

GL53MG(Plus) @Track Air Interface Protocol

EGPRS/LTE Cat-M1/LTE Cat-NB2/GNSS Tracker

TRACGL53MGAN0704

V7.04



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History

Version	Date	Author	Description of Change
1.00	May 7, 2020	Eden Zhang	Initial.
2.00	February 19, 2021	Eden Zhang	Added AT+GTSVR (modified reserved Bit 78 of <Configuration Mask> of AT+GTRTO command for 'SVR').
3.00	September 29, 2021	Eden Zhang	Added 'C' to <Sub Command> of AT+GTRTO .
4.00	February 8, 2022	Eden Zhang	Modified major version number as 04.
4.01	March 24, 2022	Eden Zhang	Added 'QON' and 'QOF' to <Bluetooth Command> of AT+GTRTO to enable/disable QIoT feature.
4.02	April 20, 2022	Eden Zhang	Added Bit 7 of parameter <Report Item Mask> of AT+GTCFG .
5.00	October 14, 2022	Eden Zhang	Rollback the logic of GTNMD and fixed the description.
5.01	October 21, 2022	Eden Zhang	1. Modified the description of parameter <Sensor Enable> within AT+GTNMD; 2. Added a table to describe how to switch the working mode by BIT0 of <Mode> within AT+GTNMD; 3. Deleted the note information about AT+GTNMD from <Mode Selection> section of AT+GTCFG.
5.02	October 28, 2022	Eden Zhang	1. Added parameters <GNSS Timeout> and <CSQ Threshold> of AT+GTCFG; 2. Added new power on type 14 of +RESP:GTPNA.
5.03	November 15, 2022	Eden Zhang	1. Added the description of <Buffer Mode>; 2. Added the new power on type 17 and 23 of +RESP:GTPNA.
5.04	February 28, 2023	Zanas Zuo	Added parameters <Working Hours Start> and <Working Hours End> to AT+GTNMD
5.05	March 3, 2023	Eden Zhang	Added parameters <CSQ Threshold Times> and <CSQ Threshold Timeout> to AT+GTCFG .
5.06	March 9, 2023	Eden Zhang	Added <MAC Address> information into +RESP:GTVER .

5.07	May 23, 2023	Zanas Zuo	Added Bit 6 of parameter <GSM Report> of AT+GTCFG .
5.08	May 25, 2023	Zanas Zuo	Added +RESP:GTIND
5.09	July 27, 2023	Zanas Zuo	Added parameter <Hold Time> to AT+GTSVR .
6.00	November 17, 2023	Zanas Zuo	Added AT+GTNTS .
6.01	December 7, 2023	Eden Zhang	- Added note information in AT+GTDG feature; - Added <Block List> in AT+GTNTS feature.
7.00	March 1, 2024	Eden Zhang	Integrated the GL53MG and GL53MG Plus protocols
7.01	March 14, 2024	Zanas Zuo	Add the power on type information to <Report Type> of the +RESP:GTFRI .
7.02	April 25, 2024	Zanas Zuo	- Added AT+GTBID. - Added +RESP:GTBIE. - Added +RESP:GTBID.
7.03	June 25, 2024	Zanas Zuo	1. Added the parameter <TLS Enable> to AT+GTSRI command.
7.04	June 28, 2024	Zanas Zuo	- Added parameters <Discard No Fix> and <GSM Item Mask> to AT+GTCFG command. - Added Bit 8 of parameter <Report Item Mask> of AT+GTCFG. - Add the battery percentage information to <Battery Percentage> of the +RESP:GTGSM.

1. Overview

1.1. Scope of This Document

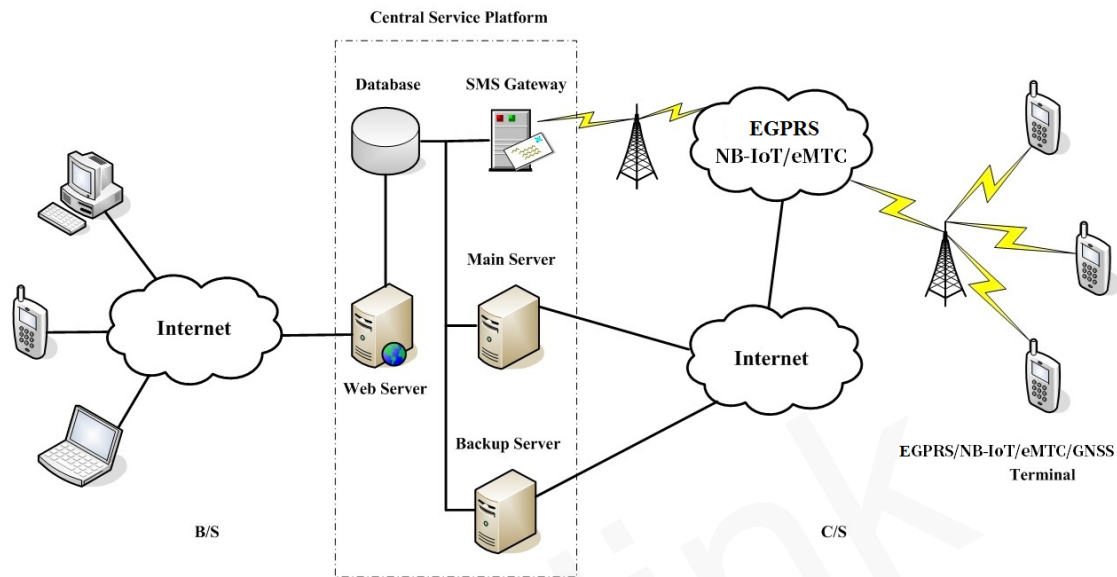
This @Track Air Interface Protocol (hereinafter referred to as @Track protocol), defines all digital communication interfaces between the backend server and the terminal, based on printable ASCII characters over SMS, LTE or EGPRS. The backend server sends a command to the terminal and then the terminal confirms the receipt with an acknowledgment message. If configured, the terminal also sends report messages to the backend server.

This document describes how to build the backend server based on the @Track Air Interface Protocol.

1.2. Terms and Abbreviations

Abbreviation	Description
APN	Access Point Network
ASCII	American National Standard Code for Information Interchange
LTE	Long Term Evolution
EGPRS	Enhanced General Packet Radio Service
HDOP	Horizontal Dilution of Precision
ICCID	Integrated Circuit Card Identity
IP	Internet Protocol
SMS	Short Message Service
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
UTC	Coordinated Universal Time
GNSS	Global Navigation Satellite System

2. System Architecture



The backend server should be accessible to terminals and have the following abilities:

- ✧ The backend server should be able to access the Internet and listen for the incoming connections from the terminal.
- ✧ The backend server should be able to support TCP or UDP connection with the terminal. It should be able to receive data from the terminal and send data back.
- ✧ The backend server should be able to receive and send SMS.

3. Message Description

3.1. Message Format

Messages in this document are composed of printable ASCII characters. The message format varies according to the message type as shown.

Message Format	Message Type
AT+GTXXX=<parameter1>, <parameter2>,...\$	Command
+ACK:GTXXX,<parameter1>,<parameter2>,...\$	Acknowledgement
+RESP:GTXXX,<parameter1>,<parameter2>,...\$	Report

“XXX” is the function name and used to distinguish messages of the same type. The “<parameter1>, <parameter2>, ...” carry the message’s parameters. The number of parameters varies according to messages. The ASCII character ‘,’ is used to separate the character. The parameter string may contain the following ASCII characters: ‘0’-‘9’, ‘a’-‘z’, and ‘A’-‘Z’. The message string ends with the character ‘\$’.

To learn more, refer to [Chapter 3.2 Command and Acknowledgement](#) and [Chapter 3.3 Report](#).

By sending commands to the terminal, the backend server can configure, query and control the terminal when it performs specific actions. When the terminal receives commands, it will reply with a corresponding acknowledgement message. According to the configuration of the parameters, the terminal can send report messages to the backend server. Please see the following figure:

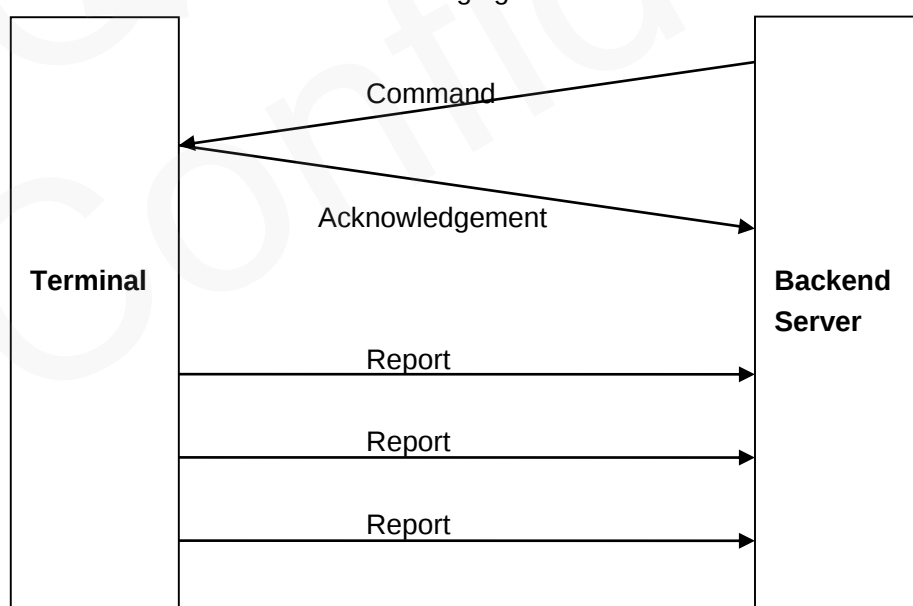


Figure 1: @Track Protocol Message Flow

3.2. Command and Acknowledgement

3.2.1. Server Connection

3.2.1.1. Bearer Setting Information

The command **AT+GTBSI** is used to configure the parameters for EGPRS/LTE parameters.

➤ AT+GTBSI=

Example: AT+GTBSI=gl53,uniwap,ctnet@mynet.cn,vnet.mobi,,,,,00,0,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gl53
2	APN	<=64	(ASCII)	
3	APN User Name	<=30	(ASCII)	
4	APN Password	<=30	(ASCII)	
5	Backup APN	<=40	(ASCII)	
6	Backup APN User Name	<=30	(ASCII)	
7	Backup APN Password	<=30	(ASCII)	
8	APN Authentication Methods / Network Mode	2	00 - 33	00
9	LTE Mode	1	0 - 5	0
	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

- ✧ <Password>: The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gl53".
- ✧ <APN>: Access point name (APN).
- ✧ <APN User Name>: The APN user name. If the parameter field is empty, the current value for this parameter will be cleared.
- ✧ <APN Password>: The APN Password. If the parameter field is empty, the current value for this parameter will be cleared.
- ✧ <Backup APN>: Backup access point name (APN). If <APN> does not work, <Backup APN> will be used.

- ✧ <Backup APN User Name>: The backup APN user name. If the parameter field is empty, the current value for this parameter will be cleared.
- ✧ <Backup APN Password>: The backup APN password. If the parameter field is empty, the current value for this parameter will be cleared.
- ✧ <APN Authentication Methods / Network Mode>: This field is in hex format. 4 high bits indicate APN authentication method and 4 low bits indicate network mode.

Mobile network mode of the device:

- 0: Auto (LTE first, EGPRS second).
- 1: EGPRS only.
- 2: LTE only.
- 3: EGPRS First. (LTE & EGPRS).

Mobile APN Authentication method of the device:

- 0: No authentication
- 1: PAP authentication
- 2: CHAP authentication
- 3: PAP or CHAP authentication

- ✧ <LTE Mode>: The LTE network mode.
 - 0: Cat-M1 & Cat-NB2 (Cat-M1 first).
 - 1: Cat-NB2 & Cat-M1 (Cat-NB2 first).
 - 2: Cat-M1.
 - 3: Cat-NB2.
 - 4: Cat-NB2 first (network search sequence: NB2>2G>M1). It is valid when <Network Mode> is set to 0 (Auto: LTE first, EGPRS second).
 - 5: Cat-NB2 only (network search sequence: NB2>2G). It is valid when <Network Mode> is set to 0 (Auto: LTE first, EGPRS second).

Note: If <Network Mode> is set to 1, <LTE Mode> is invalid.

Find the network search sequence in the following table:

Network Mode		LTE Mode		Search Sequence		
Mode	Detail	Mode	Detail	1	2	3
0	Auto	0	Cat-M1&Cat-NB2 (Cat-M1 First)	M1	2G	NB2
		1	Cat-M1&Cat-NB2 (Cat-NB2 First)	2G	NB2	M1
		2	Cat-M1	M1	2G	N/A
		3	Cat-NB2	2G	NB2	N/A
		4	Cat-NB2 First	NB2	2G	M1
		5	Cat-NB2 Only	NB2	2G	N/A
1	EGPRS Only	N/A	N/A	2G	N/A	N/A
2	LTE Only	0	Cat-M1&Cat-NB2 (Cat-M1 First)	M1	NB2	N/A
		1	Cat-M1&Cat-NB2 (Cat-NB2 First)	NB2	M1	N/A
		2	Cat-M1	M1	N/A	N/A
		3	Cat-NB2	NB2	N/A	N/A
3	EGPRS First	0	Cat-M1&Cat-NB2 (Cat-M1 First)	2G	M1	NB2
		1	Cat-M1&Cat-NB2 (Cat-NB2 First)	2G	NB2	M1
		2	Cat-M1	2G	M1	N/A

		3	Cat-NB2	2G	NB2	N/A
--	--	---	---------	----	-----	-----

- ✧ **<Serial Number>**: The serial number of the command. It will be included in the ACK message of the command.
- ✧ **<Tail Character>**: A character to indicate the end of the command. It must be '\$'.

Note: If **<APN>**, **<APN User Name>**, **<APN Password>**, **<Backup APN>**, **<Backup APN User Name>**, or **<Backup APN Password>** is empty in **AT+GTBSI** or **AT+GTQSS** command, the device will clear the corresponding parameter. For other fields that are left empty, the device will keep using last stored value.

The acknowledgment message of the **AT+GTBSI** command:

➤ **+ACK:GTBSI,**

Example: +ACK:GTBSI,2E0704,868487004351904,GL53MG,FFFF,20201112060303,09D8\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_', ' '	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ **<Protocol Version>**: The protocol version that the device conforms to. The first two characters indicate the device type. As shown in the example, “**2E**” means GL53MG, “**87**” means GL53MG Plus. The middle two characters indicate the major version number of the protocol and the last two characters indicate the minor version number of the protocol. Both version numbers are hex digits. For example, “**0A01**” means version 10.01.
- ✧ **<Unique ID>**: The IMEI of the device.
- ✧ **<Device Name>**: The specified name of the device.
- ✧ **<Serial Number>**: A serial number which is the same as the **<Serial Number>** in the corresponding command. It distinguishes which command the ACK message is for.
- ✧ **<Send Time>**: The local time when receiving the right **AT+GTXXX** command.
- ✧ **<Count Number>**: A self-increasing count number in each acknowledgment message and report message. It counts from 0000 and increases by 1 for each message. It rolls back after “FFFF”.
- ✧ **<Tail Character>**: A character to indicate the end of the command. It must be '\$'.

Note: Only after both the commands **AT+GTBSI** and **AT+GTSRI** are properly set can the ACK messages and other messages be sent to the backend server.

