GV50(P) @Track Air Interface Protocol

GSM/GPRS/GNSS Tracker

TRACGV50AN001

Version: 4.01

International Telematics Solutions Innovator

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Contents

0. Revision History

Revision	Date	Author	Description of Change
1.00	2016-07-27	Batty Zhang	1. Initial.
2.00	2017-05-05	Stefan Chang	1. Added the parameter <*Ignition Detection Mode*> to **AT+GTDIS**. 2. Added the event report **+RESP: GTIGN**, **+RESP: GTIGF** and **+RESP: GTIGL**. 3. Added the parameters <*Output ID*>, <*Output Status*>, <*Duration*> and <*Toggle Times*> to **AT+GTOUT** to support output function.
3.00	2017-05-07	Stefan Chang	1. Added the Virtual Ignition Detection function, and the commands **At +GTVVS** and **AT+GTAVS**.
3.00	2017-05-07	Borg Jiang	1. Modified Bit 4 in <*Event Mask*> of **AT+GTCFG** for the event report **+RESP: GTCID**.
3.00	2017-05-07	Borg Jiang	1. Modified the parameter <*AT Command / Configuration Mask / Satellite information Mask*> for **+RESP:GTGSV**, **+RESP:GTRSV** and **+RESP:GTBSV** messages in the **AT+GTRTO** command.
3.01	2017-05-08	Batty Zhang	1. Used one of the reserved fields of **AT+GTSRI** and **AT+GTQSS** as <*Protocol Format*> to set the format of the report message. 2. Updated the parameter <*Event Mask*> of the command **AT+GTCFG**. 3. Updated the parameter <*Known Roaming Event Mask*> of the command **AT+GTRMD**. 4. Added the command **AT+GTHRM** to customize the composition of the HEX report message. 5. Added description for HEX format report messages.
3.01	2017-05-26	Borg Jiang	1. Added <*CSQ RSSI*>, <*CSQ BER*> and <*Satellite Numbe*> to position related report **+RESP: GTFRI**. 2. Used Bit 26 of <*+RSP Mask*> in **AT+GTHRM** as the corresponding mask to control the reporting of <*CSQ RSSI*>, <*CSQ BER*> in hex format location report **+RSP**. 3. Changed the parameter <*Satellites in View*> to <*Satellite Number*>.
3.01	2017-06-12	Borg Jiang	1. Modified the default value of <*+RSP Mask*> in **AT+GTHRM**.
3.02	2017-06-21	Stefan Chang	1. Added the parameter <*Backup Battery VCC*> to the command **AT+GTINF**.

3.03	2017-08-18	Borg Jiang	1. Added <*Special SACK Enable*> to **AT+GTSRI**.
3.04	2017-08-29	Stefan Chang	1. Added the parameter <*Backup Battery Percentage*> to the report **+RESP: GTFRI**. 2. Added the parameter <*Battery Level*> of the <*+RSP Mask*> in the command **AT+GTHRM**.
3.05	2017-10-16	Stefan Chang	1. Added the parameter <*AGPS Mode*> to the command **AT+GTCFG**. 2. Changed the default <*Mode*> setting in **AT+GTGAM** to 0 (i.e. the **AT+GTGAM** function is disabled by default)
4.00	2017-12-18	Stefan Chang	1. Added <*Output Direction*> to **AT+GTRTO**.
4.00	2017-12-18	Sun Xu	1. Modified the highest bit of the input port status of <*Device Status*> in the **+RESP: GTFRI** message to indicate the the status of the main power. 2. Changed <*Digital Input Status*> to <*Input Status*> with the value range of 00-81.
4.01	2018-01-10	Stefan Chang	1. Modified the description of <*PDP Interval*> in **AT+GTDOG**.

1. Overview

1.1. Scope of This Document

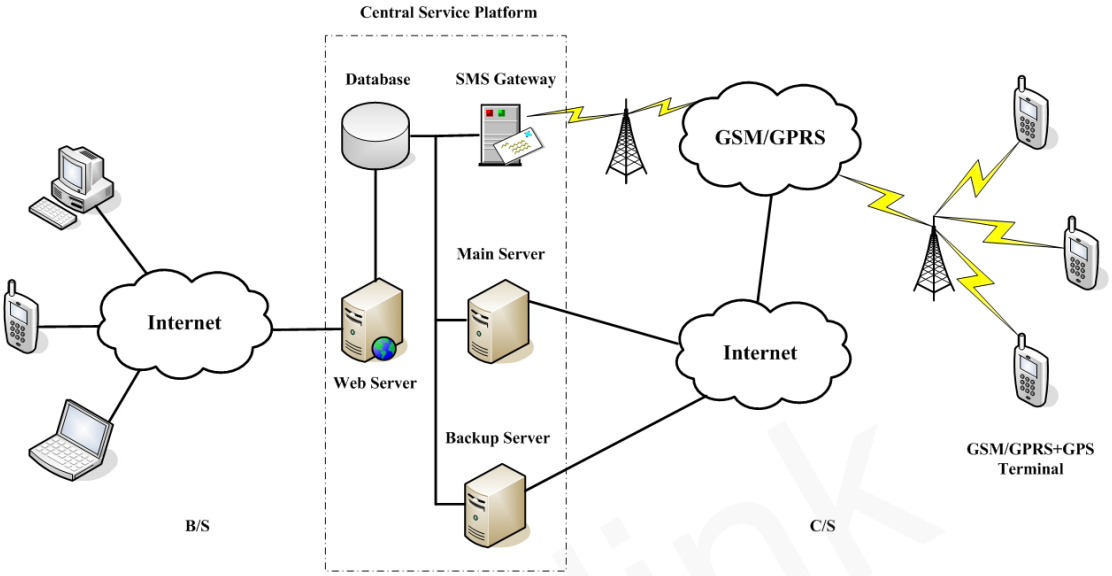
The @Track Air Interface Protocol is a digital communication interface based on printable ASCII characters over SMS or GPRS, which is used for all communications between the backend server and the terminal. The backend server sends a command to the terminal and then the terminal confirms the receipt with an acknowledgement message. If necessary, the terminal also sends report messages to the backend server.

The purpose of this document is to describe 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
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
GNSS	Global Navigation Satellite System
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

2. System Architecture



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

- ✧ The backend server should be able to access the internet and listen for the connection originating 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 to the terminal.
- ✧ The backend server should be able to receive and send SMS.

3. Message Description

3.1. Message Format

All of the @Track Air Interface Protocol messages are composed of printable ASCII characters. Message format which varies with message type is shown in the table below:

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

The entire message string ends with the character '$'.
The characters "XXX" allow the identification of the difference between messages.
The "<parameter1>,<parameter2>,…" carry the message's parameters. The number of parameters is different in different messages. The ASCII character ',' is used to separate the neighbouring parameter characters. The parameter string may contain the following ASCII characters: '0'–'9', 'a'–'z', and 'A'–'Z'.
Details of each message format are available in the corresponding message sections.

By sending Commands to the terminal, the backend server can either configure and query the parameters of the terminal or control the terminal when it performs specific actions. When the terminal receives Commands over the air, 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:

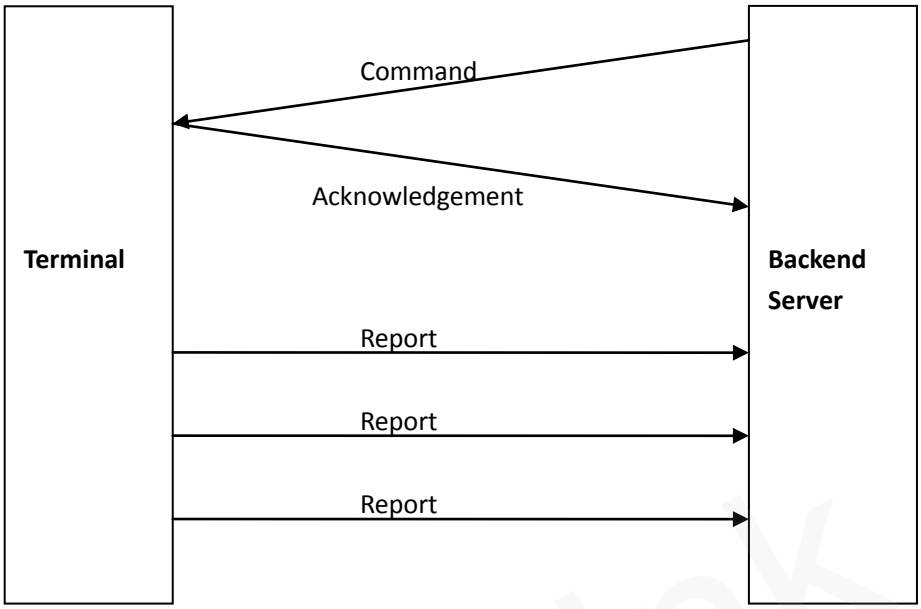


Figure 1: @Track Protocol Message Flow

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 GPRS parameters.

