,	(single quote)
045	055	02D	00101101	-	(minus or dash)
046	056	02E	00101110	.	(dot)
047	057	02F	00101111	/	(forward slash)

048	060	030	00110000	0	
049	061	031	00110001	1	
050	062	032	00110010	2	
051	063	033	00110011	3	
052	064	034	00110100	4	
053	065	035	00110101	5	
054	066	036	00110110	6	
055	067	037	00110111	7	
056	070	038	00111000	8	
057	071	039	00111001	9	
058	072	03A	00111010	:	(colon)
059	073	03B	00111011	;	(semi-colon)
060	074	03C	00111100	<	(less than)
061	075	03D	00111101	=	(equal sign)
062	076	03E	00111110	>	(greater than)
063	077	03F	00111111	?	(question mark)
064	100	040	01000000	@	(AT symbol)
065	101	041	01000001	A	
066	102	042	01000010	B	
067	103	043	01000011	C	

068	104	044	01000100	D	
069	105	045	01000101	E	
070	106	046	01000110	F	
071	107	047	01000111	G	
072	110	048	01001000	H	
073	111	049	01001001	I	
074	112	04A	01001010	J	
075	113	04B	01001011	K	
076	114	04C	01001100	L	
077	115	04D	01001101	M	
078	116	04E	01001110	N	
079	117	04F	01001111	O	
080	120	050	01010000	P	
081	121	051	01010001	Q	
082	122	052	01010010	R	
083	123	053	01010011	S	
084	124	054	01010100	T	
085	125	055	01010101	U	
086	126	056	01010110	V	
087	127	057	01010111	W	

088	130	058	01011000	X	
089	131	059	01011001	Y	
090	132	05A	01011010	Z	
091	133	05B	01011011	[	(left/opening bracket)
092	134	05C	01011100	\	(back slash)
093	135	05D	01011101	]	(right/closing bracket)
094	136	05E	01011110	^	(caret/circumflex)
095	137	05F	01011111	_	(underscore)
096	140	060	01100000	`	
097	141	061	01100001	a	
098	142	062	01100010	b	
099	143	063	01100011	c	
100	144	064	01100100	d	
101	145	065	01100101	e	
102	146	066	01100110	f	
103	147	067	01100111	g	
104	150	068	01101000	h	
105	151	069	01101001	i	
106	152	06A	01101010	j	

107	153	06B	01101011	k	
108	154	06C	01101100	l	
109	155	06D	01101101	m	
110	156	06E	01101110	n	
111	157	06F	01101111	o	
112	160	070	01110000	p	
113	161	071	01110001	q	
114	162	072	01110010	r	
115	163	073	01110011	s	
116	164	074	01110100	t	
117	165	075	01110101	u	
118	166	076	01110110	v	
119	167	077	01110111	w	
120	170	078	01111000	x	
121	171	079	01111001	y	
122	172	07A	01111010	z	
123	173	07B	01111011	{	(left/opening brace)
124	174	07C	01111100	|	(vertical bar)
125	175	07D	01111101	}	(right/closing brace)

126	176	07E	01111110	~	(tilde)
127	177	07F	01111111	DEL	(delete)

8. Appendix B: MUX

This appendix contains the following sections:

- PREMUX State, below
- Mux-Init State, below
- MUX State
- Software Procedures Related to RS232 HW Lines

8.1. PREMUX State

8.1.1.1.1. Entry to State

- When the G30 powers up.

Exit from state:

- When the DTE sends the +CMUX command to the G30 to start the MUX stack and the G30 acknowledges with an OK response. (The MUX-Init state then begins.)

8.2. MUX-Init State

This state has two phases:

- The 1st phase is the very short period when the G30 is getting ready to communicate with the DTE over the MUX protocol.
- The 2nd phase is when the G30 is ready and is waiting for the DTE to begin using the MUX protocol by sending a special low-level byte sequence (SABM0 frame).

Entry to state:

- When the G30 receives the +CMUX command and returns a success response (OK).