3.2.1.2. Backend Server Registration Information

The command **AT+GTSRI** is used to configure to which backend server that the device sends reports, including the server information and the method of communication between the backend server and the device. Once configured correctly, it should be able to report data to the backend server.

➤ AT+GTSRI=

Example:

AT+GTSRI=gl53,3,,1,180.169.235.202,7037,116.226.45.229,7012,+8613812341234,15,1,0,1,,,0001\$

AT+GTSRI=gl53,3,,1,some.host.name,7037,116.226.45.229,7012,+8613812341234,15,1,0,1,,,0001\$

SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gl53
2	Report Mode	1	0 - 6	0
3	Manual Netreg	1	0 - 1	1
4	Buffer Mode	1	0 - 2	1
5	Main Server IP / Domain Name	<=60	(ASCII)	
6	Main Server Port	<=5	0 - 65535	0
7	Backup Server IP / Domain Name	<=60	(ASCII)	
8	Backup Server Port	<=5	0 - 65535	0
9	SMS Gateway	<=20	(Call Number)	
10	Heartbeat Interval	<=3	0 5 - 360(min)	0
11	SACK Enable	1	0 - 2	0
12	SMS ACK Enable	1	0 1	0
13	PSM Network Hold Time	<=5	0 - 86400 (sec)	0
14	Reserved	0		
15	TLS Enable	1	0 1	0

	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

- ✧ **<Report Mode>**: This parameter defines the method of communication between the backend server and the device. Supported report modes are as follows:
- 0: Stop mode.
 - 1: TCP short-connection preferred mode. The connection is based on TCP protocol. The device connects to the backend server every time it needs to send data, and will shut down the connection when it finishes sending data. If the device fails to establish TCP connection to the backend server (both Main Server and Backup Server), it will try to send data via SMS to the SMS gateway.
 - 2: TCP short-connection forced mode. The connection is based on TCP protocol. The device connects to the backend server every time it needs to send data and will shut down the connection when the device finishes sending data. If the device fails to establish TCP connection to the backend server (both Main Server and Backup Server), it will store the data in the memory buffer if the buffer report function is enabled. Otherwise, the data is dropped.
 - 3: TCP long-connection mode. The connection is based on TCP protocol. The device connects to the backend server and maintains the connection using the heartbeat data. The backend server should respond to the heartbeat data from the devices.
 - 4: UDP mode. The device will send data to the backend server by UDP protocol. Receiving protocol commands via UDP is supported if the C network allows it to proceed.
 - 5: Forced SMS mode. Only SMS is used for data transmission.
Note: The message **+RESP:GTALM** is sent via TCP short connection when the report mode is Forced SMS mode.
 - 6: UDP with fixed local port mode. Like the UDP mode, the device will send data using UDP protocol. The difference is the device will use a fixed local port rather than a random port to communicate with the server in this mode. Thus the backend server could use the identical port to communicate with all devices if the backend server and the devices are all in the same VPN network. The port number the device uses is the same as the port number of the main server.
- ✧ **<Manual Netreg>**: Enable/disable manual network registration.
- 0: Disable manual network registration.
 - 1: Enable manual network registration.
- ✧ **<Buffer Mode>**: The working mode of the buffer report function. If the buffer report function is enabled, the device will store all reports locally when in areas without EGPRS/LTE network coverage. If the device goes back to areas with EGPRS/LTE network coverage, it will then send all the buffered reports through EGPRS/LTE. The

device will delete all buffered reports after upgrading Modem/BB/MCU firmware locally or OTA.

- 0: Disable the buffer report function.
 - 1: Low priority - Enable the buffer report function: In this mode, the device will send the buffered messages after sending real-time messages.
 - 2: High priority - Enable the buffer report function: In this mode, the device will send all the buffered messages before sending real-time messages, except **+RESP:GTSOS**, **+RESP:GTPFA** and **+RESP:GTUPD**.
- ✧ **<Main Server IP / Domain Name>**: The IP address or the domain name of the primary server.
- ✧ **<Main Server Port>**: The port of the primary server.
- ✧ **<Backup Server IP / Domain Name>**: The IP address or the domain name of the backup server.
- ✧ **<Backup Server Port>**: The port of the backup server.
- ✧ **<SMS Gateway>**: Maximum 20 characters (including the optional national code starting with "+"). Short code (for example, 10086) is also supported.
- ✧ **<Heartbeat Interval>**: The interval for sending heartbeat package message (**+ACK:GTHBD**) when report mode is TCP long-connection mode or UDP mode. If it is set to 0, no heartbeat message will be sent.
- ✧ **<SACK Enable>**: This parameter defines whether the backend server should respond to the device with SACK messages when receiving messages from the device.
- 0: The backend server does not reply with a SACK message after receiving a message from the device.
 - 1: The backend server replies with a SACK message when receiving a message from the device.
 - 2: The backend server replies with a SACK message when receiving a message from the device, but the device does not check the serial number of the SACK message.
- Note:** If the device receives **+SACK:GTHBD** from the backend server, the device must check the serial number of the SACK message **+SACK:GTHBD** regardless of the **<SACK Enable>** setting.
- ✧ **<SMS ACK Enable>**: It defines whether to reply with the ACK confirmation via SMS when the command is sent via SMS.
- 0: The device will send the ACK confirmation using the mode specified by **<Report Mode>**.
 - 1: The device will send the ACK confirmation via SMS to the phone number which sends the command via SMS.
- ✧ **<PSM Network Hold Time>**: This parameter is used in power-saving mode when the **<Report Mode>** is set to be TCP long-connection mode, UDP mode or Forced SMS mode. The network connection of the device will maintain **<PSM Network Hold Time>** after the message is sent and then the firmware will sleep.
- ✧ **<TLS Enable>**: Enable/disable TLS encrypted transmission on TLS 1.2 server. This parameter takes effect only when **<Report Mode>** is set to 1, 2, 3 and 7.

- 0: Disable the TLS 1.2 server.
- 1: Enable the TLS 1.2 server.

Note: If <Report Mode> is set to 4 (UDP mode), we recommend to enable SACK or heartbeat mechanism (in this case, <Heartbeat Interval> should not be set to 0). Otherwise, the backend server may not be able to send commands to the device.

The acknowledgment message of the **AT+GTSRI** command:

➤ **+ACK:GTSRI,**

Example: +ACK:GTSRI,2E0704,868487004351904,GL53MG,0001,20201112060541,09DB\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

Note: Only after both the commands **AT+GTBSI** and **AT+GTSRI** are properly set can the ACK messages and other messages be sent to the backend server.

3.2.1.3. Quick Start Setting

The command **AT+GTQSS** is used to configure the parameters for EGPRS/LTE parameters and backend server information if the length of all the settings is less than 160 bytes. Otherwise, the two commands **AT+GTBSI** and **AT+GTSRI** are used to configure those settings.

➤ **AT+GTQSS=**

Example: AT+GTQSS=gl53,,,,3,,1,116.226.44.17,7011,116.226.45.229,7012,+8613812341234,15,1,1,1,0002\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gl53
2	APN	<=64	(ASCII)	

3	APN User Name	<=30	(ASCII)	
4	APN Password	<=30	(ASCII)	
5	Report Mode	1	0 - 6	0
6	Reserved	0		
7	Buffer Mode	1	0 - 2	1
8	Main Server IP / Domain Name	<=60	(ASCII)	
9	Main Server Port	<=5	0 - 65535	0
10	Backup Server IP/ Domain Name	<=60	(ASCII)	
11	Backup Server Port	<=5	0 - 65535	0
12	SMS Gateway	<=20	(Call Number)	
13	Heartbeat Interval	<=3	0 5 - 360(min)	0
14	SACK Enable	1	0 - 2	0
15	Reserved	0		
16	SMS ACK Enable	1	0 1	0
	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

The acknowledgment message of the **AT+GTQSS** command:

➤ **+ACK:GTQSS,**

Example: +ACK:GTQSS,2E0704,868487004351904,GL53MG,FFFF,20201112062405,09E2\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.2.1.4. Network Operator Selection

The **AT+GTNTS** command is used to set network operator selection. The function will work only if the parameter *<Manual Netreg>* in **AT+GTSRI** command is set to 1.

➤ AT+GTNTS=

Example: AT+GTNTS=gl53,0,,,,,,,,,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9' , 'a' - 'z' , 'A' - 'Z'	gl53
2	Enable	1	0 1	0
3	Reserved	0		
4	Reserved	0		
5	Allowed Oper1	5 6	00000 - 99999 000000 - 999999 XXXFF XXXFFF	
6	Allowed Oper2	5 6	00000 - 99999 000000 - 999999 XXXFF XXXFFF	
7	Allowed Oper3	5 6	00000 - 99999 000000 - 999999 XXXFF XXXFFF	
8	Reserved	0		
9	Blocked Oper1	5 6	00000 - 99999 000000 - 999999 XXXFF XXXFFF	
10	Blocked Oper2	5 6	00000 - 99999 000000 - 999999 XXXFF XXXFFF	
11	Blocked Oper3	5 6	00000 - 99999 000000 - 999999 XXXFF XXXFFF	
12	Reserved	0		
	Serial number	4	(HEX)	
	Tail character	1	\$	\$

- ✧ *<Enable>*: Specify the working mode of filtering the telecom operators.
 - 0: Disable
 - 1: Enable
- ✧ *<Allowed Oper1>*: Specify the PLMN(s) as telecom operators allowed list. The terminal supports setting up to 3 operators (i.e. PLMN). Each PLMN is represented by 5 or 6 digits, the first three digits represent MCC, and the remaining digits represent MNC. For example, "46000" means PLMN 46000.
In particular, the wildcard "FF" or "FFF" (Note that 'F' is a capital letter) can be used to match all MNCs in the country, that is, the format can be "MCCFF" or "MCCFFF" (where MCC is the specific mobile country code). For example, "460FF" covers the telecom operators all across China
- ✧ *<Blocked Oper1>*: Specify the PLMN(s) as telecom operators blocked list. The terminal supports setting up to 3 operators (i.e. PLMN). Each PLMN is represented by 5 or 6 digits, the first three digits represent MCC, and the remaining digits represent

MNC. For example, “46000” means PLMN 46000.

In particular, the wildcard “FF” or “FFF” (Note that ‘F’ is a capital letter) can be used to match all MNCs in the country, that is, the format can be “MCCFF” or “MCCFFF” (where MCC is the specific mobile country code). For example, “460FF” covers the telecom operators all across China

Note: The function will be discounted when searching NBIot network, because it'll take too long to search.

The acknowledgment message of **AT+ GTNTS** command:

➤ **+ACK:GTNTS**

Example: +ACK:GTNTS,2E0704,868487004352084,GL530MG,004F,20230815071850,006E\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol version	6	(HEX)	
Unique ID	15	(IMEI)	
Device name	<=20	'0' - '9' , 'a' - 'z' , 'A' - 'Z' , '-' , '_'	
Serial number	4	(HEX)	
Send time	14	YYYYMMDDHHMMSS	
Count number	4	(HEX)	
Tail character	1	\$	\$

3.2.2. Device Configuration

3.2.2.1. Global Configuration

The command **AT+GTCFG** is used to configure the global parameters.

➤ **AT+GTCFG=**

Example: AT+GTCFG=gl53,,GL53MG,,0823,002F,0,5,10101010101010,0,1200,0,1,24,1,1,0,5,0,0000,150,10,0,6,1,2,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gl53
2	New Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	
3	Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	GL53MG
4	Discard No Fix	1	0 1	0
5	Event Mask	<=4	(HEX)	0823

6	Report Item Mask	<=4	(HEX)	002F
7	Mode Selection	1	0 - 2	0
8	Continuous Send Interval	<=4	0 1-1440(min)	5
9	Week Report Selection	14	'0' - '1'	1010101 0101010
10	Start Mode	1	0 - 2	0
11	Specified Time of Day	4	HHMM	1200
12	Adjustment Enable	1	0 - 1	0
13	Initial Wakeup Interval	<=2	1 - 4 6 8 12 24	1
14	Final Wakeup Interval	<=2	1 - 4 6 8 12 24	24
15	Hold Days	<=2	1 - 99	1
16	Report Frequency	<=3	1 - 100	1
17	GNSS Enable	1	0 1	0
18	GNSS Fix Delay	2	5 - 60(sec)	5
19	AGPS Mode	1	0 1	0
20	GSM Report	4	(HEX)	0000
21	GNSS Timeout	<=3	60 - 270	150
22	Battery Low Percentage	<=2	0 - 30	10
23	Function Key Mode	1	0 - 2	0
24	CSQ Threshold	<=2	0 - 31	6
25	SOS Report Mode	1	0 - 2	1
26	Location Request Mask	1	0 2	2
27	CSQ Threshold Times	1-2	1 - 10	3
28	CSQ Threshold Timeout	2	15 - 90 (sec)	30
29	GSM Item Mask	<=4	(HEX)	0000
	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

- ✧ <New Password>: It is used to change the current password.
- ✧ <Device Name>: The name of the device. It appears in each message.
- ✧ <Discard No Fix>: Disable/enable **+RESP:GTFRI** report when there is no GNSS fix.
 - 0: Enable report.

- 1: Disable report.
- ✧ <Event Mask>: A Hex value to configure which event report can be sent to the backend server. Each bit corresponds to a message. If the bit is set to 1, the corresponding message can be sent to the backend server. Otherwise, the corresponding message cannot be sent to the backend server. Here is the matching between each bit and message.
 - Bit 0 (0001): **+RESP:GTPNA**
 - Bit 1 (0002): **+RESP:GTPFA**
 - Bit 2 (0004): Reserved
 - Bit 3 (0008): Reserved
 - Bit 4 (0010): Reserved
 - Bit 5 (0020): **+RESP:GTBPL**
 - Bit 6 (0040): Reserved
 - Bit 7 (0080): Reserved
 - Bit 8 (0100): Reserved
 - Bit 9 (0200): Reserved
 - Bit 10 (0400): Reserved
 - Bit 11 (0800): **+RESP:GTPNL**
 - Bit 12 (1000): Reserved
 - Bit 13 (2000): Reserved
- ✧ <Report Item Mask>: The bitwise mask that configures the composition of the message, especially the composition of GNSS information.
 - Bit 0 (0001): <Speed>
 - Bit 1 (0002): <Azimuth>
 - Bit 2 (0004): <Altitude>
 - Bit 3 (0008): Network data, including <MCC>, <MNC>, <LAC> and <Cell ID>
 - Bit 4 (0010): Reserved
 - Bit 5 (0020): <Send Time>, the time when the report message is generated.
 - Bit 6 (0040): <Device Name>
 - Bit 7 (0080): <Number of Satellites>
 - Bit 8 (0100): <GSM Expand Report Mask>, the bit is valid for **+RESP:GTGSM**, set it to 1 to enable <GSM Item Mask>.

For each bit, set it to 1 to enable the corresponding component in the report and 0 to disable the corresponding component in the report. This mask is valid for all messages.
- ✧ <Mode Selection>: It configures the working mode of the device.
 - 0: Power saving mode (PSM). The device enters power saving status and reports the message **+RESP:GTFRI** periodically according to power saving mode parameters (such as <Start Mode>, <Specified Time of Day>, <Adjustment Enable>, <Initial Wakeup Interval>, <Final Wakeup Interval>, <Hold Days>, and <Report Frequency>). The connection between the device and the server will be maintained for a period of time according to the setting of <PSM Network Hold Time> in **AT+GTSRI**, and then the device will go into

deep sleep.