➢ **AT+GTBSI=**

Example: **AT+GTBSI=gv50,cmnet,,,,,,,0000$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
APN	<=40		
APN User Name	<=30		
APN Password	<=30		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	

Tail Character	1	$	$

- <*Password*>: The valid characters for the password include '0'– '9', 'a' –'z', and 'A' –'Z'. The default value is "gv50".
- <*APN*>: Access point name (APN).
- <*APN User Name*>: The GPRS APN user name. If the parameter field is empty, the current value for this parameter will be cleared.
- <*APN Password*>: The GPRS APN password. If the parameter field is empty, the current value for this parameter will be cleared.
- <*Reserved*>: Not used at present. Please keep the field empty.
- <*Serial Number*>: The serial number of the command. It will be included in the ACK message of the command.
- <*Tail Character*>: A character which indicates the end of the command. It must be '$'.

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

- **+ACK:GTBSI,**

Example: **+ACK:GTBSI,090200,135790246811220,,0000,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Protocol Version*>: The protocol version that the terminal conforms to. The first two characters indicate the device type. As shown in the example, "**09**" means GV50. The middle two characters represent the major version number of the protocol and the last two characters represent the minor version number of the protocol. And both version numbers are hex digits. For example, "**020A**" means version 2.10.
- <*Unique ID*>: The IMEI of the terminal.
- <*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 to send the ACK message.
- <*Count Number*>: A self-incrementing number in each acknowledgment message and report message. It begins from 0000 and increases by 1 for each message. And it recycles back after

"FFFF".

✧ <*Tail Character*>: A character which indicates 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 report messages be sent to the backend server.

3.2.1.2.Backend Server Registration Information

The command **AT+GTSRI** is used to configure where and how to report all the messages, including the server information and the communication method between the backend server and the terminal. When the terminal is configured correctly, it should be able to report data to the backend server.

➢ **AT+GTSRI=**

Example:
AT+GTSRI=gv50,3,,1,116.226.44.17,7011,116.226.45.229,7012,+8613812341234,15,1,,,,,0001$
AT+GTSRI=gv50,3,,1,some.host.name,7011,116.226.45.229,7012,+8613812341234,15,1,,,,,0001$
AT+GTSRI=gv50,8,,1,116.226.44.17:7010/GV50/message,7011,116.226.45.229,7012,+8613812341234,15,1,,,,,0001$
AT+GTSRI=gv50,8,,1,some.host.name:7011/GV50/message,7011,116.226.45.229,7012,+8613812341234,15,1,,,,,0001$

Parameter	Length (byte)	Range/Format	Default
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Report Mode	1	0 – 6 | 8	0
Reserved	0		
Buffer Mode	1	0|1|2	1
Main Server IP / Domain Name	<=60		
Main Server Port	<=5	0 – 65535	0
Backup Server IP	<=15		0.0.0.0
Backup Server Port	<=5	0 – 65535	0
SMS Gateway	<=20		
Heartbeat Interval	<=3	0|2 – 360min	0
SACK Enable	1	0|1	0
Protocol Format	1	0|1	0

SMS ACK Enable	1	0|1	0
Reserved	0		
Special SACK Enable	1	0|1	0
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Report Mode*>: This defines the communication method between the backend server and the terminal. Supported report modes are as follows:

- 0: Stop mode.
- 1: TCP short-connection preferred mode. The connection is based on TCP protocol. The terminal connects to the backend server every time it needs to send data and will shut down the connection when the terminal finishes sending data. And if it 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 terminal connects to the backend server every time it needs to send data and will shut down the connection when the terminal finishes sending data. And if it 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 terminal connects to the backend server and maintains the connection using the heartbeat data. The backend server should respond to the heartbeat data from the terminals.
- 4. UDP mode. The terminal will send data to the backend server by UDP protocol. Receiving protocol commands via UDP is supported if the GPRS network allows it. It is recommended to enable heartbeat sending and the **+RESP:GTPDP** report when receiving commands via UDP is the case.
- 5: Forced SMS mode. Only SMS is used for data transmission.
- 6: UDP with fixed local port. Like the UDP mode, the terminal will send data using UDP protocol. The difference is the terminal 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 terminals if the backend server and the terminals are all in the same VPN network. The port number the device uses is the same as the port number of the primary server.
- 7: Reserved.
- 8: HTTP GET Mode. The terminal will send message using HTTP GET method. The message to be sent is included in the URL of the HTTP GET Method. Only ASCII format message is sent in this mode. <*SACK Enable*> will be ignored, and the first character '+' will be replaced by the path defined in the URL.

  Examples of messages in this mode:

  Example1:

  URL: www.queclink.com:8080/report/

Message:

GET /report/ACK:GTQSS,390200,00000000000000,GV50,FFFF,20160831170607,0004A$ HTTP/1.1<CR><LF>
Host:220.178.67.210<CR><LF>
Accept: */*<CR><LF>
Accept-Language: en-us,en-gb,zh-cn<CR><LF>
User-Agent: Queclink_GV50<CR><LF>
Connection: Keep-Alive<CR><LF><CR><LF>

Example2:

URL: www.queclink.com:8080/report

Message:

GET /reportACK:GTQSS,390200,00000000000000,GV50,FFFF,20160831170607,004B$ HTTP/1.1<CR><LF>
Host:220.178.67.210<CR><LF>
Accept: */*<CR><LF>
Accept-Language: en-us,en-gb,zh-cn<CR><LF>
User-Agent: Queclink_GV50<CR><LF>
Connection: Keep-Alive<CR><LF><CR><LF>

Example3:

URL: www.queclink.com:8080

Message:

GET /RESP:GTINF,390200,00000000000000,GV50,41,,31,0,1,,,4.11,0,1,0,,,20160905065034,96,,37.9,,,20160905145038,04F2$ HTTP/1.1<CR><LF>
Host:220.178.67.210<CR><LF>
Accept: */*<CR><LF>
Accept-Language: en-us,en-gb,zh-cn<CR><LF>
User-Agent: Queclink_GV50<CR><LF>
Connection: Keep-Alive<CR><LF><CR><LF>

✧ <*Buffer Mode*>: The working mode of the buffer report function. If the device goes into areas without GSM/GPRS network coverage when the buffer report function is enabled, it will store all the report messages locally. When the device goes back to areas with GSM/GPRS network coverage, it will then send all the buffered reports through GPRS.

- 0: Disable the buffer report function.
- 1: Low priority - Enable the buffer report function. Under this working mode, the device will send the buffered messages after real time messages.
- 2: High priority - Enable the buffer report function. Under this working mode, the device will send all the buffered messages before real time message.

✧ <*Main Server IP / Domain Name*>: The IP address or the domain name of the primary server. For the HTTP GET mode, this represents the URL including server address and port number. For example, in “www.queclink.com:8080/report”, “www.queclink.com” is domain name of the HTTP server, “8080” is the port of the HTTP server and “report” is the URL header before message body data in the following HTTP GET packet. If there is no “/report” in the URL,

then there is no such header before message body data.