Exit from state:

- If a timeout occurs due to the failure of the G30 to receive the SABM0 frame after a predefined interval. The G30 then returns to the PREMUX state. The interval is defined to 10 seconds.
- If the RS232 connection is closed, the G30 returns to the PREMUX state.
- After a SABM0 frame is received, the G30 moves on to the MUX state.

8.3. MUX State

Entry to state:

- When the G30 receives the SABM0 frame.

Exit from state:

- When the DTE requests the G30 to return to the PREMUX State.

8.4. Software Procedures Related to RS232 HW Lines

8.4.1. RI Hardware Line

- PREMUX state: There is no change to the current RI line behavior.
- MUX-Init state: The RI line becomes inactive.
- MUX state: There is no change to the current RI line behavior.

8.4.2. DCD Hardware Line

In MUX and MUX-Init states, the DCD is always inactive. This line is not used within the MUX.

8.4.3. DTR Hardware Line

The procedure upon DTR interrupt is dependent on the AT&D settings in PREMUX state (GRLC profile). In general, the DTR is always active.
If the PREMUX AT&D setting is 4 and the DTR is toggled while the G30 is in MUX or MUX-INIT state, the G30 will return to PREMUX state. Upon its return, the G30 will release any call (GPRS, CSD) except for a voice call.

Note: If the PREMUX AT&D setting was not 4, the G30 ignores the DTR without any operation. The AT&D4 will be supported in future releases.

8.4.4. G30 DTR Interrupt

When G30 changes its state from PREMUX to MUX-Init, the G30 will disable the DTR interrupt (since there is no need to use the DTR line) if its AT&D (of the GRLC profile) value is not 4.
When G30 changes its state to back to PREMUX, it re-enables its DTR interrupt.

8.4.5. DSR Hardware Line (Optional)

The DSR is always active in MUX state.

8.4.6. MUX UART Port Speed

Auto baud rate detection is disabled in the MUX. To set the UART baud rate, the G30 uses the <port speed> parameter in +CMUX command. If the parameter is absent, the MUX uses the same baud rate that was in PREMUX state.

8.4.7. Controlling the UART Port Speed Within MUX State

AT commands such as +CBAUD and +IPR change the virtual baud rate of an IDLC. The AT+CBAUD? or AT+IPR? commands display the virtual baud rate of the specific IDLC. The AT+CMUX? command returns the UART baud rate.

8.4.8. Basic Mode UART Software Flow Control

When the G30 enters MUX state or MUX-Init state and the requested mode is Basic, UART software flow control is disabled. If the AT&K command is set for software flow control, the G30 RS232 serial manager ignores the XON/XOFF characters. When the G30 returns to PREMUX state, it reads the GRS232CFG AT&K value and acts accordingly.

8.4.9. Basic Mode MUX Software Flow Control Per Channel

When G30 enters MUX state and the requested mode is Basic, Software Flow Control Per Channel is enabled.
When G30 MUX virtual channel is not able to receive data, it sends the appropriate MSC command (according to 3G TS 27.010 V3.3.0), that contains the number of virtual channel that not able to receive data. If terminal continues to send data to that virtual channel, G30

will buffer incoming data and deassert CTS (hardware flow control) when the buffer is full.
When G30 MUX virtual channel is ready and able to receive data, it sends the appropriate MSC command (according to 3G TS 27.010 V3.3.0), that contains the number of virtual channel that ready to receive data.
If the terminal is not able to receive data (typically because its receive buffer is almost full), it sends the appropriate MSC command (according to 3G TS 27.010 V3.3.0) with the number of virtual channel, that not able to receive data. In this case, G30 stops to send data at appropriate virtual channel. When the terminal is ready and able to receive data, it sends the appropriate MSC command to G30 (according to 3G TS 27.010 V3.3.0) with the number of virtual channel, to indicate this.

8.4.10. MUX Mode

The following table describes the basic mode in a non-ERM environment.