- 1: Continuous mode. The device is always active. This allows the control of the device at any time and immediate receipt of ACK information from the device. The device performs GNSS fix and reports the message **+RESP:GTFRI** periodically according to *<Continuous Send Interval>*.
 - 2: Automatic mode. In this mode, if *<Continuous Send interval>* is less than 10 minutes, the device works in continuous mode. Otherwise it will enter power saving mode, and wake up at an interval specified by *<Continuous Send Interval>*. In this case, *<Adjustment Enable>*, *<Initial Wakeup Interval>*, and *<Final Wakeup Interval>* will not work, and the device wakes up at a fixed interval.
- ✧ *<Continuous Send Interval>*: The send interval of the message **+RESP:GTFRI** when *<Mode Selection>* is set to 1 or 2. The value range is 1-1440 and the unit is minute. If the value is set to 0, the device will not report the message, and will not go to sleep.
- ✧ *<Week Report Selection>*: It configures the report mode for each day in one week. There are a total of seven 2-character combinations. The seven combinations represent seven days of one week respectively. The first two characters represent Sunday, and last two characters represent Saturday. It only controls the report message **+RESP:GTFRI** with power-saving mode.
- The first character of each combination defines whether the device will report messages to the server on this day of week, and the second character defines whether the message should contain GNSS information when the first character is set to 1. The 14-digit format can be configured as follows.
- Example:** 11000000101011. It means the messages on Sunday and Saturday will contain GNSS information, no message will be reported Monday, Tuesday and Wednesday, and messages for Thursday and Friday will not contain GNSS information.
- ✧ *<Start Mode>*: The parameter that configures how to determine the first wakeup time. The time of next wakeup will be calculated based on the *<Initial Wakeup Interval>*.
- 0: First wakeup at the time defined by *<Specified Time of Day>*.
 - 1: To get the first wakeup time, add the current time and *<Initial Wakeup Interval>*.
 - 2: The device will first wake up at the wake-up time point (calculated by *<Specified Time of Day>* and *<Initial Wakeup Interval>*) closest to the current time. Wake-up time points are the time of the day when the device should wake up. For example, if *<Specified Time of Day>* is 0300 and *<Initial Wakeup Interval>* is 4 hours, then the wake-up time points are 03:00, 07:00, 11:00, 15:00, 19:00, 23:00. If the current time is 15:30, then the closest wake-up time is 19:00.
- ✧ *<Specified Time of Day>*: It configures the start time for the device to wake up (also referred to as first wakeup time herein). The value range of "HH" is "00"- "23". The value range of "MM" is "00"- "59".
- ✧ *<Adjustment Enable>*: Enable/disable the adjustment of the wakeup interval.
- 0: Disable interval adjustment.

- 1: Enable interval adjustment.
- ✧ <Initial Wakeup Interval>: A numeral to specify the initial hour interval for waking up the device. The value 24 means the device wakes up once per 24 hours. If <Adjustment Enable> is disabled, the device will always use this value as its waking-up interval.
- ✧ <Final Wakeup Interval>: A numeral to specify the final hour interval for waking up the device. The value 24 means the device wakes up once per 24 hours. If the <Adjustment Enable> is enabled, after the specified time of <Hold Days>, the device's waking up interval switches from <Initial Wakeup Interval> to <Final Wakeup Interval>. And the device's report interval will remain at this value.
- ✧ <Hold Days>: The number of days to hold <Initial Wakeup Interval> before switching to <Final Wakeup Interval>.
- ✧ <Report Frequency>: This parameter value multiplied by <Initial Wakeup Interval> or <Final Wakeup Interval> equals the report frequency (Unit: hour) for the message **+RESP:GTFRI**.

Note: If <Report Frequency> is set to 2 and <Initial Wakeup Interval> or <Final Wakeup Interval> is set to 2, the device will wake up every 2 hours and report the **+RESP:GTFRI** every 4 hours. This parameter will also work when <Mode Selection> is 2 and it's value is more than or equal to 10.

If <Mode Selection> is 2, this parameter value multiplied by <Continuous Send Interval> equals the report frequency (Unit: minute) for the message **+RESP:GTFRI**.

- ✧ <GNSS Enable>: Enable/disable GNSS fix.
 - 0: Disable GNSS fix: The GNSS position information will be empty.
 - 1: Enable GNSS fix: The device reports messages containing GNSS information normally.
- ✧ <GNSS Fix Delay>: This value indicates the waiting time after GNSS fix succeeds. After GNSS fix succeeds, the device will wait for a period of time (specified by <GNSS Fix Delay>) and then get the result of GNSS fix because the position obtained immediately after the GNSS fix may not be accurate. (e.g. If <GNSS Fix Delay> is set to 7, the device will wait 7 seconds after GNSS fix and then get the fix result). The range of the parameter value is 5 - 60, and the default value is 5. Unit: second.
- ✧ <AGPS Mode>: A numeral to indicate whether to enable AGPS. AGPS helps to increase the chance of getting GNSS position successfully and reduce the time to get GNSS position.
 - 0: Disable the AGPS function.
 - 1: Enable the AGPS function.

Note: The AGPS uses a URL to download the ephemeris data. Some SIM card operators do not support parsing URL to get the data. Contact with the SIM card provider to see whether URL parsing is supported or not. If not, disable this function. Otherwise, the power consumption of the device will increase. AGPS only increases the speed to get GNSS fix. It will not affect the function of GNSS.

- ✧ <GSM Report>: It controls how and when to report cell information and only supports ASCII format.

The high 2 bits, Bit 14 – 15, represent the report mode of **+RESP:GTGSM** message.

- 0: Do not allow the cell information report.
- 1: Allow the cell information report after failing to get the GNSS position if cell information is available.
- 2: Report the message **+RESP:GTGSM** after each successful GNSS fix if cell information is available.
- 3: Report the message **+RESP:GTGSM** regardless of GNSS fix is successful or not if cell information is available.

The low 2 bits, Bit 0 and Bit 2 are used to configure **+RESP:GTGSM** will be sent after which message.

- Bit 0 for **+RESP:GTRTL**
- Bit 2 for **+RESP:GTFRI**
- Bit 6 for **+RESP:GTNMR**

Note: It will take more time to search information of neighbor cells if this feature is enabled, and maybe cause higher data traffic consumption.

- ✧ **<GNSS Timeout>**: It specifies the maximum amount of time that is allowed for acquiring a GNSS fix.
- ✧ **<Battery Low Percentage>**: If the battery percentage is lower than the value specified by this parameter, the device will report the message **+RESP:GTBPL**.
- ✧ **<Function Key Mode>**: The working mode for the function key long press operation.
 - 0: The device will not perform any operation when the button is long pressed.
 - 1: The device will power off when the button is long pressed.
 - 2: When the function key is long pressed, SOS event will be triggered.

Note: Press button down for 3 to 20 seconds as a valid operation.

- ✧ **<CSQ Threshold>**: The parameter which specifies the CSQ RSSI level threshold used to check for weak signals and the parameter only work in power saving mode and automatic mode (continuous send interval $\geq 10\text{min}$). If the CSQ RSSI level of the device doesn't reach 99 and falls below **<CSQ Threshold>** within **<CSQ Threshold Timeout>** seconds, the device will stop searching the signal network and go to sleep to save battery power. If the value is 0, the device will not check for weak signals.
- ✧ **<SOS Report Mode>**: A numeral to indicate the way of reporting GNSS location for SOS event.
 - 0: Report only the last GNSS location immediately after SOS event is triggered.
 - 1: Try to report the current GNSS location after SOS event is triggered.
 - 2: Report the last GNSS location immediately after SOS event is triggered, and then try to get the current GNSS location to report.
- ✧ **<Location Request Mask>**: Mask to control the location request
 - Bit 0: Reserved.
 - Bit 1: SMS location request.
- ✧ **<CSQ Threshold Times>**: A numeral to indicate the number of times the device triggered a weak signal process. If the number of weak signal processes exceeds the threshold specified by this parameter, the device will not check **<CSQ Threshold>** on the next wakeup.

- ✧ **<CSQ Threshold Timeout>**: It specifies the maximum length of time used to check **<CSQ Threshold>**. If the CSQ RSSI level of the device falls below **<CSQ Threshold>** during this period, the device will trigger weak signal processing. The unit is second.
- ✧ **<GSM Item Mask>**: Bitwise mask to determine whether specified parameter fields are included in the **+RESP:GTGSM** report message. For each bit, set it to 1 to enable the corresponding parameter field in the report.
 - Bit 0: **<Battery Percentage>**

Note: When the device is in power-saving mode, the module is turned off. Thus, in this case, the device cannot receive or process the “get position” message, and will process the message after it wakes up.

The acknowledgment message of the **AT+GTCFG** command:

➤ **+ACK:GTCFG,**

Example: +ACK:GTCFG,2E0704,868487004352084,GL53MG,008D,20201110100240,133A\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_',	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.2.2.2. Auto Unlock PIN

The command **AT+GTPIN** is used to unlock the USIM automatically.

➤ **AT+GTPIN=**

Example: AT+GTPIN=gl53,0,,,,,,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gl53
2	Auto Unlock PIN	1	0 1	0
3	PIN	4 - 8	'0' - '9'	
4	Reserved	0		
5	Reserved	0		
6	Reserved	0		

7	Reserved	0		
8	Reserved	0		
	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

- ✧ <Auto Unlock PIN>: A numeral to indicate whether to unlock the USIM-PIN for the device.
 - 0: Do not unlock USIM-PIN automatically.
 - 1: Each time the device powers on, it will detect whether the USIM card is locked with a PIN. If it is locked, the device will auto-unlock the PIN.
- ✧ <PIN>: The PIN code which is used for unlocking PIN automatically. If it is empty, the PIN code saved in the device will be cleared.

The acknowledgment message of the **AT+GTPIN** command:

➤ **+ACK:GTPIN,**

Example: +ACK:GTPIN,2E0704,868487004351904,GL53MG,FFFF,20201111000330,0A0E\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.2.2.3. Protocol Watchdog

The command **AT+GTDG** is used to reboot the device in a time based manner. This helps the device avoid working in abnormal status for a long time.

➤ **AT+GTDG=**

Example: AT+GTDG=gl53,1,,1,0130,,1,,0,,,0004\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gl53
2	Mode	1	0 - 1	1
3	Reserved	0		
4	Interval	<=2	1 - 30(day hour)	7

5	Time	4	HHMM	0200
6	Reserved	0		
7	Report Before Reboot	1	0 1	1
8	Reserved	0		
9	Unit	1	0 1	0
10	Reserved	0		
11	Reserved	0		
12	Reserved	0		
	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

- ✧ **<Mode>**: The working mode of this function.
 - 0: Disable this function.
 - 1: Reboot periodically according to the **<Interval>** and **<Time>** settings. It only works in continuous mode.
- ✧ **<Interval>**: The time interval (in days or hours) for rebooting the device.
- ✧ **<Time>**: At what time to perform the reboot operation when the **<Interval>** is reached. It only works when the unit is day.
- ✧ **<Report Before Reboot>**: Whether to report the **+RESP:GTD OG** message before reboot. 0 means "Do not report the message before reboot", and 1 means "Report the message before reboot". If this parameter is enabled, the device will obtain a real-time location and send it to the server.
- ✧ **<Unit>**: The unit of **<Interval>**.
 - 0: Day
 - 1: Hour

Note: The feature only works when device in continuous mode.

The acknowledgment message of the **AT+GTD OG** command:

➤ **+ACK:GTD OG,**

Example:			
+ACK:GTD OG,2E0704,868487004351904,GL53MG,FFFF,20201111000319,0A2B\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_',	
Serial Number	4	(HEX)	

Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.2.2.4. Time Adjustment

The command **AT+GTTMA** is used to adjust local time.

➤ **AT+GTTMA=**

Example: AT+GTTMA=gl53,+,7,0,1,20201112032345,,,,,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gl53
2	Sign	1	+/-	+
3	Hour Offset	<=2	0 - 12	0
4	Minute Offset	<=2	0 - 59	0
5	Daylight Saving	1	0 1	0
6	UTC Time	14	YYYYMMDDHHMMSS	
7	Reserved	0		
8	Reserved	0		
9	Reserved	0		
10	Reserved	0		
	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

- ✧ <Sign>: It indicates the positive or negative offset of the local time from UTC time.
- ✧ <Hour Offset>: UTC offset in hours.
- ✧ <Minute Offset>: UTC offset in minutes.
- ✧ <Daylight Saving>: Enable/disable daylight saving time.
 - 0: Disable daylight saving time.
 - 1: Enable daylight saving time.
- ✧ <UTC Time>: UTC time used to adjust the local time.

The acknowledgment message of the **AT+GTTMA** command:

➤ **+ACK:GTTMA,**

Example: +ACK:GTTMA,2E0704,868487004351904,GL53MG,FFFF,20201111000049,0A35\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.2.2.5. Non-movement Detection

The command **AT+GTNMD** is used to configure the parameters for movement and non-movement detection.

➤ AT+GTNMD=

Example: AT+GTNMD=gl53,0,0,3,3,2,1440,1, 0000, 0000,,,,,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gl53
2	Sensor Enable	1	0 - 1	0
3	Mode	1	0 - F	0
4	Non-movement Duration	<=3	1 - 200(*15sec)	3
5	Movement Duration	<=2	3 - 50(*100ms)	3
6	Movement Threshold	1	2 - 9	2
7	Rest Send Interval	<=4	5 - 1440(min)	1440
8	Report Mode	1	1 - 3	2
9	Working Hours Start	4	HHMM	0000
10	Working Hours End	4	HHMM	0000
11	Reserved	0		
12	Reserved	0		
13	Reserved	0		
14	Reserved	0		
15	Reserved	0		
	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

✧ <Sensor Enable>: Enable/disable the sensor function, that the device can detect

movement or non-movement event.

- ✧ **<Mode>**: A hex numeral to determine how the function works. Each bit of the hex numeral indicates different actions the device can perform. If a bit is 1, the device will perform the corresponding action as described below.

Bit 0 (1): If movement is detected, the device enters continuous mode. If non-movement is detected, the device will enter working mode as follows:

BIT0	Mode Selection	Continuous Interval	Working Mode
0	0	N/A	Power Saving Mode, Use <i><Wakeup Interval></i> to calculate next wakeup time
	1	N/A	Continuous Mode
	2	< 10	Continuous Mode
		>= 10	Power Saving Mode, Use <i><Continuous Interval></i> to calculate next wakeup time
1	0	N/A	Power Saving Mode, Use <i><Wakeup Interval></i> to calculate next wakeup time
	1		
	2	< 10	Power Saving Mode, Use <i><Continuous Interval></i> to calculate next wakeup time
		>= 10	

Bit 1 (2): Report the message **+RESP:GTNMR** to the backend server when non-movement is detected.

Bit 2 (4): Report the message **+RESP:GTNMR** to the backend server when movement is detected.

Bit 3 (8): Change the GNSS fix interval and the **+RESP:GTFRI** report interval to *<Rest Send Interval>* when non-movement is detected. If Bit 3 is enabled, Bit 0 will become invalid, and the device will stay in continuous mode.