- <*Main Server Port*>: The port of the primary server. For the HTTP GET mode, this parameter is invalid.
- <*Backup Server IP*>: The IP address 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 "+" for sending SMS messages. Short code (for example, 10086) is also supported.
- <*Heartbeat Interval*>: The time interval for sending the heartbeat message (**+ACK:GTHBD**) when the 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 defines whether the backend server will respond to the terminal with SACK messages when receiving messages from the terminal. If the parameter <*SACK Enable*> is set to 1, <*Special SACK Enable*> will be disabled.
  - 0: The backend server will not reply with a SACK message after receiving a message from the terminal.
  - 1: The backend server will reply with a SACK message when receiving a message from the terminal.
- <*Protocol Format*>: This defines the format of the report message sent from the device to the backend server. 0 means "ASCII format", 1 means "HEX format".
- <*SMS ACK Enable*>: A numeral to indicate whether to send the acknowledgement message to the original number when the command is sent via SMS.
  - 0: The device will send the acknowledgement message to the backend server according to the mode configured by the <*Report Mode*>.
  - 1: The device will send the acknowledgement message to the original number via SMS if the command is received via SMS.
- <*Special SACK Enable*>: This parameter defines whether the backend server will repond to the terminal wilth special SACK messages when receiving the special messages (i.e. **+RESP:GTCID**) from the terminal. It is used when the parameter <*SACK Enable*> is disabled.
  - 0: The backend server will not reply with a special SACK message after receiving a message from the terminal.
  - 1: The backend server will reply with a special SACK message when receiving a message from the terminal.

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

- **+ACK:GTSRI,**

Example: **+ACK:GTSRI,090200,135790246811220,,0001,20090214093254,11F0$**			
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' '-' '_'	

Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

3.2.1.3.Quick Start Setting

The command **AT+GTQSS** is used to configure the GPRS parameters and backend server information if the length of all these settings is less than 160 bytes. Otherwise the two commands **AT+GTBSI** and **AT+GTSRI** are used to do it.

- **AT+GTQSS=**

Example: **AT+GTQSS=gv50,cmnet,,,3,,1,116.226.44.17,7011,116.226.45.229,7012,+8613812341234,15,1,,,,0002$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
APN	<=40		
APN User Name	<=30		
APN Password	<=30		
Report Mode	1	0 – 6 | 8	0
Reserved	0		
Buffer Mode	1	0|1|2	1
Main Server IP / Domain Name	<=60		
Main Server Port	<=5	0 – 65535	0
Backup Server IP	<=15		0.0.0.0
Backup Server Port	<=5	0 – 65535	0
SMS Gateway	<=20		
Heartbeat Interval	<=3	0|2 – 360min	0
SACK Enable	1	0|1	0

Protocol Format	1	0|1	0
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

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

- **+ACK:GTQSS,**

Example: **+ACK:GTQSS,090200,135790246811220,,0002,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.2.Device Configuration

3.2.2.1.Global Configuration

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

- **AT+GTCFG=**

Example: **AT+GTCFG=gv50,123456,gv50,,,,,,,,,,,,,,,,,0,0003$** **AT+GTCFG= gv50,,,1,123.4, ,,0,1,,2FF,,1,1,300,0, ,1,,,0,0003$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
New Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	gv50

ODO Enable	1	0|1	0
ODO Initial Mileage	<=9	0.0 – 4294967.0Km	0.0
Reserved	0		
Reserved	0		
Report Composition Mask	<=4	0000 – FFFF	003F
Power Saving Mode	1	0 – 2	1
Reserved	0		
Event Mask	<=4	0000 – FFFF	3D0F
Reserved	0		
LED On	1	1|2	2
Info Report Enable	1	0|1	0
Info Report Interval	<=5	30 – 86400sec	300
Location by Call	1	0|1|2|3	0
Reserved	0		
Reserved	0		
AGPS Mode	1	0|1	0
GSM Report	<=4	0000 – FFFF	0017
GPS Lost Time	<=2	0 – 30min	0
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*New Password*>: It is configured to change the current password.
- <*Device Name*>: An ASCII string which represents the name of the device.
- <*ODO Enable*>: Enable/disable the odograph function to calculate the total mileage. The current mileage is included in every position report message.
- <*ODO Initial Mileage*>: The initial value for calculating the total mileage.
- <*Report Composition Mask*>: Bitwise mask to configure the composition of a report message, especially the composition of GPS information.
  - Bit 0 for <*Speed*>
    - Bit 1 for <*Azimuth*>
    - Bit 2 for <*Altitude*>
  - Bit 3 for GSM tower data, including <*MCC*>, <*MNC*>, <*LAC*>, <*Cell ID*> and the <*Reserved*> parameter value “00”
    - Bit 4 for <*Mileage*>
    - Bit 5 for <*Send Time*>

- Bit 6 for <*Device Name*>

For each bit, set it to 1 to enable the corresponding component in the report, and 0 to disable the corresponding component. This mask is valid for all report messages. Bit 3 is invalid for the **+RESP:GTGSM** message.

✧ <*Power Saving Mode*>: It configures the mode of the power saving function. If the parameter <*Power Saving Mode*> is set to 0, the GPS will always be on. If the parameter value is set to 1, the fixed report, geo-fence and speed alarm report functions are suspended when the device is at a standstill or the engine is turned off (Auto parking fence and manual parking fence will not be suspended in this case). If the parameter value is set to 2, it is mostly like mode 1 and the difference is that the fixed report will not be suspended and the fix and send interval of it will be set to <*IGF Report Interval*> in **AT+GTFRI** when the engine is off.

- 0: Disable the power saving function.
- 1: Mode 1 of the power saving function.
- 2: Mode 2 of the power saving function.

✧ <*Event Mask*>: Bitwise mask to configure which event report will be sent to the backend server.

- Bit 0 for **+RESP:GTPNA**
- Bit 1 for **+RESP:GTPFA**
- Bit 2 for **+RESP:GTMPN**
- Bit 3 for **+RESP:GTMPF**
- Bit 4 for **+RESP:GTCID**
- Bit 5 Reserved
- Bit 6 Reserved
- Bit 7 Reserved
- Bit 8 for **+RESP:GTSTT**
- Bit 9 Reserved
- Bit 10 for **+RESP:GTPDP**
- Bit 11 for the power on **+RESP:GTRTL**
- Bit 12 for the ignition report **+RESP:GTIGN/+RESP:GTVGN** and **+RESP:GTIGF/+RESP:GTVGF**
- Bit 13 for the ignition on/off location report **+RESP:GTIGL/+RESP:GTVGL**

For each bit, set it to 1 to enable the corresponding event report, and 0 to disable the corresponding event report.

✧ <*LED On*>: It configures the working mode of LEDs.

- 1: Turn on Cell LED and GPS LED as configured.
- 2: All LEDs (Cell LED and GPS LED) work 10 minutes after power on and then will be off.

✧ <*Info Report Enable*>: Enable/disable the device information report (**+RESP:GTINF**) function. The device information includes state of the device, ICCID, GSM signal strength, voltage of external power supply, GPS LED working mode, the last known time of GPS fix, status of all digital inputs and outputs, time zone information and daylight saving setting.

- 0: Disable the device information report function.
- 1: Enable the device information report function.

- <*Info Report Interval*>: The interval for reporting the device information.
- <*Location by Call*>: It configures how to handle the incoming call.
  - 0: Just hang up the call.
  - 1: Hang up the call and report the current position with the **+RESP:GTLBC** message.
  - 2: Hang up the call and report the current position with a Google Maps link via SMS to the phone number of the incoming call.
  - 3: Hang up the call and report the current position with the message **+RESP:GTLBC**. At the same time, the deivce sends a Google Maps link via SMS to the phone number of the incoming call.
- <*AGPS Mode*>: A numeral which indicates whether to enable AGPS. AGPS helps increase the chances of getting GPS position successfully and reduces the time needed to get GPS position.
  - 0: Disable the AGPS function.
  - 1: Enable the AGPS function.
- <*GSM Report*>: It controls how or when to report cell information.

  The 2 high bits (Bit 14 – 15) indicate the GSM report mode.
  - 0: Do not allow the cell information report.
  - 1: Allow the cell information report after failing to get GPS position if cell information is available.
  - 2: Report the message **+RESP:GTGSM** after getting GPS position successfully every time if cell information is available.
  - 3: Report the message **+RESP:GTGSM** regardless of whether getting GPS position is successful or not every time if cell information is available.