Table 8-1: MUX Mode

Feature	Basic Mode
Start flag	0xF9
Close flag	0xF9
Length field	Yes
Data transparency	No
Frame	UIH (or UI)
Processing cost	Low
Recovery of synchronization	Slow
SW flow control per channel	Yes

Note: The length is still required in the information field of the UIH frame.

8.4.11. MUX State Procedures

Valid channel indexes in MUX state are 0 to 4, where 0 is the index of the control channel and 1-4 are indexes of the information channels (IDLC).
The following table describes the basic procedures (Open/Close/Err) performed when the G30

is in MUX state.

Table B-2:

Procedure	Description
Unrecognized Frames/Invalid Frames	The G30 ignores unrecognized and invalid frames.
SABMi Reception – Channel Establishment	Upon receiving a SABMi frame (i = channel index), the G30 checks whether i is within the valid range and is not already established. It them tries to establish the new channel. If the G30 succeeds, it sends a UA frame. If it is not successful, it sends a DM frame.
DISCi Reception – Disconnect Channel	Upon receiving a DISCi frame (i = channel index), the G30 checks whether i is within the valid range and represents an open channel. If so, the G30 attempts to close the channel. If the G30 is successful, it sends a UA frame. If it is not successful, it sends a DM frame. Closing a channel hangs up any active CDSs. However, active voice calls are not hung up, even after the IDLC is closed.
DISC0 Reception – Close MUX	Upon receiving a DISC0 frame, the G30 checks for any open IDLCs. If the only open channel is the control channel, the G30 sends a UA frame to the DTE, returns to PREMUX state (command mode) and sends an OK to the DTE. If there are any open information channels, or if the G30 cannot return to PREMUX state, it sends a DM frame to the DTE. **Note:** After opening the MUX, it should remain open until the G30 is powered down. A close procedure is also supported on the MUX, which enables you to close the MUX, return to PREMUX, and then open the MUX again. Because of this basic concept, you should avoid programming DTE applications to open and close the G30 MUX frequently.
CLD Command – Close Down	Upon receiving a CLD frame, the G30 checks whether there are any open IDLC frames. If the only open channel is the control channel, the G30 sends a UA frame to the DTE, returns to PREMUX state (command mode) and sends an OK to the DTE. If there are any open information channels, or if the G30 cannot return to PREMUX state, it sends a DM frame to the DTE. **Note:** This option will be supported in future releases.
MSC Command	If "FC" bit in MSC command is set, G30 MUX stops to send data on a corresponding to a DLCI field virtual channel. Otherwise G30 MUX starts to send data on a corresponding to a DLCI field virtual channel. The G30 MUX replies to a terminal with received MSC command.

8.4.11.1. UIH Frames

Unnumbered information (UIH) frames contain only a Header checksum. There are two types of UIH frames:

- Data transfer frames destined to a specific IDLC channel. The G30 MUX distributes the data inside the UIH frame to the relevant IDLC.
- Control frames being sent between the two MUX control channels. Upon receiving a UIH frame, the G30 acknowledges by sending back the same frame to the DTE with the c/r bit changed.

8.4.11.2. Test UIH Control Frames

Upon receiving a Test frame, the G30 sends back a test frame response to the DTE. This test mechanism lets the DTE "know" that the G30 MUX is communicating.

8.4.11.3. MSC UIH Control Frame – Virtual Channel V.24 signals

The MSC frame reflects the current IDLC v.24 signal status. The G30 stores eight statuses for each established IDLC. The signals are divided into two groups:

- M_FC, RI, DCD, CTS, DSR
- D_FC, RTS, DTR

A change in the status of the first group of signals can be made only by the G30. A change in the status of the second group of signals can be made by a specific channel in DTE (IDLC).
When a change is made by the G30 to the status of any of the first group of signals in an IDLC, it sends an MSC frame to the DTE with the new status, as follows:

- **CTS** - Not supported, always on.
- **RI** - When an IDLC receives an incoming call alert, it updates the RI signal value, similar to what is done in GRLC. The G30 sends the MSC "RI on" frame, followed 1 second later by an MSC "RI off" frame, followed 4 seconds later by another "RI on" frame. This pattern repeats until the incoming call alert is halted.
- **DCD** - Each IDLC changes its virtual DCD according to its specific &C setting (like in
- GRLC). Upon a change in an IDLC DCD status, the G30 sends the MSC DCD frame. This change in DCD status may is dependent on a change to an &C value.
- **DSR** - When an IDLC is opened via the SABMi command, the G30 sends an MSC frame to the DTE. In this MSC frame the DSR bit is set to ON. When an IDLC is closed via the DISCi command, the G30 sends an MSC frame to the DTE. In this MSC frame, the DSR bit is set to OFF.
- **M_FC** - When G30 is ready and able to receive data, it updates the "FC" value and sends the MSC "FC on" frame. When G30 is not able to receive data, it sets the "FC" bit and sends the MSC "FC off" frame.

Note: Note: The first MSC frame sent from G30 to a specific IDLC after a SABMi command keeps its default values, which are: "M_FC on", "RI off", "DCD off" and "CTS on".

When a change is made by a DTE-specific IDLC to the status of any of the second group of signals, it sends an MSC frame to the G30 with the new status, as follows:

- **RTS** - Not supported, always on.
- **D_FC** - When an IDLC is ready and able to receive data, it updates the "FC" value and sends the MSC "FC on" frame. When an IDLC is not able to receive data, it sets the "FC" bit and sends the MSC "FC off" frame.
- **DTR** - The G30 passes on to the relevant IDLC the change in its DTR signal. The IDLC reacts to the DTR change according to its AT&D setting (like in GRLC). When an IDLC has its DTR set to OFF, no AT command or data will be conveyed to or from it.

Note: The reception or sending of MSC frames does not affect the G30 hardware RS232 pins.

8.4.12. MUX Customer Packet

8.4.12.1. MUX Customer Open Source Code Packet

Each of the following points represents an API user interface:

- **Point 1:** The RX data is generated by the user ISR. At this point, the data is unpacked and dispatched to the correct API TS0710_rx_handler_api channel.
- **Point 2:** The MIP either generates or triggers an API function for each TS0710_DLC_APP_rx_handler_api() channel.
- **Point 3:** The user wants to send data from the API TS0710_application_send_data channel.
- **Point 4:** The MIP either generates or triggers an API function for sending the API USER_tx_service() frame TX.
- **Point 5:** The Manager is used to close the MUX, open the MUX, and for testing (echo, ping).

The following figure illustrates a MUX user packet, which has a maximum of four virtual channels.