- ✧ **<Non-movement Duration>**: A time parameter to determine whether the device enters non-movement status. If the motion sensor detects that the device stays in non-movement status for a period of time specified by *<Non-movement Duration>*, the device will be considered to be in non-movement status.
- ✧ **<Movement Duration>**: A time parameter to determine whether the device enters movement status. If the motion sensor detects that the device stays in movement for a period of time specified by *<Movement Duration>*, the device will be considered to be in movement status.
- ✧ **<Movement Threshold>**: The threshold for the motion sensor to determine whether the device is in movement state. The smaller the value is, the easier it will be for the device to be considered to enter the state of movement.
- ✧ **<Rest Send Interval>**: The send interval for the **+RESP:GTFRI** message when the device is in rest state and Bit 3 of *<Mode>* is set to 1.
- ✧ **<Report Mode>**: The parameter that configures how to report **+RESP:GTNMR** when motion sensor status changes.

- 1: Report the last fixed position.

- 2: Report the current position.
 - 3: Report the last fixed position immediately, and then turn on GNSS to get the current position and report position information again.
- ✧ *<Working Hours Start>*, *<Working Hours End>*: The start and end time of the sensor function during the day. When these two parameters are set to their default values, the device doesn't control the working time of the sensor function. In addition, these two parameters can't be set to the same time except for the default value. **Note:** This mechanism only works in two modes, a power saving mode, and an automatic mode when *<Continuous Send interval>* is greater than or equal to 10 minutes.

The acknowledgement message of the **AT+GTNMD** command:

➤ **+ACK:GTNMD,**

Example:			
+ACK:GTNMD,2E0704,868487004351904,GL53MG,FFFF,20201112182210,0A3B\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.2.2.6. Settings for Preserving Device's Specified Logic States

The command **AT+GTPDS** is used to preserve specified logic state of the device. The function works according to the working mode, and saves the logic state according to the value of the *<Mask>*.

➤ **AT+GTPDS=**

Example:				
AT+GTPDS=gl53,1,00000011,,,,,,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gl53
2	Mode	1	0 - 2	1
3	Mask	<=8	(HEX)	00008019
4	Reserved	0		
5	Reserved	0		
6	Reserved	0		

7	Reserved	0		
8	Reserved	0		
9	Reserved	0		
	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

- ✧ **<Mode>**: The working mode of the **AT+GTPDS** command.
- 0: Disable this function.
 - 1: Preserve specified logic state of the device according to the value of the **<Mask>**.
 - 2: Reset all the specified logical states listed in the **<Mask>** after receiving the command, and then preserve specified logic state of the device according to the value of the **<Mask>**.
- ✧ **<Mask>**: Bitwise mask to configure which device states will be preserved.
Each bit represents a state.
- Bit 0: States of GEO
 - Bit 1: Reserved
 - Bit 2: Reserved
 - Bit 3: Information of last known position
 - Bit 4: Current device state, including motion state
 - Bit 15: Indication of the **+RESP:GTBPL** message having been reported

The acknowledgment message of the **AT+GTPDS** command:

➤ **+ACK:GTPDS,**

Example:

+ACK:GTPDS,2E0704,868487004351904,GL53MG,FFFF,20201112184619,0A51\$

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.2.2.7. Abbreviation Command

The **AT+GTABC** command is composed of abbreviated parameters from other commands.

➤ AT+GTABC=

Example: AT+GTABC=gl53,rm:5,an:cmnet,dn:127.0.0.1,0001\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 8	'0' - '9', 'a' - 'z', 'A' - 'Z'	gl53
2	Parameters (Optional)	<=140	(ASCII)	
	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

- ✧ <Parameters>: It is composed of abbreviations of parameters and their values, formatted as <abbreviation: value>. Each two <abbreviation: value> are separated by ','.

Here are the supported parameters and their abbreviations:

Abbreviation	Parameters
rm	Report Mode
an	APN
be	Buffer Enable
dn	Main Server IP / Domain Name
pt	Main Server Port
hb	Heartbeat Interval
ss	SMS ACK Enable
ct	Mode Selection
sm	Start Mode
st	Specified Time of Day
aj	Adjustment Enable
ih	Initial Wakeup Interval Hours
hd	Hold Days
fh	Final Wakeup Interval Hours
rp	Report Frequency
si	Continuous Send Interval
wr	Week Report Selection
em	Event Mask
ce	Report Item Mask
bl	Battery Low Percentage
ge	GNSS Enable
gr	GSM Report
tz	Time Zone, starting with '+' or '-'
nc	LTE Network Control

The acknowledgment message of the **AT+GTABC** command:

➤ **+ACK:GTABC,**

Example:			
+ACK:GTABC,2E0704,868487004351904,GL53MG,0001,20201111000026,0A56\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	IMEI	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_', ' '	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.2.3. Alarm Settings

3.2.3.1. Circular Geo-Fence Information

The command **AT+GTGEO** is used to configure the parameters of Circular Geo-Fence (Geo-Fence is a virtual perimeter on a geographic area using a location-based service. When the device enters or exits the area, a notification is generated. The notification contains information about the location of the device and can be sent to the backend server).

➤ **AT+GTGEO=**

Example:				
AT+GTGEO=gl53,0,3,121.348813,31.163878,50,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gl53
2	GEO ID	1 2	0 - 19	
3	Mode	1	0 - 3	0
4	Longitude	<=11	-180 - 180	
5	Latitude	<=10	-90 - 90	
6	Radius	<=7	50 - 6000000(m)	50
	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

- ✧ <GEO ID>: The ID of the circular Geo-Fence. A total of 20 zones (0 to 19) are supported.
- ✧ <Mode>: The working mode of the device reporting circular Geo-Fence messages **+RESP:GTGIN** or **+RESP:GTGOT** to the backend server.
 - 0: Disable the Geo-Fence function.
 - 1: Entering the zone. The **+RESP:GTGIN** report will be generated only when the device enters the Geo-Fence.
 - 2: Exiting the zone. The **+RESP:GTGOT** report will be generated only when the device exits the Geo-Fence.
 - 3: Both entering and exiting the zone.
- ✧ <Longitude>: The longitude of a point which is defined as the center of the circular Geo-Fence region. The unit is degree and accuracy is 6 decimal places. West longitude is defined as negative starting with “-” and east longitude is defined as positive without “+”.
- ✧ <Latitude>: The latitude of a point which is defined as the center of the circular Geo-Fence region. The unit is degree and accuracy is 6 decimal places. South latitude is defined as negative starting with “-” and north latitude is defined as positive without “+”.
- ✧ <Radius>: The radius of the circular Geo-Fence region. The value range is 50 - 6000000 and the unit is meter.

The acknowledgment message of the **AT+GTGEO** command:

➤ **+ACK:GTGEO,**

Example:

**+ACK:GTGEO,2E0704,868487004351904,GL53MG,0,000B,20201111000013,0A6A
\$**

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
GEO ID	<=2	0 - 19	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.2.4. Other Settings

3.2.4.1. Real Time Operation

The command **AT+GTRTO** is used to retrieve information from the device or control the device when it executes certain actions.

➤ AT+GTRTO=

Example: AT+GTRTO=gl53,8,,,,,FFFF\$ AT+GTRTO=gl53,2,SRI,,,,,FFFF\$ AT+GTRTO=gl53,2,000020000000000000000008A02,,,,,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gl53
2	Sub Command	<=2	1 - 36	
3	AT Command Configuration Mask ATI Mask Bluetooth Command	3 24 8	"SRI" 00000000000000000000 000000 - FFFFFFFFFFFFFFFFFF FFFFFFFF 00000000 - FFFFFFFF " RST" "QON" "QOF"	
4	Reserved	0		
5	Reserved	0		
6	Reserved	0		
7	Sub Command Parameter	<=2	0 1 2 FF	0
	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

✧ <Sub Command>: A HEX value to indicate the sub command to be executed.

- 0: **(Reserved)**
- 1: **RTL**. Request the device to report its current position immediately via the message **+RESP:GRTL**.
- 2: **READ**. Get the current configuration of the device via the message **+RESP:GTALM**.
- 3: **REBOOT**. Reboot the device.
- 4: **RESET**. Reset all parameters to factory settings and clear all buffered messages.
- 5: **PWROFF**. Power off the device.

- 6: **CID**. Get the ICCID of the SIM card being used by the device via the message **+RESP:GTCID**.
 - 7: **CSQ**. Get the current EGPRS signal level of the device via the message **+RESP:GTCSQ**.
 - 8: **VER**. Get the version information of the device via the message **+RESP:GTVER**.
 - 9: **(Reserved)**
 - A: **(Reserved)**
 - B: **TMZ**. Get the time zone settings via the message **+RESP:GTTMZ**.
 - C: **GIR** Get cell information via message **+RESP:GTGSM**, only support ASCII format message
 - D: **AIF**. Get APN, ICCID, RSSI, cell ID, and IP via **+RESP:GTAIF**.
 - E: **GSV**. Request the device to report the GNSS fix level. The corresponding information will be reported via the message **+RESP:GTGSV**.
 - F-13: **(Reserved)**
 - 14: **BLE**. Commands for Bluetooth
 - 15-1B: **(Reserved)**
 - 1C: **ATI**. Get the basic device information via the message **+RESP:GTATI**.
 - 1D-30: **(Reserved)**
 - 31: **DELBUF**. Delete all of buffered messages.
 - 32: **(Reserved)**
 - 33: **INF**. Request the device information report. The corresponding information will be reported via the message **+RESP:GTINF**.
 - 34-35: **(Reserved)**
 - 36: **CLM**. Reset the coulometer. This command needs to be sent after the user replaces the battery with a new one.
- ✧ **<AT Command / Configuration Mask / ATI Mask>**:
- **<AT Command>**: To get a single AT command's configuration when **<Sub Command>** is set to 2, follow the format in the following example. For example, to get the configuration of **AT+GTBSI**, please set **AT+GTRTO=g153,2,BSI,,,,,FFFF\$**, and get it via **+RESP:GTALM**.
 - **<Configuration Mask>**: If **<Sub Command>** is set to 2, the configuration information of the specified **<Configuration Mask>** can be obtained via the message **+RESP:GTALM**. The Configuration Mask must be 24 bytes. If it is less than 24 bytes, '0' will be added in the high bytes of the Configuration Mask.

Configuration Mask Table:

Mask Bit	Item
Bit 81 - Bit 95	Reserved
Bit 80	BID
Bit 79	GLM
Bit 78	SVR

Bit 77	NMD
Bit 57 - Bit 76	Reserved
Bit 56	UPC
Bit 36 - Bit 55	Reserved
Bit 35	FVR
Bit 34	Reserved
Bit 33	PDS
Bit 25 - Bit 32	Reserved
Bit 24	WLT
Bit 21 - Bit 23	Reserved
Bit 20	NTS
Bit 18 - Bit 19	Reserved
Bit 17	DOG
Bit 16	Reserved
Bit 15	PIN
Bit 12 - Bit 14	Reserved
Bit 11	GEO
Bit 10	Reserved
Bit 9	TMA
Bit 4 - Bit 8	Reserved
Bit 3	CFG
Bit 2	Reserved
Bit 1	SRI
Bit 0	BSI

- **<ATI Mask>**: If **<Sub Command>** is set to 1C, the basic device information will be reported via the message **+RESP:GTATI** according to the **<ATI Mask>** setting.

ATI Mask Table:

Mask Bit	Item
Bit 0	Firmware Version
Bit 1	MCU Firmware Version
Bit 2 - Bit 6	Reserved

Bit 7	Modem Firmware Version
Bit 8 - Bit 11	Reserved for Firmware Version
Bit 12	Hardware Version
Bit 13	Modem Hardware Version
Bit 14 - Bit 15	Reserved for Hardware Version
Bit 16 - Bit 17	Reserved
Bit 18	Sensor ID
Bit 19 - Bit 31	Reserved

- *<Bluetooth Command>*: The parameter that specifies the *<Bluetooth Command>* to be executed when *<Sub Command>* is set to 14.
"RST": Reset Bluetooth pairing information.
"QON": Enable Bluetooth broadcast
"QOF": Disable Bluetooth broadcast

If *<Sub Command>* is set to 2, and this parameter field is left empty, the device will report all the configurations via **+RESP:GTALM**.

- ✧ *<Sub Command Parameter>*: The parameter used together with some of the sub commands.

For the sub command RESET (4):

- 0: Light. Reset all configuration parameters, except parameters that are configured by the **AT+GTBSI**, **AT+GTSRI**, **AT+GTCFG**, **AT+GTPIN**, **AT+GTNTS** and **AT+GTTMA** commands.
- 1: Heavy. Reset all configuration parameters, except parameters configured by the **AT+GTPIN** command.

Note: This field is only valid when the *<AT Command / Configuration Mask>* field is empty.

For the sub command BLE (14) and *<Bluetooth Command>* field is "QON":

- 0: default. Set the broadcast timeout of Bluetooth as 30 seconds.
- 1: Set the broadcast timeout of Bluetooth as 60 seconds.
- 2: Set the broadcast timeout of Bluetooth as 300 seconds.
- 3: The Bluetooth will broadcast all the time and the device will not go into sleep mode.

NOTE: After Power-On or reboot by RTO-3 or GTDOG, the device will work in continuous mode if the interval is more than 30 seconds; also same work mode when broadcasting for more than 1 minute.

The acknowledgment message of the **AT+GTRTO** command:

- **+ACK:GTRTO,**

Example:

+ACK:GTRTO,2E0704,868487004351904,GL53MG,RTL,FFFF,20201111000006,0A78\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Sub Command	<=6	Sub Command String	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.2.4.2. Allowed Number List Configuration

The command **AT+GTWLT** is used to configure a list of authorized phone numbers which are allowed to perform the SMS function.

➤ AT+GTWLT=

Example:

AT+GTWLT=gl53,1,1,2,1381388888,13913999999,,,,,000C\$

SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gl53
2	Number Filter	1	0 1	0
3	Phone Number Start	<=2	1 - 10	
4	Phone Number End	<=2	1 - 10	
5	Phone Number List	<=20*10	(Call Number)	
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		
9	Reserved	0		
	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

✧ *<Number Filter>*: The parameter that indicates whether to filter the original number according to *<Phone Number List>* before executing SMS commands.

- 0: SMS commands will be executed no matter whether the original number is in the *<Phone Number List>*.
- 1: SMS commands will be executed only when the original number is in the

<Phone Number List>.

- ✧ <Phone Number Start>: The parameter that indicates the first index of the allowed numbers to be input. For example, if it is 1, the device will update the allowlist from the 1st number. If it is empty, <Phone Number List> should not include phone numbers.
- ✧ <Phone Number End>: The parameter that indicates the last index of the allowed numbers to be input. For example, if it is 2, the device will update the allowlist until the 2nd one. If it is empty, <Phone Number List> should not include phone numbers.
- ✧ <Phone Number List>: A phone number allowlist that could include several phone numbers. And two neighboring phone numbers are separated with ",". The number of the phone number in the list depends on the parameters <Phone Number Start> and <Phone Number End>. For example, if <Phone Number Start> is 1 and <Phone Number End> is 2, the <Phone Number List> should include 2 phone numbers and the two numbers are separated with ",".

Note: If more phone numbers are needed, please adjust <Phone Number Start> and <Phone Number End> for appropriate settings. If some phone numbers in <Phone Number List> are empty, then the corresponding phone numbers will be deleted. For example, to delete the 4th, 5th and 6th numbers of the <Phone Number List>, please set <Start Index> to 4 and <End Index> to 6 and keep those three phone numbers of <Phone Number List> empty.