  Bitwise mask to configure which event report will be sent to the backend server.
  - Bit 0 for **+RESP:GTRTL**
  - Bit 1 for **+RESP:GTLBC**
  - Bit 2 for **+RESP:GTFRI**
  - Bit 3 Reserved
  - Bit 4 for **+RESP:GTTOW**
  - Bit 5 – 13 Reserved

  For each bit, set it to 1 to enable the corresponding event report, and 0 to disable the corresponding event report.
- <*GPS Lost Time*>: A time parameter for the monitoring of GPS signals. If there is no GPS signal or successful GPS fix for <*GPS Lost Time*> consecutively, the device will send the event report **+RESP:GTGSS** to indicate "GPS signal lost". When the GPS signal is recovered or a successful fix is obtained again, the device will send the event report **+RESP:GTGSS** to indicate the recovery. 0 means "Disable this parameter".

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

- **+ACK:GTCFG,**

Example: **+ACK:GTCFG,090200,135790246811220,,0003,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.2.2.Auto-unlock PIN

The command **AT+GTPIN** is used to configure the auto-unlock PIN function of the device. Some operators offer SIM card with PIN code protection by default. To make the device work with the PIN-protected SIM card, this command is used to configure the device to auto-unlock the SIM PIN with the pre-set PIN code.

➢ **AT+GTPIN=**

Example: **AT+GTPIN=gv50,1,0000,,,,,,0014$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Enable Auto-unlock PIN	1	0|1	1
PIN	4 – 8	'0' – '9'	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Enable Auto-unlock PIN*>: Set it to 1 to enable the auto-unlock PIN function, and 0 to disable the auto-unlock PIN function.

✧ <*PIN*>: The PIN Code used to unlock the SIM PIN.

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

- **+ACK:GTPIN,**

Example: **+ACK:GTPIN,090200,135790246811220,,0014,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.2.3.Time Adjustment

The command **AT+GTTMA** is used to adjust the local time on the device remotely. Upon this command, the device will set the time zone and daylight saving accordingly. Then it will use the given UTC time to adjust the local time based on the time zone and daylight saving setting. This command will also be a trigger for the device to start GPS. After a successful GPS fix, the device will update the local time with the GPS UTC time again.

- **AT+GTTMA=**

Example: **AT+GTTMA= gv50,-,3,30,0,20090917203500,,,,,0011$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Sign	1	+|–	+
Hour Offset	<=2	0 – 23	0
Minute Offset	<=2	0 – 59	0
Daylight Saving	1	0|1	0
UTC Time	14	YYYYMMDDHHMMSS	
Reserved	0		
Reserved	0		

Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
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 on the device.

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

➢ **+ACK:GTTMA,**

Example: **+ACK:GTTMA,090200,135790246811220,,0011,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.2.4.Outside Working Hours

To protect the privacy of the driver when he is off duty, the device can be configured to report empty location information outside working hours. The command **AT+GTOWH** is used to define the working hours and the working mode to protect the privacy. If this function is enabled, the device will report empty latitude, empty longitude, and empty GSM tower information in all the report messages in ASCII format.

➢ **AT+GTOWH=**

Example:

AT+GTOWH=gv50,1,1F,0900,1200,1300,1730,,,,0,1,0,0,,,,,0012$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Mode	1	0|1	0
Day of Work	<=2	0 – 7F	1F
Working Hours Start1	4	HHMM	0900
Working Hours End1	4	HHMM	1200
Working Hours Start2	4	HHMM	1300
Working Hours End2	4	HHMM	1800
Reserved	0		
Reserved	0		
Reserved	0		
Output ID (GV50P)	1	0 – 1	0
Output Status (GV50P)	1	0|1	0
Duration (GV50P)	<=3	0 – 255(×100ms)	0
Toggle Times (GV50P)	<=3	0 – 255	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of this function.

- 0: Disable this function.
- 1: Enable this function. Under this mode, the device will automatically check the current time against the working hour range. If it is currently outside the working hours, the device will hide the location information. Otherwise the location information will be reported normally.

✧ <*Day of Work*>: It specifies the working days in a week in a bitwise manner.

- Bit 0 for Monday
- Bit 1 for Tuesday
- Bit 2 for Wednesday
- Bit 3 for Thursday

- Bit 4 for Friday
- Bit 5 for Saturday
- Bit 6 for Sunday

For each bit, 0 means “off day”, and 1 means “working day”.

✧ <*Working Hours Start1*>, <*Working Hours End1*>: The first period of the working hours in a day.

✧ <*Working Hours Start2*>, <*Working Hours End2*>: The second period of the working hours in a day.

✧ <*Output ID*>, <*Output Status*>, <*Duration*> and <*Toggle Times*>: If this function is enabled and it is currently off duty time, a specified wave will be output at the specified output. **Note:** All these four parameters ending with “(GV50P)” indicate that they only work on GV50P.

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

➢ **+ACK:GTOWH,**

Example: **+ACK:GTOWH,090200,135790246811220,,0012,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.2.5.Protocol Watchdog

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

➢ **AT+GTDOG=**

Example: **AT+GTDOG=gv50,1,,1,0130,,1,,,60,60,,0013$** **AT+GTDOG=gv50,2,30,,,,1,,,60,60,,0013$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Mode	1	0|1|2	0

Ignition Frequency	<=3	10 – 120 min	60
Interval	<=2	1 – 30 day	30
Time	4	HHMM	0200
Reserved	0		
Report Before Reboot	1	0|1	1
Reserved	0		
Reserved	0		
GSM Interval	4	0 | 5-1440 min	60
PDP Interval	4	0 | 5-1440 min	60
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Mode*>: The working mode of the watchdog function.
  - 0: Disable this function
  - 1: Reboot periodically according to the <*Interval*> and <*Time*> settings.
  - 2: Reboot upon ignition on. To use this mode, the ignition signal must be connected.
- <*Ignition Frequency*>: If the time interval between two adjacent ignitions is greater than the value specified by this parameter when the working mode is 2, the device will automatically reboot upon ignition on. The device will reboot automatically upon the second ignition on for the first time use whatever the time interval from the first ignition-on. To use this parameter, the ignition signal must be connected.
- <*Interval*>: The interval for rebooting the device. It is measured in days. Rebooting the device for the first time will ignore this interval.
- <*Time*>: The time to perform the reboot operation when <*Interval*> is reached.
- <*Report Before Reboot*>: Whether to report the **+RESP:GTDOG** 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 initiate a real-time location fix before sending the message with the current location information.
- <*GSM Interval*>: The time interval in minutes for rebooting the device when the device loses the GSM signal. 0 means "Do not reboot the device".
- <*PDP Interval*>: The interval for rebooting the device when PDP context activation fails or the interaction of messages fails (e.g. no TCP ack, Server ack). 0 means "Do not reboot the device". Before using this parameter, at least one of the two fields <*APN*> and <*Backup APN*> in the command **AT+GTBSI** should not be empty.

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

- **+ACK:GTDOG,**

Example: **+ACK:GTDOG,090200,135790246811220,,0013,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
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 states of the device. The specified logic states selected according to the value of <*Mask*> will be preserved or reset according to the working mode.

➢ **AT+GTPDS=**

Example: **AT+GTPDS=gv50,1,1F,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Mode	1	0|1|2	0
Mask	<=4	0000-FFFF	0
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of this function.
- 0: Disable this function.
- 1: Preserve specified logic state according to the value of <*Mask*>.
- 2: Reset all the specified logic states listed in the <*Mask*> after receiving the command, and then preserve specified logic state 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: State of GEO
- Bit 1: Reserved
- Bit 2: Reserved
- Bit 3: Information of last known position
- Bit 4: State of ignition
- Bit 5: State of wave shape 1
- Bit 6: Reserved
- Bit 7: State of SPD
- Bit 8: State of SSR
- Bit 9: State of main power

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

➢ **+ACK:GTPDS,**

Example: **+ACK:GTPDS,090200,135790246811220,,000D,20090214093254,FFFF$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.3.Position Related Report

3.2.3.1.Fixed Report Information

The command **AT+GTFRI** is used to configure the parameters of fixed report (**+RESP:GTFRI**).