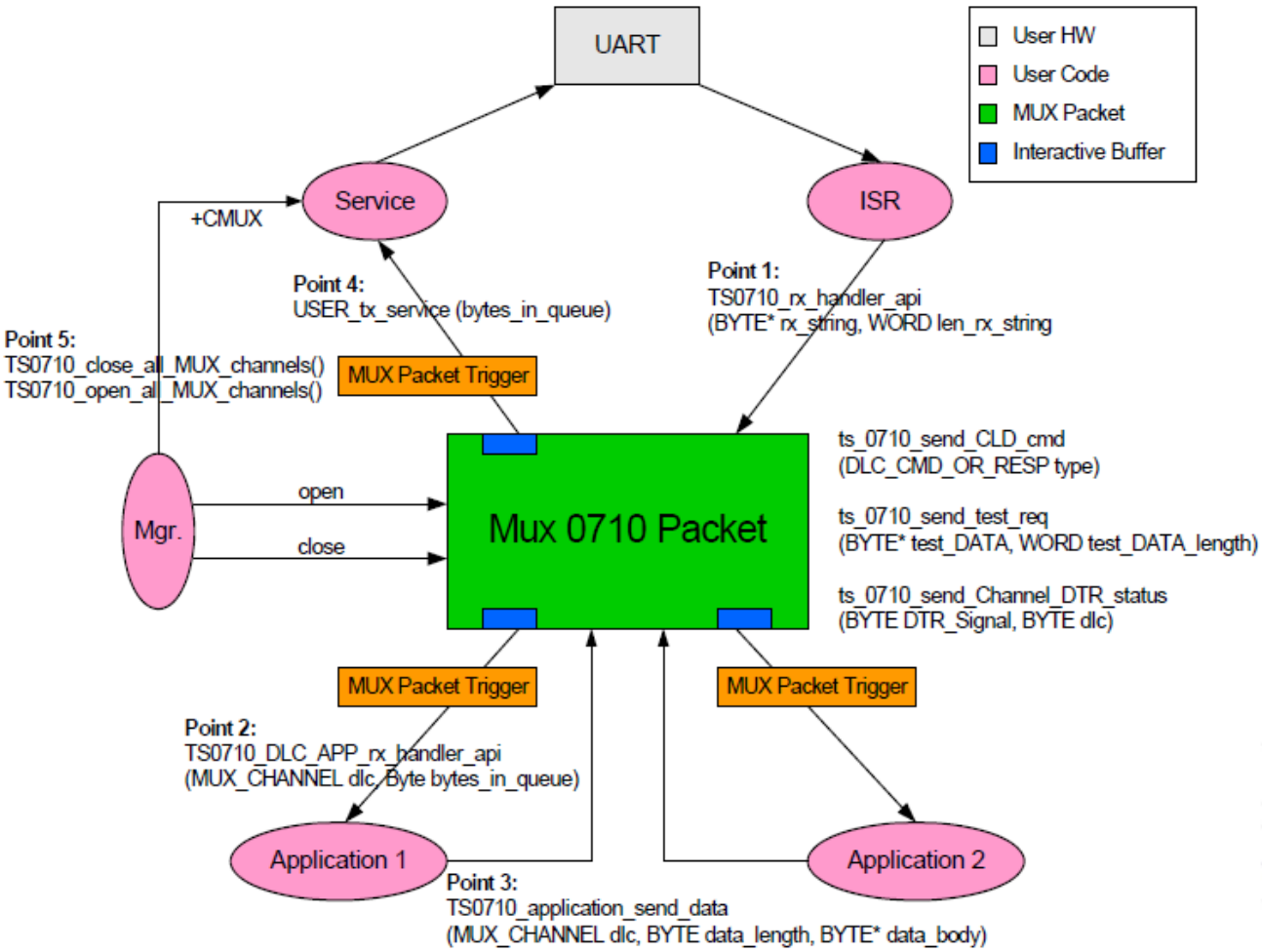

Figure 8-1:MUX Integration Packet

8.4.12.2. APIs

There are five API user integrations, as follows:

- Open service
- Close service
- Sending Data service
- Receiving Data service
- MUX service test, MSC, FC and so on (refers only to the control channel)

8.4.12.2.1. Open Service

The API Open Service MIP and MUI procedures are as follows:

- MIP: Use API TS0710_open_all_MUX_channels().
- MUI:

1. Send establish for control channel (27.010 SABM command frame for Channel 0).
2. Wait for ACK (27.010 UA command frame).
3. Send up to four establish command frames for the data channels (27.010 SABM command frame for Channel 1).
4. Wait for ACK frames (27.010 UA command frame).

8.4.12.2.2. Close Service

The API Close Service MIP and MUI procedures are as follows:

- MIP:

1. Use API TS0710_close_all_MUX_channels().
2. Wait for all ACKs (27.010 UA command frame).

- MUI:

1. Send release for last opened information channels (27.010 DISC command frame for Channels 1-4).
2. Wait for ACK (27.010 UA command frame).
3. Send release for control channel (27.010 DISC command frame for Channel 0) or 27.010 CLD command frame.
4. Wait for ACK (27.010 UA command frame).

8.4.12.2.3. Sending Data Service

The API Sending Data Service MIP and MUI procedures are as follows:

- MIP: Use API TS0710_application_send_data (MUX_CHANNEL dlc, BYTE data_length, BYTE *data_body).
- MUI: Use UIH frame with the data encapsulated for sending Channel 1-4 data.