The acknowledgment message of the **AT+GTWLT** command:

➤ **+ACK:GTWLT,**

Example:			
+ACK:GTWLT,2E0704,352948070074301,,000C,20161005095505,0025\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

Note: Make sure the size of the command does not exceed 160 bytes if it is sent via SMS.

3.2.4.3. Settings for SMS with Google Maps Link

The command **AT+GTGLM** is used to configure whether to send an SMS with a Google Maps link for an SOS event.

➤ **AT+GTGLM=**

Example: AT+GTGLM=gl53,1,1,1,13698562356,,,,,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	gl53
2	Google Mode	1	0 1 2	0
3	Phone Number Start	1	1 - 3	
4	Phone Number End	1	1 - 3	
5	Direct Number List	<=20*3		
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		
9	Reserved	0		
	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

- ✧ <Google Mode>: A numeral to indicate whether to send an SMS with a Google Maps link to the number in <Direct Number List> for SOS.
 - 0: Do not send an SMS with a Google Maps link to the number in the <Direct Number List> for SOS.
 - 1: Send an SMS with a Google Maps link including the device name to the number in the <Direct Number List> for SOS.
 - 2: Send an SMS with a Google Maps link not including the device name to the number in the <Direct Number List> for SOS.
- ✧ <Phone Number Start>: A numeral to indicate the first index of the direct numbers to be input. For example, if it is 1, the device will update the direct number list from the 1st number. If it is empty, there should be no <Direct Number List>.
- ✧ <Phone Number End>: A numeral to indicate the last index of the direct numbers to be input. For example, if it is 2, the device will update the direct number list until the 2nd one. If it is empty, there should be no <Direct Number List>.
- ✧ <Direct Number List>: A phone number allowlist that could include several phone numbers. Two adjacent phone numbers are separated with ",". The number of the phone numbers in the list is determined by the parameters <Phone Number Start> and <Phone Number End>. For example, if <Phone Number Start> is 1 and <Phone Number End> is 2, the <Direct Number List> should include 2 phone numbers and the two numbers are separated by ",".

The acknowledgment message of the **AT+GTGLM** command:

➤ **+ACK:GTGLM,**

Example: +ACK:GTGLM,2E0704,015181001707687,,0073,20190906073241,00AB\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	

Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.2.4.4. Over-the-Air Configuration Update

The **AT+GTUPC** command is used to download configuration file over the air for the update of the local configuration.

➤ AT+GTUPC=

Example:

AT+GTUPC=gl53,0,30,0,1,0,http://www.queclink.com/configure.ini,1,1,1,5,,3,0001
\$

SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gl53
2	Max Download Retry	1	0 - 3	0
3	Download Timeout	<=2	5 - 30(min)	10
4	Download Protocol	1	0	0
5	Report Enable	1	0 1	0
6	Update Interval	<=4	0 - 8760(hour)	0
7	Download URL	<=100	URL	
8	Mode	1	0 1	0
9	Reserved	0		
10	Extended Status Report	1	0 1	0
11	Identifier Number	<=8	(HEX)	0
12	Reserved	0		
13	Reserved	0		
	Serial Number	4	(HEX)	
	Tail Character	1	\$	\$

- ✧ <Max Download Retry>: It specifies the maximum number of retries to download the configuration file upon download failure.
- ✧ <Download Timeout>: It specifies the expiration timeout of a single download. If the download expires, it is considered to be failed.
- ✧ <Download Protocol>: The protocol used to download the file. Only HTTP is supported now, and this parameter is set to 0.
- ✧ <Report Enable>: A numeral which indicates whether to report the message **+RESP:GTUPC** when the configuration is updated over the air.
 - 0: Do not report the message **+RESP:GTUPC** or **+RESP:GTEUC**.
 - 1: Report the message **+RESP:GTUPC** or **+RESP:GTEUC**.
- ✧ <Update Interval>: The time measured in hours for updating the configuration over the air.
- ✧ <Download URL>: The parameter that specifies the URL to download the configuration file. If the <Download URL> ends with "/", it means the URL is just a path without a file name. The device will add <imei>.ini as the file name to complete the URL. If it is greater than 100 bytes in length, an error will be returned, The URL is a complete path and must contain an http header, such as http://.
- ✧ <Mode>: A numeral which indicates the working mode of updating configuration over the air.
 - 0: Disable this function.
 - 1: Enable this function.
- ✧ <Extended Status Report>: The parameter that indicates the message to be reported for the configuration update status when <Report Enable> is 1. In HEX format, this parameter is ignored and only the **+RESP:GTUPC** message will be sent to the backend server.
 - 0: Report the message **+RESP:GTUPC**.
 - 1: Report the message **+RESP:GTEUC** to include more information.
- ✧ <Identifier Number>: A numeral to identify the update configuration request. This number will be included in the message **+RESP:GTEUC** to indicate the request it is related to.

Note:

1. Make sure there is only one command per line in the configuration file and there is a "\r\n" between two commands. Only the first command will be executed when there is more than one command in a line.
2. There should be no space before each command.
3. The configuration file should be a plain text file.

The acknowledgment message of the **AT+GTUPC** command:

➤ **+ACK:GTUPC,**

Example:

+ACK:GTUPC,2E0704,868446036658678,GL53MG,0001,20190918070426,44C5\$

Parameter	Length (Byte)	Range/Format	Default
-----------	---------------	--------------	---------

Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.2.4.5. Configuration File Version

The command **AT+GTFVR** is used to record configuration information from the configuration file (generated by Manage Tool) to be downloaded by the device during update via **AT+GTUPC**.

➤ AT+GTFVR=

Example:

AT+GTFVR=gl53,TEST,0001,,,,,,,,,0010\$

Parameter	Length (Byte)	Range/Format	Default
Password	4 - 20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gl53
Configuration Name	<=40	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Configuration Version	4	0000 - 9999	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Digital Signature	32	'0'-'9', 'a'-'z', 'A'-'Z'	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Generation Time	14	YYYYMMDDHHMMSS	
Serial Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ <Configuration Name>: The name of the configuration file.
- ✧ <Configuration Version>: The version number of the configuration file. The first two characters indicate the major version number, and the last two characters indicate the minor version number.

- ✧ <Digital Signature>: The parameter is used to confirm the validity of subsequent commands.
- ✧ <Generation Time>: The time when the configuration file is generated.

Note: The **AT+GTFVR** command must be the first command in the configuration file.

The acknowledgment message of the **AT+GTFVR** command:

➤ **+ACK:GTFVR,**

Example: +ACK:GTFVR,2E0704,865284040754818,GL53MG, ,0010,20191224060848,479 E\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_',	
Generation Time	14	YYYYMMDDHHMMSS	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.2.4.6. SMS Position Request

This command can only be sent via SMS. Device will send SMS messages with Google Maps hyperlink of the current position immediately. Please refer to Chapter 3.3.5 for details of the position report.

Command Format	get position
Example	get position

get position: It is a command string to query current position and is not case sensitive.

3.2.5. Bluetooth Setting

3.2.5.1. Stolen Vehicle Recovery

This device is powered by internal battery only which can last 1-3 years based on actual usage. Small in size, the device (Ghost Device) can be hidden in many places in the vehicle. Another device (Wired Device) should be installed with permanent 12V power source. Both devices support Bluetooth Low Energy (BLE) connectivity and can generate the **+RESP:GTSVR** alert message if they determine a theft has occurred and the other one has been removed.

➤ **AT+GTSVR=**

Example: AT+GTSVR=gl53,1,111122223333,10,1,865585040008967,1,,,,,FFFF\$			
Parameter	Length (byte)	Range/Format	Default
Password	4 - 20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gl53
Mode	1	0 1	0
Target MAC Address	12	XXXXXXXXXXXX	FFFFFFF FFFFF
Connect Interval	<=4	10 20 30 60 120 180 240 360 480 720 1440	10
Connect Timeout Count	<=2	1 - 10	1
Target IMEI	15	'0' - '9'	00000000 0000000
Continuous Mode Switch	1	0 1	0
Hold Time	<=2	0 - 72(hour)	0
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	\$	\$

✧ <Mode>: The working mode of the stolen vehicle recovery function.

- 0: Disable this function.
- 1: Enable this function.

Note: If <Mode> in **AT+GTSVR** is set to 1, other features of Bluetooth will not work.

✧ <Target MAC Address>: The MAC address of the target device.

✧ <Connect Interval>: It defines the interval for connecting to the target device. Unit: minute.

✧ <Connect Timeout Count>: A numeral to indicate the number of times the device's Bluetooth cannot find the target device. If the number of connection failures exceeds the threshold specified by this parameter, the device will consider the target device has been removed and report the **+RESP:GTSVR** message.

✧ <Target IMEI>: The IMEI of the target device.

✧ <Continuous Mode Switch>: It specifies whether the device switches to continuous mode when the target device is lost or restored.

- 0: Do not switch to continuous mode.
- 1: Change the current working mode to continuous mode when the target device is lost, and reset the working mode to the mode configured by <Continuous Mode> when the target device is restored.

✧ <Hold Time>: The amount of time the device will work in continuous mode when the target device is lost and <Continuous Mode Switch> set 1, When the <Hold Time> ends, the device will return to the <Mode Selection> set by **AT+GTCFG**.

The acknowledgment message of the **AT+GTSVR** command:

➤ **+ACK:GTSVR,**

Example: +ACK:GTSVR,2E0704,869406800001101,GL53MG,0017,20190410103044,0452\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 - XXXFFF, X∈{'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.2.5.2. Bluetooth Beacon ID Setting

The command **AT+GTBID** is used to scan Bluetooth beacon ID accessories. This feature only supported by GL53MG Plus.

➤ **AT+GTBID=**

Example: AT+GTBID=gl53,,1,4,000A,,4,,,,,30,,,123456,ABCDEF,BCDEFA,CDEFAB,DEFABC,,,,,,FFFF\$			
Parameter	Length (Byte)	Range/Format	Default
Password	4 - 20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gl53
Reserved	0		
Enable	1	0 1	0
Beacon ID Accessory Model	1	4	4
Accessory Append Mask	<=4	0 - FFFF	000A
Reserved	0		
Expand Organization Unique Identifier Numbers	1	0 - 4	0
Reserved	0		
Reserved	0		

Reserved	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Organization Unique Identifier	6	(HEX)	
Organization Unique Identifier1 (Optional)	6	(HEX)	
Organization Unique Identifier2 (Optional)	6	(HEX)	
Organization Unique Identifier3 (Optional)	6	(HEX)	
Organization Unique Identifier4 (Optional)	6	(HEX)	
Message Type	1	0 1	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 - FFFF	
Tail Character	1	\$	\$

✧ <Enable>: Enable/disable this function.

- 0: Disable this function.
- 1: Enable this function.

✧ <Beacon ID Model>: The model of the Bluetooth accessory. The following is supported now:

- 4: WID310. Five reserved parameters are used as follows:

Reserved	0		
Reserved	0		
Advance detect interval	<=3	30 - 600(s)	30

Reserved	0		
Reserved	0		

- ✧ *<Advance detect interval>*: The Bluetooth will turn on in advance according to the this field, when the device generated the **+RESP:GTFRI**.
Note: If the device generates **+RESP:GTFRI** immediately, the device reports the saved beacon information. if *<Advance detect interval>* is greater than *<Continuous Send Interval>* and *<Mode Selection>* is set 1, The Bluetooth will turn on in advance according to the *<Continuous Send Interval>*.
- ✧ *<Accessory Append Mask>*: Bitwise mask to configure the composition of the Bluetooth accessory information in **+RESP:GTBIE** message.
 - Bit 0: Reserved
 - Bit 1: *<Accessory MAC>*
 - Bit 2: Reserved
 - Bit 3: *<Accessory Battery Level>*
 - Bit 4: Reserved
 - Bit 5: Reserved.
 - Bit 6: *<Accessory Signal Strength>*.
- ✧ *<Expand Organization Unique Identifier Numbers>*: The expand number of *<Organization Unique Identifier>*.
- ✧ *<Organization Unique Identifier>*: It is the first three bytes of Bluetooth address, which is composed of NAP and UAP. Only one Organization Unique Identifier (OUI) is allowed for each type of Bluetooth accessory. For example, 'AC233F' represents the Bluetooth Beacon E6. The 'AC23' is NAP, the '3F' is UAP. If the device detects this OUI, the **+RESP:GTBIE** message will be reported. If the value is empty, it means "Disable this function".
- ✧ *<Message Type>*: The type of message.
 - 0: Report **+RESP:GTBID** (MAX 15 device information will be reported).
 - 1: Report **+RESP:GTBIE** (MAX 100 device information will be reported).

The acknowledgment message of the **AT+GTBID** command:

➤ **+ACK:GTBID,**

Example:			
+ACK:GTBID,870704,869406800001101,GL53MG,0017,20190410103044,0452\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 - XXFFFF, X∈{'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'	
Serial Number	4	0000 - FFFF	
Send Time	14	YYYYMMDDHHMMSS	

Count Number	4	0000 - FFFF	
Tail Character	1	\$	\$

3.3. Report

This section defines the formats of the report messages. Due to the max length limit of an SMS message (160 bytes), it is recommended to carefully set the *<Report Item Mask>* in **AT+GTCFG** to limit the length of the report which contains GNSS position information in the case of SMS transmission. Otherwise the report will be truncated to fit the length of an SMS message.

3.3.1. Position Related Report

3.3.1.1. General Position Report

- **+RESP:GTRTL**: The message for the *<Sub Command>* set to 1 of the **AT+GTRTO** command
- **+RESP:GTPNL**: The first location message after the device powers on
- **+RESP:GTNMR**: Non-movement/ movement is detected by motion sensor according to the setting of the **AT+GTNMD** command
- **+RESP:GTDG**: The watchdog reboot message
- **+RESP:GTFRI**: Fixed-time message
- **+RESP:GTSOS**: The message reported after long pressing the function key if the function key is enabled and the mode is SOS mode

Example:

```
+RESP:GTRTL,2E0704,868487004352084,GL53MG,,0,1,3,0.6,0,17.0,121.408822,31.175222,20201125021711,0001,0001,0001,01A2D001,10,0,,61,1,0,1,13,20201125101711,09C5$
```

```
+RESP:GTPNL,2E0704,868487004352084,GL53MG,,0,1,3,3.3,306,16.3,121.408543,31.175148,20201125021810,0001,0001,0001,01A2D001,11,0,,61,1,0,1,13,20201125101810,09C8$
```

```
+RESP:GTNMR,2E0704,868487004352084,GL53MG,,1,1,3,0.4,0,15.6,121.408997,31.175212,20201125021937,0001,0001,0001,01A2D001,9,0,,61,1,1,1,13,20201125101937,09CC$
```

```
+RESP:GTDG,2E0704,868487004352084,GL53MG,,0,1,1,0.5,230,16.9,121.408642,31.175152,20201125022306,0001,0001,0000,01A2D001,5,0,,61,1,1,1,13,20201125102306,09D7$
```

+RESP:GTFRI,2E0704,868487004352084,GL53MG,,0,1,1,0.5,0,17.2,121.408407,31.174992,20201125021512,0001,0001,0001,01A2D001,10,0,,61,1,0,1,13,20201125101556,09C2\$

+RESP:GTSOS,2E0704,868487004352084,GL53MG,,0,1,0,1.8,16,15.3,121.409017,31.175290,20201125022121,0001,0001,0000,01A2D001,11,0,,61,1,0,1,13,20201125102221,09D3\$

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'	
Reserved	0		
Report Type	1	0 - 1 8 9 1 - 23	
Number	1	1	
GNSS Accuracy	<=2	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXXX.X (m)	
Longitude	<=11	(-)XXX.XXXXXXX	
Latitude	<=10	(-)XX.XXXXXXX	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4 8	(HEX)	
CSQ RSSI	<=2	0 - 31 99	
CSQ BER	<=2	0 - 7 99	
Number of Satellites (Optional)	<=2	0 - 99	
Battery Percentage	<=3	0 - 100	
Mode Selection	1	0 - 2	
Movement Status	1	0 1	
Radio Access Technology	1	0 - 2	
Band	<=4	0 - 1900	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

✧ *<Report Type>*: The type of the messages **+RESP:GTD0G** ,**+RESP:GTNMR** and **+RESP:GTFRI**. For other reports, it is 0.