➢ **AT+GTFRI=**

Example:
AT+GTFRI=gv50,0,,,,,,,,,,,,,,,0009$
AT+GTFRI=gv50,1,1,,1,1000,2300,,30,,,,,600,,,,,0009$
AT+GTFRI=gv50,2,1,,1,1000,2300,,,500,,,,,,,,0009$
AT+GTFRI=gv50,3,1,,1,1000,2300,,,,1000,,,,,,,0009$
AT+GTFRI=gv50,4,1,,1,1000,2300,,60,,300,,,,,,,0009$

Parameter	Length (byte)	Range/Format	Default
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Mode	1	0 – 5	0
Discard No Fix	1	0|1	1
Reserved	0		
Period Enable	1	0|1	1
Start Time	4	HHMM	0000
End Time	4	HHMM	0000
Reserved	0		
Send Interval	<=5	5 – 86400sec	30
Distance	<=5	50 – 65535m	1000
Mileage	<=5	50 – 65535m	1000
Reserved	0		
Corner Report	<=3	0 – 180	0
IGF Report Interval	<=5	0|5 - 86400sec	600
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of the fixed report function.

- 0: Disable this function.
- 1: Fixed Time Report. The position report message is sent to the backend server periodically according to the parameter <*Send Interval*>.
- 2: Fixed Distance Report. The position report message is sent to the backend server when the straight-line distance between the current GPS position and the last sent

GPS position is greater than or equal to the distance specified by the parameter <*Distance*>. Connect the vehicle ignition signal to the ignition detection port of the device for this function.

- 3: Fixed Mileage Report. The position report message is sent to the backend server when the path length between the current GPS position and the last sent GPS position is greater than or equal to the mileage specified by the parameter <*Mileage*>. Connect the vehicle ignition signal to the ignition detection port of the device for this function.
- 4: Optimum Report. The device simultaneously observes both time interval and path length between two adjacent position reports. It will report device position if the calculated time interval between the current time and time of last report is greater than <*Send Interval*>, and the length of path between the current position and the last position is greater than <*Mileage*>. Connect the vehicle ignition signal to the ignition detection port of the device for this function.
- 5: Fixed Time or Mileage Report. The device checks either time interval or path length between two adjacent position reports. It will report device position if the calculated time interval between the current time and time of last report is greater than <*Send Interval*>, or the length of path between the current position and the last position is greater than <*Mileage*>. Connect the vehicle ignition signal to the specified digital input port of the device for this function.

✧ <*Discard No Fix*>: Disable/enable reporting when there is no GPS fix.
- 0: Enable reporting.
- 1: Disable reporting.

✧ <*Period Enable*>: Disable/enable the time range specified by <*Start Time*> and <*End Time*>. If the time range is enabled, the position reporting will be limited within the time range.

✧ <*Start Time*>: The start time of the scheduled report. The valid format is “HHMM”. The value range of “HH” is “00”–“23”. The value range of “MM” is “00”–“59”.

✧ <*End Time*>: The end time of the scheduled report. The valid format and range are the same as those of <*Start Time*>.

✧ <*Send Interval*>: The time interval for sending the position information. The value range is 5 – 86400 and the unit is second. If <*Report Mode*> in **AT+GTSRI** is set to forced SMS mode, this value should be greater than 15 seconds.

✧ <*Distance*>: The specified distance for sending the position information when <*Mode*> is 2. Unit: meter.

✧ <*Mileage*>: The specified length for sending the position information when <*Mode*> is 3 and 4. Unit: meter.

✧ <*Corner Report*>: The threshold to determine whether the device is turning around a corner. 0 means “Disable the corner report”. For other values, the device will compare the current azimuth with that of the last known corner. If the difference is greater than or equal to this value, the corner report will be sent with **+RESP:GTFRI**.

✧ <*IGF Report Interval*>: The time interval for fixing and sending the position information when <*Power Saving Mode*> in **AT+GTCFG** is set to 0|2 and the engine is off. If <*IGF Report Interval*> is less than 60 seconds, the GPS will be always on. Its value range is 0|5 – 86400 and the unit is second.

Note: If the current <*Mode*> is not 0 and the <*Power Saving Mode*> in **AT+GTCFG** is set to 0 or 2, the message **+RESP:GTFRI** will be sent to the backend server periodically according to the parameter <*IGF Report Interval*> when the engine is off.

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

- **+ACK:GTFRI,**

Example: **+ACK:GTFRI,090200,135790246811220,,0009,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.3.2.Frequency Change of Fixed Report Information

The command **AT+GTFFC** is used to change the parameters of fixed report when certain event occurs, so that different report interval requirements can be met. When the event disappears, the device will resume its previous settings.

The device supports up to 5 sets of parameters for different events. Priority is assigned among these events. Only the parameters for the highest priority event are applied if more than one event occurs at the same time.

- **AT+GTFFC=**

Example: **AT+GTFFC=gv50,0,1,0,,,,,,,30,500,500,300,,0,,,,,0000$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Priority	1	0-4	0
Mode	1	0-3	0
FRI Mode	1	0-5	0

Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
FRI IGN Report Interval	<=5	5-86400s	30
FRI Report Distance	<=5	50-65535m	500
FRI Report Mileage	<=5	50-65535m	500
FRI IGF Report Interval	<=5	0|5-86400s	300
Reserved	0		
Corner Report	<=3	0 – 180	0
Reserved			
Reserved			
Reserved			
Reserved			
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Priority*>: Priority of the event which triggers the parameter change for fixed report. 0 indicates the highest priority.
- <*Mode*>: It specifies the trigger event for the change of fixed report parameters.
  - 0: Disable the parameters of the specified priority.
  - 1: Change the fixed report parameters when the device enters into any of the defined Geo-Fence.
  - 2: Change the fixed report parameters when the device enters into known GSM roaming state. (Please refer to the command **AT+GTRMD** for details)

    3: Change the fixed report parameters when the device enters into unknown GSM roaming state.
- <*FRI Mode*>: When the specified event occurs, the working mode of the fixed report will be changed according to this parameter.
  - 0: Do not change the working mode.
  - 1: Change the working mode to “Fixed Time Report”.
  - 2: Change the working mode to “Fixed Distance Report”.
  - 3: Change the working mode to “Fixed Mileage Report”.
  - 4: Change the working mode to “Optimum Report”.

- 5: Change the working mode to “Fixed Time or Mileage Report”.

✧ <*FRI IGN Report Interval*>: The time interval for sending the position information when ignition is on. The value range is 5 – 86400 and the unit is second.

✧ <*FRI Report Distance*>: The specified distance for sending the position information when the report mode is fixed distance report. Unit: meter.

✧ <*FRI Report Mileage*>: The specified path length for sending the position information when the report mode is fixed mileage report or optimum report. Unit: meter.

✧ <*FRI IGF Report Interval*>: The time interval for fixing and sending the position information when the ignition is off if <*Power Saving Mode*> in **AT+GTCFG** is set to 0|2. The value range is 0|5 – 86400 and the unit is second.

✧ <*Corner Report*>: The threshold to determine whether the device is turning around a corner. 0 means “Disable the corner report”. For other values, the device will compare the current azimuth with that of last known corner. If the difference is greater than or equal to this specific value, the corner report will be sent with **+RESP:GTFRI**.

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

➢ **+ACK:GTFFC,**

Example: **+ACK:GTFFC,090200,135790246811220,,0009,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.4.Alarm Settings

3.2.4.1.Tow Alarm Configuration

The **AT+GTTOW** command is used to configure the sensitivity of the motion sensor and the tow alarm parameters.

➢ **AT+GTTOW=**

Example: **AT+GTTOW=gv50,1,5,0,120,1,0,5,10,4,10,4,,,,,,,,000B$**

Parameter	Length (byte)	Range/Format	Default
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Tow Enable	1	0|1	0
Engine Off to Tow	<=2	5 – 15 min	10
Fake Tow Delay	<=2	0 – 10 min	1
Tow Interval	<=5	30 – 86400 sec	300
Tow Output ID (GV50P)	1	0 – 1	0
Tow Output Status (GV50P)	1	0|1	0
Tow Output Duration (GV50P)	<=3	0 – 255 (×100ms)	0
Tow Output Toggle Times (GV50P)	<=3	0 – 255	0
Rest Duration	<=3	1 – 255 (×15sec)	2
Motion Duration	<=2	1 – 10 (×100ms)	3
Motion Threshold	1	1 – 9	2
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Tow Enable*>: Enable or disable the tow alarm report (**+RESP:GTTOW**).