8.4.12.2.4. Receiving Data Service

The API Receiving Data Service MIP and MUI procedures are as follows:

- MIP:

1. Use API BYTE TS0710_rx_handler_api (BYTE* rx_string, WORD len_rx_string) for unpack frames.
2. Use TS0710_DLC_APP_rx_handler_api (MUX_CHANNEL dlc,BYTE bytes_in_queue) for reading the arrival data from the channel buffer void.

- MUI: Create data unpack.

8.4.12.2.5. MUX Service Test

Includes MSC, FC, and so on (all to control channel). For the following service functions, refer to Figure 8-1:MUX Integration Packet MIP:

1. Void ts_0710_send_CLD_cmd (DLC_CMD_OR_RESP type).
2. Void ts_0710_send_test_req (BYTE* test_DATA, WORD test_DATA_length).
3. Void ts_0710_send_Channel_DTR_status (BYTE DTR_Signal, BYTE dlc).
4. Void ts_0710_send_test_req (BYTE* test_DATA, WORD test_DATA_length).

8.4.12.3. MUX Open Service

To open the MUX service:

1. Send the AT+CMUX command to the G30 for initiation of the GSM 27.010 protocol.
2. Wait for the OK response.
3. Open the MUX within ten seconds (otherwise, the G30 will exit the MUX mode and revert back to PREMUX state).
   A maximum of four channels can be opened: One channel for control, and four channels for information. Currently there is no service type limitation regarding the information channels. That is, AT commands, GPRS, Voice, and Data services can go through each of the information channels when only one simultaneous session/call can be established. AT commands from all channels are always allowed.
   A minimum of two channels must be opened: The control channel, and data channel.

8.4.12.4. MUX Close Service

To close the MUX service:

1. Close all CSD/GPRS connections.
2. Close all data channels (DLC - DLC4).
3. Close MUX, or channel 0 (DLC0), or toggle the hardware DTR signal (to be implemented in future releases).

8.4.12.5. Data Transfer

After all the MUX channels are opened, the user can send and receive data over the four virtual channels (Channels 1 to 4). The user can also send and receive MUX command data on the control channel (DLC0), as when testing for an echo.

9. Acronyms and abbreviations

ACCH	AT Command Channel - Used for AT-commands, TCP/IP, Internal-GPRS session, Voice-Call, and SMS applications
AOC	Advice of Charge
APN	Access Point Name
ASCII	A standard seven-bit code character set
ATA	AT command for call answer
ATD	AT command for call originating
ATH	AT command for Hanging-up a call
ATO	AT command to return to Data mode after temporarily exiting by ESC
BM	Broadcast Message
CA	A certificate authority or certification authority is an entity which issues digital certificates for use by other parties. It is an example of a trusted third party.
CB	Cell Broadcast
CBM	Cell Broadcast Message
CDS	Call Data Services (External-GPRS session, CSD session, FAX session)
Certificate	A public key certificate (or identity certificate) is a certificate which uses a digital signature to bind together a public key with an identity - information such as the name of a person or an organization, their address, and so forth. The certificate can be used to verify that a public key belongs to an individual.
Cipher Suite	A set of cryptographic algorithms. A cipher suite specifies one algorithm for each of the following tasks: Key exchange, Bulk encryption and Message authentication.
CSD	Circuit-switched Data
CSNS	Single Numbering Call Scheme
CTS	Clear to Send
CTS	RS232 pin used for HW flow control. The MGOM uses this pin to stop data transmission from the DTE (on the TXD pin).
DA	Destination Address
DCD	Data Carrier Detect
DCE	Data Communication Equipment (G30)
DCSs	Data Coding Schemas
DLC	Data Link Connection
DLC0	The multiplexer control channel.
DLCI	Data Link Connection Identifier
DSP	Digital Signal Processor
DSR	Data Set Ready