● For **+RESP:GTD0G**

0: Reboot periodically according to the *<Interval>* and *<Time>* settings.

8: Reboot message for modem failure watchdog.

- 9: Reboot message for firmware failure watchdog in continuous mode
(For firmware failure in power saving mode, the device goes to sleep)
- For **+RESP:GTNMR**
 - 0: The state of the device changes from motion to rest.
 - 1: The state of the device changes from rest to motion.
 - For **+RESP:GTFRI**
 - <Power On Type> in the **+RESP:GTPNA** message would be filled here.
- ✧ <Number>: The number of points in one message. This parameter value is always 1.
 - ✧ <GNSS Accuracy>: A numeral to indicate the GNSS fix status and HDOP of the GNSS position. 0 indicates the current GNSS fix fails and the last known GNSS position is used. A non-zero value (1 - 50) indicates the current GNSS fix is successful and represents the HDOP of the current GNSS position. If <GNSS Enable> in **AT+GTCFG** is 0, the GNSS position information will be empty.
 - ✧ <Speed>: The speed read from GNSS.
 - ✧ <Azimuth>: The azimuth from GNSS.
 - ✧ <Altitude>: The height above sea level from GNSS.
 - ✧ <Longitude>: The longitude of the current position. The unit is degree, and accuracy is 6 decimal places. West longitude is represented as a negative value starting with the minus sign "-" and east longitude is represented as a positive value without "+".
 - ✧ <Latitude>: The latitude of the current position. The unit is degree, and accuracy is 6 decimal places. South latitude is represented as a negative value starting with the minus sign "-" and north latitude is represented as a positive value without "+".
 - ✧ <GNSS UTC Time>: UTC time from GNSS.
 - ✧ <MCC>: Mobile country code. It is 3-digit in length and ranges from 000-999. If Bit 3 of the field <Report Item Mask> in **AT+GTCFG** is set to 0, the length of this field is 0 in ASCII format messages.
 - ✧ <MNC>: Mobile network code. It is 3-digit in length and ranges from 000-999. If Bit 3 of the field <Report Item Mask> in **AT+GTCFG** is set to 0, the length of this field is 0 in ASCII format messages.
 - ✧ <LAC>: Location area code in hex format.
 - ✧ <Cell ID>: Cell ID in hex format.
 - ✧ <CSQ RSSI>: The signal strength level.
 - ✧ <CSQ BER>: The quality of the network signal. The range is 0-7, and 99 is for unknown signal strength.
 - ✧ <Number of Satellites>: The number of satellites. The parameter is controlled by Bit 7 of <Report Item Mask>.
 - ✧ <Battery Percentage>: Current volume of the battery in percentage.
 - ✧ <Mode Selection>: Current mode of the device.
 - 0: Power saving mode (PSM)
 - 1: Continuous mode
 - 2: Automatic mode
 - ✧ <Movement Status>: The movement status of the device. **Note:** The <Sensor Enable> in the **AT+GTNMD** command must be enabled, otherwise this field is empty.
 - 0: Rest

- 1: Motion
- ✧ <Radio Access Technology>: The radio access technology the device is using.
 - 0: EGPRS
 - 1: CAT-M
 - 2: NB-IOT
- ✧ <Band>: Network band.

➤ **+RESP:GTGIN**

If Geo-Fence is configured and enabled, the device will send the message **+RESP:GTGIN** to the backend server according to settings when the device enters the Geo-Fence.

➤ **+RESP:GTGOT**

If Geo-Fence is configured and enabled, the device will send the message **+RESP:GTGOT** to the backend server according to settings when the device leaves the Geo-Fence.

Example:

+RESP:GTGIN,2E0704,868487004352084,GL53MG,,,1,00002,,,,1,1,4.9,107,29.8,121.409080,31.175257,20201125034533,0001,0001,0001,01A2D001,6,0,,20201125114534,0A2B\$

+RESP:GTGOT,2E0704,868487004352084,GL53MG,,,1,00001,,,,1,1,5.0,83,30.6,121.409073,31.175280,20201125034133,0001,0001,0001,01A2D001,7,0,,20201125114134,0A1D\$

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9' , 'a' - 'z' , 'A' - 'Z' , '-', ' ', '_'	
Reserved	0		
Reserved	0		
Area Type	1	1	
Area Mask	5	(HEX)	
Reserved	0		
Reserved	0		
Reserved	0		

Reserved	0		
Number	1	1	
GNSS Accuracy	<=2	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4 8	(HEX)	
CSQ RSSI	<=2	0 - 31 99	
CSQ BER	<=2	0 - 7 99	
Number of Satellites (Optional)	<=2	0 - 99	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ <Area Type>: This message is for circular area. The value is always 1.
- ✧ <Area Mask>: It indicates the report message is for a single or multiple circular area overlapping.
 - Bit 0: for GEO ID 0.
 - Bit 1: for GEO ID 1.
 - ...
 - Bit 19: for GEO ID 19.

For example, if the <Area Mask> is 03, it means the overlapping of GEO ID 0 and GEO ID 1.

3.3.1.2. Location Request Report

After the device receives the “get position” request via SMS, it will send the +RESP:GTLBC message to the backend server.

➤ **+RESP:GTLBC,****Example:**

**+RESP:GTLBC,2E0704,015425000021222,GL53MG,15889570956,3,0.3,0,146.0,114.0
16352,22.537313,20200109022915,0460,0001,253D,AEC3,21,0,,91,1,0,,202011091029
17,0B13\$**

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'	
Original Number	<=20	(Call Number)	
GNSS Accuracy	<=2	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXXX.X (m)	
Longitude	<=11	(-)XXX.XXXXXXX	
Latitude	<=10	(-)XX.XXXXXXX	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4 8	(HEX)	
CSQ RSSI	<=2	0 - 31 99	
CSQ BER	<=2	0 - 7 99	
Number of Satellites (Optional)	<=2	0 - 99	
Battery Percentage	<=3	0 - 100	
Mode Selection	1	0 - 2	
Movement Status	1	0 1	
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

✧ *<Original Number>*: The phone number which initiates this report.

3.3.2. Report for Real Time Querying

3.3.2.1. +RESP:GTALM

After the device receives the command **AT+GTRTO** to read all the configurations, it will send all configurations to the backend server via the message **+RESP:GTALM**. This message is only sent via EGPRS even if the report mode is Forced SMS mode. If the

message is too long, then it will be sub-packaged into several **+RESP:GTALM** messages. The **+RESP:GTALM** message does not support HEX report.

➤ **+RESP:GTALM,**

Example:

```
+RESP:GTALM,2E0704,861106050023665,,1,1,BSI,cmnbiot,,,cmnbiot,,,02,1,SRI,1,1,
1,101.230.71.114,20593,101.230.71.114,20593,,0,1,0,0,,,QSS,cmnbiot,,,1,,1,101.230.
71.114,20593,101.230.71.114,20593,,0,1,,0,CFG,,GL53MG,,0823,002F,1,5,111111111
11111,0,1200,0,1,24,1,1,1,5,0,0000,270,10,0,6,0,2,3,30,TMA,,0,0,0,,,,,GEO,0,0,,50,
1,0,,50,2,0,,50,3,0,,50,4,0,,50,5,0,,50,6,0,,50,7,0,,50,8,0,,50,9,0,,50,10,0,,50,11,0,
,,50,12,0,,50,13,0,,50,14,0,,50,15,0,,50,16,0,,50,17,0,,50,18,0,,50,19,0,,50,PIN,1,1
234,,,,,NTS,0,,,,,,,DOG,1,,7,0200,,1,0,,,WLT,0,,,,,,,PDS,1,00008019,,,,,FV
R,,0000,,,,,,,UPC,0,10,0,0,0,0,0,0,0,,,NMD,0,0,3,3,2,1440,2,0100,0200,,,,,SVR,0,
FFFFFFFFFFFFFFF,10,1,0000000000000000,0,,,GLM,1,1064899090533,,,,,2022120504
2140,00E4$
```

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_',	
Total Packets	<=2	1 - 15	
Current Packet	<=2	1 - 15	
Configurations	<=1500		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ <Total Packets>: The total number of **+RESP:GTALM** messages.
- ✧ <Current Packet>: The sequence number of the current **+RESP:GTALM** message.
- ✧ <Configurations>: The current configurations of the device.

Note: The length of every **+RESP:GTALM** message (including header and tail) should be no more than 1500 characters.

The configuration parameters of all commands are as follows:

Parameter	Length (Byte)	Range/Format	Default
BSI	3	BSI	
APN	<=64	(ASCII)	

APN User Name	<=30	(ASCII)	
APN Password	<=30	(ASCII)	
Backup APN	<=40	(ASCII)	
Backup APN User Name	<=30	(ASCII)	
Backup APN Password	<=30	(ASCII)	
APN Authentication Methods / Network Mode	2	00 - 33	00
LTE Mode	1	0 - 3	0
SRI	3	SRI	
Report Mode	1	0 - 6	
Manual Netreg	1	0 - 1	
Buffer Mode	1	0 - 2	
Main Server IP / Domain Name	<=60	(ASCII)	
Main Server Port	<=5	0 - 65535	
Backup Server IP / Domain Name	<=60	(ASCII)	
Backup Server Port	<=5	0 - 65535	
SMS Gateway	<=20	(Call Number)	
Heartbeat Interval	<=3	0 5 - 360(min)	
SACK Enable	1	0 - 2	
SMS ACK Enable	1	0 1	
PSM Network Hold Time	<=5	0 - 86400 (sec)	
Reserved	0		
TLS Enable	1	0 1	
QSS			
APN	<=64	(ASCII)	
APN User Name	<=30	(ASCII)	
APN Password	<=30	(ASCII)	

Report Mode	1	0 - 6	
Reserved	0		
Buffer Mode	1	0 - 2	
Main Server IP / Domain Name	<=60	(ASCII)	
Main Server Port	<=5	0 - 65535	
Backup Server IP/ Domain Name	<=60	(ASCII)	
Backup Server Port	<=5	0 - 65535	
SMS Gateway	<=20	(Call Number)	
Heartbeat Interval	<=3	0 5 - 360(min)	0
SACK Enable	1	0 - 2	0
Reserved	0		
SMS ACK Enable	1	0 1	0
CFG	3	CFG	
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Discard No Fix	1	0 1	0
Event Mask	4	(HEX)	
Report Item Mask	<=4	(HEX)	
Mode Selection	1	0 - 2	
Continuous Send Interval	<=4	0 1-1440(min)	
Week Report Selection	14	'0' - '1'	
Start Mode	1	0 - 2	
Specified time of day	4	HHMM	
Adjustment Enable	1	0 - 1	
Initial Wakeup Interval	<=2	1 - 4 6 8 12 24	
Final Wakeup Interval	<=2	1 - 4 6 8 12 24	
Hold Days	<=2	1 - 99	
Report frequency	<=3	1 - 100	

GNSS Enable	1	0 1	
GNSS Fix Delay	2	5 - 60(sec)	
AGPS Mode	1	0 1	
GNSS Timeout	<=3	60 - 270	270
GSM Report	0	(HEX)	
Battery Low Percentage	<=2	0 - 30	
Function Key Mode	1	0 - 2	
CSQ Threshold	<=2	0-31	6
SOS Report Mode	1	0 - 2	
Location Request Mask	1	0 2	
CSQ Threshold Times	1-2	1 - 10	3
CSQ Threshold Timeout	2	15 - 90 (sec)	30
GSM Item Mask	<=4	(HEX)	0000
TMA	3	TMA	
Sign	1	+/-	
Hour Offset	<=2	0 - 12	
Minute Offset	<=2	0 - 59	
Daylight Saving	1	0 1	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
GEO	3	GEO	
GEO ID0	1	0	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	

GEO ID1	1	1	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID2	1	2	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID3	1	3	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID4	1	4	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID5	1	5	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID6	1	6	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	

GEO ID7	1	7	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID8	1	8	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID9	1	9	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID10	2	10	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID11	2	11	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID12	2	12	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	

GEO ID13	2	13	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID14	2	14	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID15	2	15	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID16	2	16	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID17	2	17	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
GEO ID18	2	18	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	

GEO ID19	2	19	
Mode	1	0 - 3	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Radius	<=7	50 - 6000000(m)	
PIN	3	PIN	
Auto Unlock PIN	1	0 1	
PIN	4-8	'0' - '9'	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
NTS	3	NTS	
Enable	1	0 1	0
Reserved	0		
Reserved	0		
Allowed Oper1	5 6	00000 - 99999 000000 - 999999	
Allowed Oper2	5 6	00000 - 99999 000000 - 999999	
Allowed Oper3	5 6	00000 - 99999 000000 - 999999	
Reserved	0		
Blocked Oper1	5 6	00000 - 99999 000000 - 999999	
Blocked Oper2	5 6	00000 - 99999 000000 - 999999	
Blocked Oper3	5 6	00000 - 99999 000000 - 999999	
Reserved	0		
DOG	3	DOG	

Mode	1	0 - 1	
Reserved	0		
Interval	<=2	1 - 30(day hour)	
Time	4	HHMM	
Reserved	0		
Report Before Reboot	1	0 1	
Reserved	0		
Unit	1	0 1	
Reserved	0		
Reserved	0		
Reserved	0		
WLT	3	WLT	
Call Filter	1	0 1	
Allowed Number List Number	<=20*10	(Call Number)	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
PDS	3	PDS	
Mode	1	0 - 2	
Mask	8	00000000-FFFFFFFF	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
FVR	3	FVR	
Configuration Name	<=40	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_',	
Configuration Version	4	0000 - 9999	

Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Generation Time	14	YYYYMMDDHHMMSS	
UPC	3	UPC	
Max Download Retry	1	0 - 3	
Download Timeout	<=2	5 - 30(min)	
Download Protocol	1	0	
Report Enable	1	0 1	
Update Interval	<=4	0 - 8760(hour)	
Download URL	<=100	URL	
Mode	1	0 1	
Reserved	0		
Extended Status Report	1	0 1	0
Identifier Number	<=8	(HEX)	0
Reserved	0		
Reserved	0		
NMD	3	NMD	
Sensor Enable	1	0 - 1	
Mode	1	0 - F	
Non-movement Duration	<=3	1 - 200(*15sec)	
Movement Duration	<=2	3 - 50(*100ms)	
Movement Threshold	1	2 - 9	

Rest Send Interval	<=4	5 - 1440(min)	
Report Mode	1	1 - 3	
Working Hours Start	4	HHMM	0000
Working Hours End	4	HHMM	0000
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
SVR	3	SVR	
Mode	1	0 1	0
Target MAC Address	12	XXXXXXXXXXXX	FFFFFFFF FFF
Connect Interval	4	10 20 30 60 120 180 240 360 480 720 1440	10
Connect Timeout Count	<=2	1 - 10	1
Target IMEI	15	'0' - '9'	0000000000 00000
Continuous Mode Switch	1	0 1	0
Hold Time	<=2	0 - 72(hour)	0
Reserved	0		
Reserved	0		
Reserved	0		
GLM	3	GLM	
Google Mode	1	0 1 2	
Direct Number	<=20*3	(Call Number)	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
BID	3	BID	

Reserved	0		
Enable	1	0 1	0
Beacon ID Accessory Model	1	4	4
Accessory Append Mask	<=4	0 - FFFF	000A
Reserved	0		
Expand Organization Unique Identifier Numbers	1	0 - 4	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Organization Unique Identifier	6	(HEX)	
Organization Unique Identifier1 (Optional)	6	(HEX)	
Organization Unique Identifier2 (Optional)	6	(HEX)	
Organization Unique Identifier3 (Optional)	6	(HEX)	
Organization Unique Identifier4 (Optional)	6	(HEX)	
Message Type	1	0 1	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.3.2.2. +RESP:GTCID

After the device receives the command **AT+GTRTO** to read the ICCID of the SIM card, it will send the ICCID to the backend server via the message **+RESP:GTCID**.