- 0: Disable the tow alarm report.
- 1: Enable the tow alarm report.

✧ <*Engine Off to Tow*>: A time parameter to measure whether the device is considered to be towed after the engine is turned off. If the motion sensor doesn't detect stillness within the specified time after engine is turned off, the device is being towed.

✧ <*Fake Tow Delay*>: If the motion sensor detects movement after detecting engine off and

stillness, the device turns into a state called fake tow. If the device stays in fake tow for a period of time specified by the parameter <*Fake Tow Delay*>, it is considered to be towed.

- ✧ <*Tow Interval*>: The time interval for sending the tow alarm message.
- ✧ <*Tow Output ID*>: The ID of the output port to output the specified wave shape when a tow event is detected.
- ✧ <*Tow Output Status*>: Please refer to the parameter <*Output1 Status*> in Chapter 3.2.5.
- ✧ <*Tow Output Duration*>: Please refer to the parameter <*Duration*> in Chapter 3.2.5.
- ✧ <*Tow Output Toggle Times*>: Please refer to the parameter <*Toggle Times*> in Chapter 3.2.5.
- ✧ <*Rest Duration*>: A time parameter to measure whether the device enters into rest status. The status of the device will be changed to rest if the motion sensor detects stillness which is maintained for the period of time specified by the parameter <*Rest Duration*>.
- ✧ <*Motion Duration*>: A time parameter to measure whether the device enters into motion status. The status of the device will be changed to motion if the motion sensor detects motion which is maintained for the period of time specified by the parameter <*Motion Duration*>.
- ✧ <*Motion Threshold*>: The threshold for the motion sensor to measure whether the device is moving.

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

- ➢ **+ACK:GTTOW,**

Example: **+ACK:GTTOW,090200,135790246811220,,000B,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.4.2.Geo-Fence Information

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

➢ **AT+GTGEO=**

Example: **AT+GTGEO=gv50,0,3,121.412248,31.187891,1000,600,1,1,0,0,,,,,000A$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
GEO ID	<=2	0 – 19	
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0|5 – 86400sec	0
Output ID (GV50P)	1	0 – 1	0
Output Status (GV50P)	1	0|1	0
Duration (GV50P)	<=3	0 – 255(×100ms)	0
Toggle Times (GV50P)	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*GEO ID*>: The ID of the Geo-Fence. A total of 20 zones (0 to 19) are supported.

✧ <*Mode*>: The working mode of the Geo-Fence to report the message **+RESP:GTGEO** to the backend server.

- 0: Disable the zone's Geo-Fence function.
- 1: Entering the zone. The report will be generated only when the terminal enters the Geo-Fence.
- 2: Exiting the zone. The report will be generated only when the terminal exits from 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 format is "(–)xxx.xxxxxx" and the value range is from "–180.000000" to "180.000000". The unit is degree. West longitude is defined as negative starting with the minus sign "–" and east longitude is defined as positive without "+".

✧ <*Latitude*>: The latitude of a point which is defined as the centre of the circular Geo-Fence

region. The format is "(–)xx.xxxxxx" and the value range is from "–90.000000" to "90.000000". The unit is degree. South latitude is defined as negative starting with the minus sign "–" 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.
- <*Check Interval*>: The interval of GPS checking for the Geo-Fence alarm.
- <*Trigger Mode*>: A numeral to indicate the working mode of the geofencing function.
  - 0: Disable auto trigger mode.
  - 21: Automatically set up a Geo Fence after the ignition is turned off. In this mode, the device will automatically set up a Geo-Fence with the current location as the center point of the Geo-Fence when the ignition is off. It will only send the alarm report when exiting the Geo-Fence zone. The Geo-Fence will be cancelled after the device exits the zone.
  - 22: Manually enable Geo-Fence after the ignition is turned off. In this mode, the device will automatically set a Geo-Fence with the current location as the center point of the Geo-Fence when the ignition is off. It will only send the alarm report when exiting the Geo-Fence zone. When the device exits this Geo-Fence, it will cancel this Geo-Fence and disable the trigger mode at the same time. If the driver wants to use this trigger mode again, he has to manually set the trigger mode again.
- <*Trigger Report*>: Whether to report the **+RESP:GTGES** message when a specified trigger mode is triggered and when the Geo-Fence is cancelled.
  - 0: Disable the **+RESP:GTGES** report.
  - 1: Enable the **+RESP:GTGES** report.

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

- **+ACK:GTGEO,**

Example: **+ACK:GTGEO,090200,135790246811220,,0,000A,20090214093254,11F0$**			
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' '-' '_'	
GEO ID	1	0 – 19	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.4.3.Roaming Detection Configuration

The command **AT+GTRMD** is used to configure the parameters for GSM roaming detection.

- **AT+GTRMD=**

Example: **AT+GTRMD=gv50,0,,,,,1,2,46000F,46002F,,,1,1,,,,2,2,,,,1f,,,1f,,,,,0,0,0,0,,,0001$** **AT+GTRMD=gv50,1,,,,,1,3,46000,46002,46003,,,2,2,46007,,,1,1,46001,,,3fff,,,2ff,,,,,0,0,0,0,,,0002$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Mode	1	0|1	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Home Operator Start	<=2	1-10	
Home Operator End	<=2	1-10	
Home Operator List	<=6*10		
Reserved	0		
Reserved	0		
Roaming Operator Start	<=3	1-100	
Roaming Operator End	<=3	1-100	
Roaming Operator List	<=6*100		
Reserved	0		
Reserved	0		
Blacklist Operator Start	<=2	1-20	
Blacklist Operator End	<=2	1-20	
Black List Operator	<=6*20		
Reserved	0		
Reserved	0		
Known Roaming Event Mask	<=6	000000 – FFFFFF	3D0F
Reserved	0		
Reserved	0		

Unknown Roaming Event Mask	<=6	000000 – FFFFFF	3D0F
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Output ID (GV50P)	1	0 – 1	0
Output Status (GV50P)	1	0|1	0
Duration (GV50P)	<=3	0～255(×100ms)	0
Toggle Times (GV50P)	<=3	0 – 255	0
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Mode*>: The working mode of the roaming detection function.
  - 0: Disable this function.
  - 1: Enable this function.
- <*Operator Start*>: A numeral to indicate the first index of the whitelist operator numbers to be input. For example, if the value is 1, the device will update the white list of operators from the 1st one. If the parameter is empty, there should be no white list number.
- <*Operator End*>: A numeral to indicate the last index of the whitelist operator numbers to be input. For example, if the value is 2, the device will update the white list of operators until the 2nd one. If it is empty, there should be no white list number.
- <*Home Operator List*>: A white list of PLMN operator numbers. The numbers are comprised of MCC and MNC, both of which consist of 3 digits. The last digit of MNC can be omitted (e.g. both '46001F' and '46001' are the PLMN of CHINA UNICOM). The operators in this list will be considered as in "Home" state. And two adjacent operator numbers are separated with ','. The number of the operators in the list is determined by the parameters <*Operator Start*> and <*Operator End*>. For example, if <*Operator Start*> is 1 and <*Operator End*> is 2, the operator list should include 2 operator numbers (empty value acceptable) and the two numbers are separated by with ','. 'MCCFF' type code is used to identify operators across a whole country. For example, '460FF' covers the mobile network operators all across China.
- <*Roaming Operator List*>: It is mostly like the <*Home Operator List*>, and the difference is that the operators in this list will be considered as in "Known Roaming" state.
- <*Black List Operator*>: It is mostly like the <*Home Operator List*>, and the difference is that the operators in this list will be considered as in "Blocking Report" state. In this state the device works normally but all report messages will be buffered instead of being sent.

  Note: Operators that are not in <*Home Operator List*>, <*Roaming Operator List*> or <*Black*

List Operator> will be considered as in "Unknown Roaming" state.

✧ <*Known Roaming Event Mask*>: Bitwise mask to configure which event report should be sent to the backend server when GSM roaming state is detected. If the roaming status is "Known Roaming", the <*Known Roaming Event Mask*> will be valid; if the roaming status is "Unknown Roaming", the <*Unknown Roaming Event Mask*> will be valid.