DSR	MGOM is ON and ready to communicate with the DTE device.
DT	Discharge Time
DTE	Data Terminal Equipment (such as terminals, PCs and so on). Also called Application Processor (AP).
DTMF	Dual-Tone Multi-Frequency
DTR	Data Terminal Ready
EF	Elementary Files
EONS	Enhanced Operator Name String
ERM	Error Recovery Mode
ESC	Exit to Command Mode from Data Mode (usually the +++ sequence)
ETSI	European Telecommunication Standards Institute
FCC	Federal Communications Commission (U.S.)
FO	First Octet
FTA	Full Type Approval
GCF	GSM Certification Forum
GGSN	Gate GPRS Support Node
GPIO	General Purpose Input/Output
GPRS	General Packet Radio Service
GR232CFG	The real RS232 HW lines configuration (in PREMUX).
GRLC	General RS232 Logical Channel - This channel can handle the 07.07/GSM27.005 AT command set (CSD, FAX, GPRS, Voice, Network AT, and so on.)
GSM	Global System for Mobile Communications
HCO	Hearing Carry Over allows Speech Disabled callers who can hear well on the telephone to listen directly to the person they are talking with. The Speech Disabled Relay user types his or her part of the conversation on a TTY. A Communication Assistant (CA) then speaks the typed conversation, word for word, to the standard telephone user.
IC	Integrated Circuit
ID	Identification
IDLC	Information DLC - refers to all the data channels except the control channel.
IMEI	International Mobile Equipment Identification.
ISR	Interrupt Service Routine
ITU	International Telecommunication Union
LCA	Low Cost Architecture
MCC/MNC	Mobile Country Code / Mobile Network Code
ME	Mobile Equipment
MGOM	Motorola G30 GSM OEM Modem, also called Base Band processor.
MIDs	Message IDs (Channels)
MO	Mobile Originated - sets up a call session.
MR	Message Reference

MT	Mobile Terminated - accepts a call session.
MUX	Multiplexer entity
OA	Origination Address
OEM	Original Equipment Manufacturer
P2K	Platform 2000
PCB	Printed Circuit Board
PCM	Pulse Code Modulation
PDN	Packet Data Network
PDU	Packet Data Unit
PID	Protocol Identifier
PLMN	Public Land Mobile Network
PPP	Point-to-Point Protocol
QoS	Quality of Service
RA	Recipient Address
RI	Ring Indicator
RTS	Request To Send
RTS	RS232 pin used for HW flow control. The DTE uses this pin to stop data transmission from the MGOM (on the RXD pin).
RXD	DTE received data from MGOM.
S-register	Software Resister
SC	Service Center
SCA	Service Center Address
SCTS	Service Center Time Stamp
SIM	Subscriber Identity Module
SM	Short Message
SMS	Short Message Service
SN	Serial Number
SSL	Secure Socket Layer protocol. Created by Netscape to ensure secure transactions between a client and a server.
ST	Status
SW flow control	ISO/IEC 646 SW flow control (the DC1/XON and DC3/XOFF control characters).
TBD	To Be Defined
TDMA	Time Division Multiple Access
TE	Terminal Equipment
TLS	Transport Layer Security protocol for establishing a secure connection between a client and a server. TLS is based on SSL 3.0 protocol.
TODA	Type of Destination Address
TOOA	Type of Origination Address
TORA	Type of Recipient Address
TOSCA	Type of SCA
TTY	Tele Typewriter
TXD	DTE transmit data to MGOM
UA	Unnumbered Acknowledgement
UIH	Unnumbered Information, with Only Header

	Checksum
USB	Universal Serial Bus
VCO	Voice Carry Over. This is available for people who cannot hear but are able to speak clearly. During a VCO relay call, the Deaf or Hard of Hearing caller speaks directly to the person they are conversing with. When that person responds, a Communication Assistant (CA) types back exactly what is said to the screen of the TTY or VCO phone.

9.1. Document History

Revision	Date	Changes
0	2011-05-12	Conversion in Telit Layout
1	2012-03-01	• +FTPINFO
2	2012-08-31	• Modified &K, +CMGF