➤ +RESP:GTCID,

Example:

+RESP:GTCID,2E0704,868487004352191,GL53MG,898600200918F2006058,20201125165804,03CF\$

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
ICCID	20	"0" - '9', 'A' - 'Z'	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.3.2.3. +RESP:GTCSQ

After the device receives the command **AT+GTRTO** to read the LTE signal level, it will send the LTE signal level to the backend server via the message **+RESP:GTCSQ**.

➤ +RESP:GTCSQ,

Example:

+RESP:GTCSQ,2E0704,868487004352191,GL53MG,898600200918F2006058,20201125190121,03FB\$

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	

CSQ RSSI	<=2	0 - 31 99	
CSQ BER	<=2	0 - 7 99	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

✧ <CSQ RSSI>: The signal strength level.

CSQ RSSI	Signal Strength (dBm)
0	<-113
1	-111
2 - 30	-109 - -53
31	>-51
99	Unknown

✧ <CSQ BER>: The quality of the network signal. The range is 0-7 and 99 is for unknown signal strength.

3.3.2.4. +RESP:GTVER

After the device receives the command **AT+GTRTO** to get the versions (including firmware version and hardware version), it will send the version information to the backend server via the message **+RESP:GTVER**.

➤ **+RESP:GTVER,**

Example:

+RESP:GTVER,2E0704,865284040753059,GL53MG,GL53MG,0706,0103,,0103,0222,84FD27DEA935,20230327070459,0332\$

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_',	
Device Type	<=10	'0' - '9', 'a' - 'z', 'A' - 'Z'	
Firmware Version	4	(HEX)	
Hardware Version	4	(HEX)	
Reserved	0		
Modem Hardware Version	4	0000 - 9999	

Modem Software Version	<=50		
MAC Address	12	XXXXXXXXXXXX	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ *<Firmware Version>*: The firmware version. The first two characters represent the major version and the last two characters represent the minor version. For example, **010A** means the version **1.10**.
- ✧ *<Hardware Version>*: The hardware version. The first two characters represent the major version and the last two characters represent the minor version. For example, **010A** means the version **1.10**.
- ✧ *<Modem Hardware Version>*: It gives the modem hardware information of this device.
- ✧ *<Modem Software Version>*: It gives the modem software version information of this device.
- ✧ *<MAC Address>*: The Bluetooth MAC address of device.

3.3.2.5. +RESP:GTTMZ

After the device receives the command **AT+GTRTO** to get the time zone settings, it will send the time zone information via the message **+RESP:GTTMZ** to the backend server.

➤ +RESP:GTTMZ,

Example: +RESP:GTTMZ,2E0704,868487004352191,GL53MG,-1100,0,20201125190547,0404\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Time Zone Offset	5	+/- HHMM	
Daylight Saving	1	0 1	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

3.3.2.6. +RESP:GTAIF

If the real-time operation is enabled and the parameter <Sub Command> is set to 'D' by the command **AT+GTRTO**, the device will send the APN, ICCID, RSSI, cell ID, and IP information via the message **+RESP:GTAIF** to the backend server.

➤ +RESP:GTAIF,

Example:

```
+RESP:GTAIF,2E0704,868487004352191,GL53MG,cmiot,,,,,898600200918F200605
8,31,0,8790,10.5.173.164,211.136.150.66,211.136.150.66,,,,1,20201125190643,0406$
```

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'	
APN	<=64	(ASCII)	
APN User Name	<=30	(ASCII)	
APN Password	<=30	(ASCII)	
Backup APN	<=40	(ASCII)	
Backup APN User Name	<=30	(ASCII)	
Backup APN Password	<=30	(ASCII)	
ICCID	20	(HEX)	
CSQ RSSI	<=2	0 - 31 99	
CSQ BER	<=2	0 - 7 99	
Cell ID	4 8	(HEX)	
IP Address	<=15	(IP)	
Main DNS	<=15	(IP)	
Backup DNS	<=15	(IP)	
Reserved			
Reserved			
Reserved			
Network Type	1	0 - 1 3	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	

Tail Character	1	\$	\$
----------------	---	----	----

✧ <CSQ RSSI>: The signal strength level.

CSQ RSSI	Signal Strength (dBm)
0	<-133
1	-111
2 - 30	-109 - -53
31	>-51
99	Unknown

✧ <CSQ BER>: The strength of the network signal. The range is 0-7, and 99 means unknown.

✧ <Cell ID>: Cell ID in hex format.

✧ <IP Address>: The IP address of the device.

✧ <Main DNS>: The main DNS server.

✧ <Backup DNS>: The backup DNS server.

✧ <Network Type>: Current network type.

- 0: Unregistered.
- 1: EGPRS
- 3: LTE

3.3.2.7. +RESP:GTGSV

After the device receives the command to get satellite information, it will send the satellite information via the message **+RESP:GTGSV** to the backend server.

➤ **+RESP:GTGSV,**

Example: +RESP:GTGSV,2E0704,015425000020117,GL53MG,11,2,42,5,27,6,35,7,0,9,33,12,33,17,32,19,35,25,25,29,46,30,18,202011111110234,0008\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	XX0000 - XXFFFF, X∈{'A' - 'Z','0' - '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'	
SV Count	<=2	0 - 24	
SV ID	<=3	>= 0	
SV Power	<=3	>= 0	
...			

SV ID	<=3	>= 0	
SV Power	<=3	>= 0	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ <SV Count>: The count of satellites the GNSS finds.
- ✧ <SV ID>: The satellite ID. In case of no satellite, the field is filled with zero.
- ✧ <SV Power>: Satellite power. In case of no satellite, the field is filled with zero.

3.3.2.8. +RESP:GTATI

After the device receives the command **AT+GTRTO** to get the basic device information (including modem firmware version and hardware version information), it will send the version information to the backend server via the message **+RESP:GTATI**.

➤ +RESP:GTATI,

Example:

+RESP:GTATI,2E0704,868487004352191,GL53MG,GL53MG,00041083,0110,0110,0000,0101,FF,20201125190831,040C\$

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Device Type	<=10	'0' - '9', 'a' - 'z', 'A' - 'Z'	
ATI Mask	8	(HEX)	
Firmware Version	4	(HEX)	
MCU Firmware Version	4	(HEX)	
Modem Firmware Version	4	0000 - 9999	
Hardware Version	4	(HEX)	
Sensor ID	2	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	

Tail Character	1	\$	\$
----------------	---	----	----

- ✧ <Device Type>: The type of the device.
- ✧ <ATI Mask>: Please refer to <ATI Mask> in the command **AT+GTRTO**.
- ✧ <Firmware Version>: The firmware version of the device. The first two characters indicate the major version and the last two characters indicate the minor version. For example, **010A** means the version **1.10**.
- ✧ <MCU Firmware Version>: The MCU firmware version of the device. The first two characters indicate the major version and the last two characters indicate the minor version. For example, **0102** means the version **1.02**.
- ✧ <Modem Firmware Version>: The Modem software version of the device. The first two characters indicate the major version and the last two characters indicate the minor version. For example, **0301** means the version **3.01**.
- ✧ <Hardware Version>: The hardware version of the device. The first two characters indicate the major version and the last two characters indicate the minor version. For example, **010A** means the version **1.10**.
- ✧ <Sensor ID>: It indicates the type of the sensor currently used by the device.

3.3.2.9. +RESP:GTINF

When <Sub Command> is set to 33 in the **AT+GTRTO** command, the device will send its information report via the message **+RESP:GTINF** to the backend server.

➤ +RESP:GTINF,

Example:

+RESP:GTINF,2E0704,865585040360574,GL53MG,89860000502000180722,21,0,,1,,31,,20220119083128,,,,,,,,,20220119083148,0092\$

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
ICCID	20	'0' - '9', 'A' - 'Z'	
CSQ RSSI	<=2	0 - 31 99	
CSQ BER	<=2	0 - 7 99	
Reserved	0		
Mode Selection	1	0 - 2	
Reserved	0		
Battery Percentage	3	0 - 100	

Reserved	0		
Last GNSS Fix UTC Time	14	YYYYMMDDHHMMSS	
Movement Status	1	0 1	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ <ICCID>: The ICCID of the SIM card.
- ✧ <CSQ RSSI>: The signal strength level.

CSQ RSSI	Signal Strength (dBm)
0	<-133
1	-111
2 - 30	-109 – -53
31	>-51
99	Unknown

- ✧ <CSQ BER>: The quality of the network signal. The range is 0–7, and 99 is for unknown signal strength.
- ✧ <Battery Percentage>: Current volume of the battery in percentage.
- ✧ <Last GNSS Fix UTC Time>: The UTC time of the latest successful GNSS fix.
- ✧ <Movement Status>: The motion status of the device.
 - 0: Rest
 - 1: Motion

3.3.3. Event Report

The following event reports are triggered when certain events occur.

+RESP:GTPNA: Power on report

+RESP:GTPFA: Power off report

+RESP:GTBPL: Battery low

+RESP:GTUPC: The report for over-the-air configuration update

+RESP:GTEUC: The report for over-the-air configuration update if <Extended Status Report> is 1.

+RESP:GTGSM: The report for the information of the serving cell and the neighbour cells. This report does not support the HEX format.

+RESP:GTSVR: Stolen vehicle recovery message

+RESP:GTIND: The indicate report for the device detects itself can not wakeup properly in previous wakeup, especially device is in a low battery environment.

In **+RESP:GTBPL** event report, the last known GNSS information and the current EGPRS/LTE network information are included.

➤ **+RESP:GTPNA,**

Example: +RESP:GTPNA,2E0704,868446036658678,GL53MG,20201121203001,451E\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Power On Type	<=2	1 - 23	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

✧ **<Power On Type>:** A numeral to indicate how the device is activated.

- 1: Movement detected by the device
- 2: Specified time reached
- 3: Reserved
- 4: Manual power on for the first time
- 5: RTO command or watchdog reboot
- 6: Abnormal power on
- 7: RTC error
- 8: FOTA process
- 9: Reserved
- 10: Reset PIN
- 11-13: Reserved
- 14: Active wakeup
- 15: Bluetooth lost
- 16: Bluetooth connected
- 17: Awake by the paired device
- 18-22: Reserved
- 23: Non-Movement detected by the device

Note: If device into sleep mode, that press button down for 3 times within 2 seconds will

wake it up, the power on type will be 14.

➤ **+RESP:GTPFA,**

Example: +RESP:GTPFA,2E0704,861039050000088,GL53MG,20201118152625,0184\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_',	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

➤ **+RESP:GTBPL,**

Example: +RESP:GTBPL,2E0704,868487004352084,GL53MG,,,1,0,0.5,0,6.5,121.409230,31.175332,20201126013045,0001,0001,0001,01A2D001,8,0,,9,1,1,,20201126122524,1150\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_',	
Reserved	0		
Reserved	0		
Number	1	1	
GNSS Accuracy	<=2	0 - 50	0, Last known
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	

LAC	4	(HEX)	
Cell ID	4 8	(HEX)	
CSQ RSSI	<=2	0 - 31 99	
CSQ BER	<=2	0 - 7 99	
Number of Satellites (Optional)	<=2	0 - 99	
Battery Percentage	<=3	0 - 100	
Mode Selection	1	0 - 2	
Movement Status	1	0 1	
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

✧ *<Number of Satellites>*: The number of satellites. The parameter is controlled by Bit 7 of the *<Report Item Mask>*.

➤ **+RESP:GTGSM,**

Example:

+RESP:GTGSM,2E0704,868487004361010,GL53MG,FRI,0460,0000,1805,4732,49,,0460,0000,1805,0EE8,49,,0460,0000,1807,44C8,31,,0460,0000,1805,0DEA,28,,0460,0000,1807,44CA,26,,,,,,,,,0460,0000,1805,9163,22,,20211115104524,000A\$

Parameter	Length	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_',	
Fix Type	3	FRI RTL GIR NMR	
MCC1	4	0XXX	
MNC1	4	0XXX	
LAC1	4	(HEX)	
Cell ID1	4 8	(HEX)	
RX level1	<=2	0 - 63	
Reserved	0		
MCC2	4	0XXX	

MNC2	4	0XXX	
LAC2	4	(HEX)	
Cell ID2	4 8	(HEX)	
RX level2	<=2	0 - 63	
Reserved	0		
MCC3	4	0XXX	
MNC3	4	0XXX	
LAC3	4	(HEX)	
Cell ID3	4 8	(HEX)	
RX level3	<=2	0 - 63	
Reserved	0		
MCC4	4	0XXX	
MNC4	4	0XXX	
LAC4	4	(HEX)	
Cell ID4	4 8	(HEX)	
RX level4	<=2	0 - 63	
Reserved	0		
MCC5	4	0XXX	
MNC5	4	0XXX	
LAC5	4	(HEX)	
Cell ID5	4 8	(HEX)	
RX level5	<=2	0 - 63	
Reserved	0		
MCC6	4	0XXX	
MNC6	4	0XXX	
LAC6	4	(HEX)	
Cell ID6	4 8	(HEX)	
RX level6	<=2	0 - 63	
Reserved	0		
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	

Cell ID	4 8	(HEX)	
RX level	<=2	0 - 63	
GSM Item Mask	<=4	(HEX)	
Battery Percentage (Optional)	<=3	0 - 100	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ <Fix Type>: A string which indicates the type of GNSS fix this cell information is for.
 "FRI": This cell information is for FRI request.
 "RTL": This cell information is for RTL request.
 "GIR": This cell information is for GIR request.
 "NMR": This cell information is for NMR request.
- ✧ <MCC (i)>: MCC of the neighbor cell *i* (*i* is the index of the neighbor cell).
- ✧ <MNC (i)>: MNC of the neighbor cell *i*.
- ✧ <LAC (i)>: LAC in hex format of the neighbor cell *i*.
- ✧ <Cell ID (i)>: Cell ID in hex format of the neighbor cell *i*.
- ✧ <RX level (i)>: The signal strength of the neighbor cell *i*. This parameter specifies a 6-bit value coded in 1. The dBm steps:
 0: -110 dBm
 1 to 62: -109 to -48 dBm
 63: -47 dBm
- ✧ <MCC>: MCC of the serving cell.
- ✧ <MNC>: MNC of the serving cell.
- ✧ <LAC>: LAC (in hex format) of the serving cell.
- ✧ <Cell ID>: Cell ID (in hex format) of the serving cell.
- ✧ <RX level>: The signal strength of the serving cell.
- ✧ <Battery Percentage>: Current volume of the battery in percentage. The parameter is controlled by Bit 8 of the <Report Item Mask> and <GSM Item Mask> of the **AT+GTCFG**.