- Bit 0 for **+RESP:GTPNA**
- Bit 1 for **+RESP:GTPFA**
- Bit 2 for **+RESP:GTMPN**
- Bit 3 for **+RESP:GTMPF**
- Bit 4 for **+RESP:GTCID**
- Bit 5 Reserved
- Bit 6 Reserved
- Bit 7 Reserved
- Bit 8 for **+RESP:GTSTT**
- Bit 9 Reserved
- Bit 10 for **+RESP:GTPDP**
- Bit 11 for the power on **+RESP:GTRTL**
- Bit 12 for the ignition report **+RESP:GTIGN/+RESP:GTVGN** and **+RESP:GTIGF/+RESP:GTVGF**
- Bit 13 for the location report **+RESP:GTIGL/+RESP:GTVGL** when the ignition is on or off
- Others Reserved

For each bit, set it to 1 to enable the corresponding event report, and 0 to disable the corresponding event report.

✧ <*Unknown Roaming Event Mask*>: It is mostly like the <*Known Roaming Event Mask*>.

✧ <*Output ID*>, <*Output Status*>, <*Duration*> and <*Toggle Times*>: If this function is enabled and roaming is detected, a specified wave will be output at the specified output.

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

➢ **+ACK:GTRMD,**

Example: **+ACK:GTRMD,090200,135790246811220,,0000,20090214093254,11F0$**			
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	$	$

Note:

Only an AT command string of no more than 180 bytes could be accepted by the device in the case of sending the command via Manage Tool (not via GPRS).

As **GTRMD** contains a large amount of configuration information in PLMN code list, make sure the command length does not exceed 180 bytes through proper <*Start Index*> and <*End Index*> settings. Also a color alert will occur on Command Text Box which turns yellow if there is an AT command exceeding 180 bytes when Manage Tool is used.

3.2.4.4.Speed Alarm

This command is used to set a speed range for the speed alarm function of the terminal. According to the working mode, the terminal will report the message **+RESP:GTSPD** to the backend server when its moving speed is outside or inside the range.

- **AT+GTSPD=**

Example: **AT+GTSPD=gv50,1,80,120,60,300,1,1,0,0,,,,,,,,,,000C$** **AT+GTSPD=gv50,2,80,120,60,300,1,1,0,0,,,,,,,,,,000C$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Mode	1	0|1|2|3	0
Min. Speed	<=3	0 – 400km/h	0
Max. Speed	<=3	0 – 400km/h	0
Validity	<=4	0 – 3600sec	60
Send Interval	<=4	30 – 3600sec	300
Output ID (GV50P)	1	0 – 1	0
Output Status (GV50P)	1	0|1	0
Duration (GV50P)	<=3	0 – 255(×100ms)	0
Toggle Times (GV50P)	<=3	0 – 255	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- ✧ <*Mode*>: The working mode of the speed alarm function.
  - 0: Disable speed alarm.
  - 1: Report speed alarm if the current speed is within the speed range defined by <*Min. Speed*> and <*Max. Speed*>.
  - 2: Report speed alarm if the current speed is outside the speed range defined by <*Min. Speed*> and <*Max. Speed*>.
  - 3: Report speed alarm only one time if the current speed is within / outside the speed range defined by <*Min. Speed*> and <*Max. Speed*>. In this mode, <*Send Interval*> will be ignored.
- ✧ <*Min. Speed*>: The lower speed limit.
- ✧ <*Max. Speed*>: The upper speed limit.
- ✧ <*Validity*>: If the speed meets the alarm condition and is maintained for the amount of time specified in <*Validity*>, the speed alarm will be triggered.
- ✧ <*Send Interval*>: The time interval for sending the speed alarm message.

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

- ➢ **+ACK:GTSPD,**

Example: **+ACK:GTSPD,090200,135790246811220,,000C,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	

Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.4.5.Excessive Idling Detection

The command **AT+GTIDL** is used to detect the engine excessive idling (Vehicle stays stationary while the ignition is on). To use this command, the ignition signal must be connected to the device. If the vehicle entering into the idle status is detected, the device will report the event message **+RESP:GTIDN** to the backend server. If the vehicle leaves the idle status, the device will report the event message **+RESP:GTIDF** to the backend server.

➢ **AT+GTIDL=**

Example: **AT+GTIDL=gv50,1,2,1,0,,,,1,1,0,0,,,,,000F$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Mode	1	0|1	0
Time to Idling	<=2	1 – 30 min	2
Time to Movement	1	1 – 5 min	1
Debounce Distance	<=4	0|100-9999m	0
Reserved	0		
Reserved	0		
Reserved	0		
Output ID (GV50P)	1	0 – 1	0
Output Status (GV50P)	1	0|1	0
Duration (GV50P)	<=3	0 – 255(×100ms)	0
Toggle Times (GV50P)	<=3	0 – 255	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Mode*>: The working mode of the excessive idling detection function.
  - 0: Disable this function.
  - 1: Enable this function.
- <*Time to Idling*>: If it is detected that the vehicle is stationary with ignition on for the length of time specified by this parameter, it is considered to be in idling state.
- <*Time to Movement*>: If the vehicle moves again or ignition off is detected after it enters into idling status and the status lasts for the length of time specified by this parameter, the vehicle is considered to leave idling status.
- <*Debounce Distance*>: If the vehicle moves a longer distance than <*Debounce Distance*> after it enters into idling status, the vehicle will be considered to leave idling status.
- <*Output ID*>: It specifies the ID of the output port to output specified wave shape when the vehicle enters into idling status. If it is set to 0, there will be no wave output.

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

➢ **+ACK:GTIDL,**

Example: **+ACK:GTIDL,090200,135790246811220,,000F,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.4.6.Start/Stop Report

The command **AT+GTSSR** is used to detect the status of vehicle (Start or Stop status). When the device detects the vehicle entering into start status, it will report the event message **+RESP:GTSTR** to the backend server. When the vehicle leaves the start status, and then enters into stop status, the device will report the event message **+RESP:GTSTP** to the backend server.

➢ **AT+GTSSR=**

Example: **AT+GTSSR=gv50,1,2,1,5,,,,,000F$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**

Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Mode	1	0|1	0
Time to Stop	<=2	1 – 30 min	2
Time to Start	1	1 – 5 min	1
Start Speed	<=2	1 – 10 Km/h	5
Long Stop	<=5	0 – 43200 min	0
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Mode*>: The working mode of the Start/Stop report function.
  - 0: Disable this function.
  - 1: Enable this function.
- <*Time to Stop*>: If the vehicle becomes stationary again and stays in that status for the period of time specified by this parameter after it enters into Start status, the vehicle is considered to quit Start status.
- <*Time to Start*>: If it is detected that the vehicle is moving with ignition on for the period of time specified by this parameter, it is considered to be in Start status.
- <*Start Speed*>: The start speed threshold to determine whether the vehicle is started or not. When the built-in motion sensor detects that the vehicle is moving with ignition on, the device will start to check the speed from GPS. If the device speed is maintained at a higher level than <*Start Speed*> for a period of time longer than <*Time to Start*>, the vehicle is considered to be in Start status. The event message **+RESP:GTSTR** will be reported. Otherwise, if the device speed stays at a level lower than or equal with <*Start Speed*> for a period of time longer than <*Time to Stop*>, the vehicle is considered to quit Start status. The event message **+RESP:GTSTP** will be reported. If GPS fix works in an abnormal status for more than 1 minute, the built-in motion sensor will be used to detect the Start/Stop status.
- <*Long Stop*>: After the vehicle enters into stop status and stays in the Stop state for the length of time specified by this parameter, the **+RESP:GTLSP** message will be sent. 0 means "Disable this parameter".

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

- **+ACK:GTSSR,**

Example: **+ACK:GTSSR,090200,135790246811220,,000F,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.4.7.Harsh Behavior Monitoring

The command **AT+GTHBM** is used to monitor the harsh driving behavior with GPS. In order for the function to work, the engine should be on and the status detected by motion sensor should be movement.

According to the speeds read from GPS, 3 levels of speeds are defined including high speed, medium speed and low speed. For each speed level, 2 thresholds of speed change are defined to determine harsh braking and harsh acceleration. If the change of speed within 5 seconds is greater than the corresponding threshold, the device will report the **+RESP:GTHBM** message to the backend server to indicate the harsh behavior. The same harsh behavior within 30 seconds will only be reported once.