Note:

1. It may include information of several neighbor cells. If no neighbor cell is found, the device will not report the message **+RESP:GTGSM**.
2. "ffff" in the fields of <LAC(i)> and <Cell ID(i)> means the device does not know the value.

➤ **+RESP:GTUPC,**

Example:

+RESP:GTUPC,2E0704,868487004352118,GL53MG,0,100,http://180.169.235.202:20194/UPC-GL53.ini,20201125095753,0818\$

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_', ' '	
Command ID	<=3	0 - 999	
Result	3	100 - 103 200 - 202 300 - 302 305 - 306	
Download URL	<=100	(URL)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ **<Command ID>**: The command ID in the update configuration file. It is always 0 before the device starts to update the configuration. It indicates the total number of the commands when the response code is 301. It indicates the ID of the command in wrong format when the response code is 302. It is empty when **<Result>** is greater than 302.
- ✧ **<Result>**: A numeral to indicate whether the configuration is updated successfully.
 - 100: The update command is starting.
 - 101: The update command is confirmed by the device.
 - 102: The update command is refused by the device.
 - 103: The update process is refused because the battery is low.
 - 200: The device starts to download the package.
 - 201: The device finishes downloading the package successfully.
 - 202: The device fails to download the package.
 - 300: The device starts to update the device configuration.
 - 301: The device finishes updating the device configuration successfully.
 - 302: The device fails to update the device configuration.
 - 305: The update process is interrupted by reboot.
 - 306: The update process is interrupted by MD5 verification error.
- ✧ **<Download URL>**: The complete URL to download the configuration. It includes the file name.

➤ **+RESP:GTEUC.**

Example:

+RESP:GTEUC,2E0704,868487004352118,GL53MG,0,100,http://180.169.235.202:20194/UPC-GL53 at.ini,11111111,....,20201124141321,0629\$

Parameter	Length(Byte)	Range/Format	Default
-----------	--------------	--------------	---------

Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Command ID	<=3	0 - 999	
Result	3	100 - 103 200 - 202 300 - 302 305 - 306	
Download URL	<=100	(URL)	
Identifier Number	8	(HEX)	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ **<Command ID>**: The command ID in the update configuration file. It is always 0 before the device starts to update the configuration. It indicates the total number of the commands when the response code is 301. It indicates the ID of the command in wrong format when the response code is 302. It is empty when the response code is 305 or 306.
- ✧ **<Result>**: A numeral to indicate whether the configuration is updated successfully.
 - 100: The update command is starting.
 - 101: The update command is confirmed by the device.
 - 102: The update command is refused by the device.
 - 103: The update process is refused because the battery is low.
 - 200: The device starts to download the package.
 - 201: The device finishes downloading the package successfully.
 - 202: The device fails to download the package.
 - 300: The device starts to update the device configuration.
 - 301: The device finishes updating the device configuration successfully.
 - 302: The device fails to update the device configuration.
 - 303: Reserved
 - 305: The update process is interrupted by abnormal reboot.
 - 306: The update process is interrupted by MD5 verification error.
- ✧ **<Download URL>**: The complete URL to download the configuration. It includes the file name.
- ✧ **<Identifier Number>**: Please refer to the parameter **<Identifier Number>** in the command **AT+GTUPC**.

➤ **+RESP:GTSVR,**

Example:

+RESP:GTSVR,2E0704,861106050000952,GL53MG,0,78054103B1B0,300000000000000000000000,0,0,0.1,0,59.9,121.401063,31.103422,20220119001454,0460,0000,1806,457F,16,0,,20220119084048,10D5\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 - XXFFFF, $X \in \{'A' - 'Z', '0' - '9'\}$	
Unique ID	15	IMEI	
Device Name	<=10	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_' '?'	
SVR Working State	1	0 1 2	
Target MAC Address	12	000000000000 - FFFFFFFF	
SVR Appending Information	<=30		
Target State	1	0 1	
GNSS Accuracy	<=2	0 - 50	0, Last known
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4 8	(HEX)	
CSQ RSSI	<=2	0 - 31 99	
CSQ BER	<=2	0 - 7 99	
Number of Satellites (Optional)	<=2	0 - 99	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

✧ <SVR Working State>: The parameter that indicates the status in which the +RESP:GTSVR alert message is generated.

- 0: The device loses connection with the target device.
- 1: The device regains connection with the target device normally.
- 2: The device fails to match the target device during installation phase.

✧ <SVR Appending Information>: The parameter that indicates additional Bluetooth information.

✧ <Target State>: The parameter that indicates the status of the target device.

- 0: Normal.

- 1: GSM jamming.

➤ **+RESP:GTIND,**

Example:

+RESP:GTIND,2E0704,868446036658678,GL53MG,2,20201120100000,20201121203001,451E\$

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Attempted Times	<=2	0 - 99	
Last Attempted Time	14	YYYYMMDDHHMMSS	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ *<Attempted Times>*: The number of times the device itself attempts to restore the normal wake up.
- ✧ *<Last Attempted Time>*: This time represents the last time the device detected that it could not wake up properly.

➤ **+RESP:GTBIE,**

Example:

+RESP:GTBIE,870704,861106050024994,GL53MGP_BID,2,1,1,0,0,0.1,0,66.2,121.348523,31.163238,20240528063128,0460,0000,1805,9163,,20240528063219,002F\$

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Detected Count	<=4	0 - 9999	
Total Frame	1	1 - 4	
Frame Index	1	1 - 4	
Beacon Number	<=2	0 - 30	
Beacon ID Model	1	4	

Accessory Append Mask	4	(HEX)	
Accessory MAC	12	(HEX)	
Accessory Battery Level	<=4	0 - 5000(mV)	
Accessory Signal Strength	1	-120 - 0	
GNSS Accuracy	<=2	0 - 50	0, Last known
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4 8	(HEX)	
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ <Detected Count>: The value to indicate the sequence number of beacon have been detected. It will start at 0 when it over 9999.
- ✧ <Total Frame>: A numeral to indicate the total number of frames that the following data takes up.
- ✧ <Frame Index>: A numeral to indicate the index of the current frame.
- ✧ <Beacon Number>: The number of the Bluetooth beacon accessories.
- ✧ <Beacon ID Model>: The model of the Bluetooth beacon ID accessory which is defined in **AT+GTBID**.
- ✧ <Accessory Append Mask>: Bitwise mask defined in the **AT+GTBID** command to indicate the reported Bluetooth beacon accessory data fields.
 - Bit 0: Reserved
 - Bit 1: <Accessory Mac>
 - Bit 2: Reserved

- Bit 3: <Accessory Battery Level>
 - Bit 4: Reserved
 - Bit 5: Reserved.
 - Bit 6: <Accessory Signal Strength>.
- ✧ <Accessory MAC>: The MAC address of the Bluetooth beacon accessory.
- ✧ <Accessory Battery Level>: The battery voltage of the Bluetooth beacon accessory.
- ✧ <Accessory Signal Strength>: The signal strength of Bluetooth accessory.

➤ **+RESP:GTBID,**

Example:

+RESP:GTBID,

870704,865284045844887,GL53MG,1,0,000A,78054101F4F5,2983,0,0.0,243,28.3,121.408779,31.175152,20200602023954,0460,0000,1877,8790,00,20200602023955,8430 \$

Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', ' ', '_'	
Beacon Number	<=2	0 - 30	
Beacon ID Model	1	4	
Accessory Append Mask	4	(HEX)	
Accessory MAC	12	(HEX)	
Accessory Battery Level	<=4	0 - 5000(mV)	
Accessory Signal Strength	1	-120 - 0	
GNSS Accuracy	<=2	0 - 50	0, Last known
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
GPS UTC Time	14	YYYYMMDDHHMMSS	

MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4 8	(HEX)	
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ *<Beacon Number>*: The number of the Bluetooth beacon accessories.
- ✧ *<Beacon ID Model>*: The model of the Bluetooth beacon ID accessory which is defined in **AT+GTBID**.
- ✧ *<Accessory Append Mask>*: Bitwise mask defined in the **AT+GTBID** command to indicate the reported Bluetooth beacon accessory data fields.
 - Bit 0: Reserved
 - Bit 1: *<Accessory Mac>*
 - Bit 2: Reserved
 - Bit 3: *<Accessory Battery Level>*
 - Bit 4: Reserved
 - Bit 5: Reserved.
 - Bit 6: *<Accessory Signal Strength>*.
- ✧ *<Accessory MAC>*: The MAC address of the Bluetooth beacon accessory.
- ✧ *<Accessory Battery Level>*: The battery voltage of the Bluetooth beacon accessory.
- ✧ *<Accessory Signal Strength>*: The signal strength of Bluetooth accessory.

3.3.4. Buffer Report

If the buffer report function is enabled by command **AT+GTSRI**, the device will save the report messages in a local buffer when the following occurs.

- ✧ EGPRS/LTE network is not available.
- ✧ EGPRS/LTE PDP context activation for the TCP or UDP connection fails.
- ✧ Establishment of the TCP connection with the backend server fails.

Those buffered messages will be sent to the backend server when connection to the server is recovered. The buffer reports are saved to the built-in non-volatile memory in case the device is reset. The device can buffer up to 10000 messages (160 bytes per message).

Detailed information about buffer report is listed below.

- ✧ Only **+RESP** messages except **+RESP:GTALM** are buffered.

- ✧ In the buffer report, the original header string “+RESP” is replaced by “+BUFF”. Other content such as the original sending time and count number will be kept the same.
- ✧ Buffered messages will be sent only via EGPRS/LTE by TCP or UDP protocol. They cannot be sent via SMS. If the current report mode is Forced SMS mode, the buffered messages will not be sent until the report mode is changed to TCP or UDP.
- ✧ The buffered messages will be sent after real time messages if <Buffer Mode> in **AT+GTSRI** is set to 1.
- ✧ The buffered messages will be sent before real time messages if <Buffer Mode> in **AT+GTSRI** is set to 2. The SOS message has the highest priority and is sent before the buffered messages.

Example:

The following is an example of the buffered message:

```
+BUFF:GTFRI,2E0704,868487004354866,GL53MG_auto720,,0,1,0,49.8,152,-
15.1,121.417997,31.127180,20210202103745,0460,0000,1887,F7C6,21,0,,98,2,1,0,180
0,20210202191257,006F$
```

3.3.5. Report with Google Maps Hyperlink

According to the settings of the **AT+GTGLM** command or upon receiving SMS Position Request message via SMS, the device can send an SMS with Google Maps hyperlink to a mobile phone.

If the device receives an SMS Position Request message via SMS, it will send the current position to the original number via SMS with Google Maps hyperlink if the original number is a direct number in the allowlist (please refer to <Direct Number List> in the Chapter 3.2.4.3).

If <Google Mode> in the command **AT+GTGLM** is set to 1 or 2, the device will send an SMS with Google Maps hyperlink to the direct phone numbers after the message +RESP:GTSOS.

➤ Google Maps Hyperlink,

Example:

GL53MG SOS:

<http://maps.google.com/maps?q=31.163270,121.348452>

F0 D2021/11/19T02:57:39 B97% I0 V0.6

Parameter	Length (Byte)	Range/Format	Default
SMS Header	<=30	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_',	

Google Maps Hyperlink Header	30	http://maps.Google.com/maps?q=	http://maps.Google.com/maps?q=
Latitude	<=10	-90 - 90	
Longitude	<=11	-180 - 180	
GNSS Fix	<=3	F0 F1	
GNSS UTC Time	20	DYYYY/MM/DDTHH:MM:SS	
Battery Percentage	<=6	B0% - B100%	
Motion Status	2	I0 I1	
Speed	<=6	V0.0 - 999.9 km/h	

- ✧ <SMS Header>: A string that includes the device name and GNSS fix type ("SOS"/"LBC").
- ✧ <Google Maps Hyperlink Header>: A string to indicate the header of a Google Maps hyperlink.
- ✧ <GNSS Fix>: The accuracy of the location information. F0 means "No GNSS fix".
- ✧ <Battery Percentage>: The percentage of the backup battery.
- ✧ <Motion Status>: The motion status of the device. 1 means "Motion", and 0 means "Rest".
- ✧ <Speed>: The current speed. Unit: km/h.

3.4. Heartbeat

Heartbeat is used to maintain the connection between the device and the backend server in the case of EGPRS/LTE communication. The heartbeat package is sent to the backend server at the interval defined by <Heartbeat Interval> in the **AT+GTSRI** command.

➤ +ACK:GTHBD,

Example: +ACK:GTHBD,2E0704,868446036658678,GL53MG,20201031203001,451F\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

Whenever the backend server receives a heartbeat package, it should reply with an acknowledgement to the device.

➤ **+SACK:GTHBD,**

Example: +SACK:GTHBD,2E0704,11F0\$ +SACK:GTHBD,,11F0\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Count Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ *<Protocol Version>*: The device type and the protocol version that the backend server supports. This field is optional. The backend server can just send an empty field to decrease the length of the heartbeat data acknowledgement.
- ✧ *<Count Number>*: The backend server uses the *<Count Number>* extracted from the heartbeat package from the device as the *<Count Number>* in the server acknowledgement of the heartbeat.

3.5. Server Acknowledgement

If server acknowledgement is enabled by the **AT+GTSRI** command, the backend server should reply to the device whenever it receives a message from the device.

➤ **+SACK:**

Example: +SACK:11F0\$			
Parameter	Length (Byte)	Range/Format	Default
Count Number	4	(HEX)	
Tail Character	1	\$	\$

- ✧ *<Count Number>*: The backend server uses the *<Count Number>* extracted from the received message as the *<Count Number>* in the server acknowledgement.

4. Appendix: Message Index

✧ Command and ACK

AT+GTBSI

+ACK:GTBSI

AT+GTSRI

+ACK:GTSRI

AT+GTQSS

+ACK:GTQSS

[AT+GTNTS](#)

[+ACK:GTNTS](#)

AT+GTCFG

+ACK:GTCFG

AT+GTPIN

+ACK:GTPIN

AT+GTDOG

+ACK:GTDOG

AT+GTTMA

+ACK:GTTMA

AT+GTNMD

+ACK:GTNMD

[AT+GTPDS](#)

[+ACK:GTPDS](#)

AT+GTABC

+ACK:GTABC

AT+GTGEO

+ACK:GTGEO

AT+GTRTO

+ACK:GTRTO

[AT+GTWLT](#)

[+ACK:GTWLT](#)

AT+GTGLM

+ACK:GTGLM

AT+GTUPC

+ACK:GTUPC

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+ACK:GTFVR

✧ Position Related Report

[+RESP:GTFRI](#)

[+RESP:GTRTL](#)

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✧ **Report for Querying**

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[+RESP:GTCID](#)

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[+RESP:GTVR](#)

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