➢ **AT+GTHBM=**

Example: **AT+GTHBM=gv50,1,,,100,21,6,,60,21,6,,,21,15,,1,1,8,3,,,,,0010$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Mode	1	0 – 1	0
Reserved	0		
Reserved	0		
High Speed	<=3	100 – 400km/h	100
ΔVhb	<=3	0 – 100km/h	0
ΔVha	<=3	0 – 100km/h	0
Reserved	0		
Medium Speed	<=3	60 – 100km/h	60

ΔVmb	<=3	0 – 100km/h	0
ΔVma	<=3	0 – 100km/h	0
Reserved	0		
Reserved	0		
ΔVlb	<=3	0 – 100km/h	0
ΔVla	<=3	0 – 100km/h	0
Reserved	0		
Output ID(GV50P)	1	0 – 1	0
Output Status(GV50P)	1	0|1	0
Duration(GV50P)	<=3	0 – 255(×100ms)	0
Toggle Times(GV50P)	<=3	0 – 255	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Mode*>: The working mode of the harsh behavior monitoring function.
  - 0: Disable this function.
  - 1: Enable this function: Detection by GPS only.
- <*High Speed*>, <*Medium Speed*>: If the last known speed of the device read from GPS is greater than or equal to <*High Speed*>, the vehicle that the device is attached to is considered to be at high speed. If the last known speed is less than <*High Speed*> but greater than or equal to <*Medium Speed*>, the vehicle is considered to be at medium speed. If the last known speed is less than <*Medium Speed*>, the vehicle is considered to be at low speed.
- <*ΔVhb*>: The threshold for harsh braking at high speed level. If the current speed is less than the last known speed and the change of speed is greater than or equal to this parameter value within 5 seconds, harsh braking is detected at high speed level. If it is set to 0, it means "Do not monitor harsh braking behavior at high speed level".
- <*ΔVha*>: The threshold for harsh acceleration at high speed level. If the current speed is greater than the last known speed and the change of speed is greater than or equal to this value within 5 seconds, harsh acceleration is detected at high speed level. If it is set to 0, it means "Do not monitor harsh acceleration behavior at high speed level".
- <*ΔVmb*>: The threshold for harsh braking at medium speed level. If the current speed is less than the last known speed and the change of speed is greater than or equal to this parameter value within 5 seconds, harsh braking is detected at medium speed level. If it is

set to 0, it means “Do not monitor harsh braking behavior at medium speed level”.

- ✧ <*ΔVma*>: The threshold for harsh acceleration at medium speed level. If the current speed is greater than the last known speed and the change of speed is greater than or equal to this parameter value within 5 seconds, harsh acceleration is detected at medium speed level. If it is set to 0, it means “Do not monitor harsh acceleration behavior at medium speed level”.
- ✧ <*ΔVlb*>: The threshold for harsh braking at low speed level. If the current speed is less than the last known speed and the change of speed is greater than or equal to this value within 5 seconds, harsh braking is detected at low speed level. If it is set to 0, it means “Do not monitor harsh braking behavior at low speed level”.
- ✧ <*ΔVla*>: The threshold for harsh acceleration at low speed level. If the current speed is greater than the last known speed and the change of speed is greater than or equal to this value within 5 seconds, harsh acceleration is detected at low speed level. If it is set to 0, it means “Do not monitor harsh acceleration behavior at low speed level”.
- ✧ <*Output ID*>: It specifies the ID of the output port to output specified wave shape when harsh behavior is detected. If it is set to 0, there will be no wave output.

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

- ➢ **+ACK:GTHBM,**

Example: **+ACK:GTHBM,090200,135790246811220,,0010,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.5.IO Application

3.2.5.1.Digital Output

The **AT+GTOUT** command is used to output specified wave shape from digital output ports. A total of three wave shapes are supported as shown below. If set to wave shape 1, the device will maintain this wave shape at the specified output port after power reset.

This command only works for GV50P.

Wave Shape 1:

✓ <*Duration*> = 0ms, <*Toggle Times*> = 0

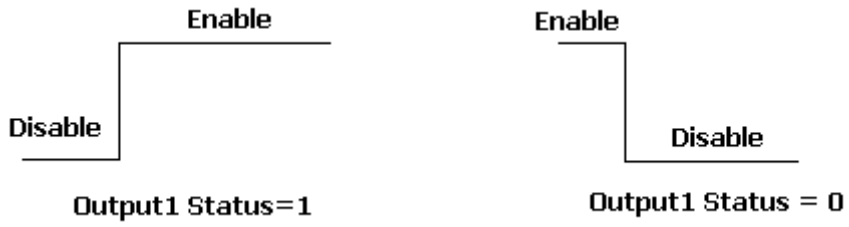


Figure 2: Wave Shape 1

Wave Shape 2:

✓ <*Duration*> = 500ms, <*Toggle Times*> = 1

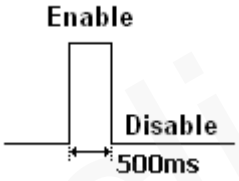


Figure 3: Wave Shape 2

Wave Shape 3:

✓ <*Duration*> = 800ms, <*Toggle Times*> = 3

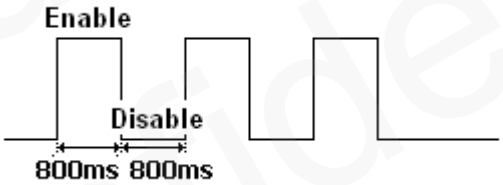


Figure 4: Wave Shape 3

➢ **AT+GTOUT=**

Example: **AT+GTOUT=gv50,1,,, ,,,1,,,,,,,0004$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Output1 Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Reserved	0		

Reserved	0		
Reserved	0		
DOS Report	1	0-1	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Output1 Status*>: Valid only for the wave shape 1 as shown in **Figure 2**, it configures the final status of the output port.
  - 0: Disable status
  - 1: Enable status
- <*Duration*>: Please refer to **Figure 2**, **Figure 3** and **Figure 4**. Unit: 100ms.
- <*Toggle Times*>: Please refer to **Figure 2**, **Figure 3** and **Figure 4**.
- <*DOS Report*>: A bitwise value to control whether to report the message **+RESP:GTDOS**. Each bit represents an output. If the bit value is 1, the device will report the message **+RESP:GTDOS** when the status of the wave shape 1 output changes.
  - Bit 0: Output 1

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

- **+ACK:GTOUT,**

Example: **+ACK:GTOUT,090200,135790246811220,,0004,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	

Tail Character	1	$	$

3.2.5.2.Digital Input Port Setting

The command **AT+GTDIS** is used to configure the parameters for the ignition input port.

➢ **AT+GTDIS=**

Example: **AT+GTDIS=gv50,0,2,,1,,,,,,,,,,,,,,,0005$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Ignition Detection	1	0	0
Sample Period	<=2	0|1 – 12(×2s)	1
Reserved	0		
Ignition Detection Mode	1	0-4	1
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	

Tail Character	1	$	$

✧ <*Ignition Detection*>: The ID of the ignition detection port.

✧ <*Ignition Detection Mode*>: A numeral to define the ignition detection mode.

- 0: Hard-wired ignition detection mode. (Only valid for GV50P)
- 1: Motion status to simulate ignition status. In this mode, movement state will trigger behaviors which should be triggered by ignition-on state, including (1) Enable the odograph function to calculate the total mileage, (2) GPS chip works in "always on" mode, (3) The fixed report, geo-fence (**AT+GTGEO** and **AT+GTPEO**) and speed alarm (**AT+GTSPD**) report functions are resumed, and non-movement state will trigger behaviors which should be triggered by ignition-off state, including (1) Disable the odograph function to calculate the total mileage, (2) GPS chip works in "only on when needed" mode, (3) The fixed report, geo-fence (**AT+GTGEO** and **AT+GTPEO**) and speed alarm (**AT+GTSPD**) report functions are suspended when the <*Power Saving Mode*> is set to mode 1.

  Note: Whenever the ignition detection mode is set to 1, restart the device for it to work properly.
- 2: External power voltage mode (virtual ignition detection). Ignition state is related to the voltage of external power (please refer to the command **AT+GTVVS**). Please enable the function of **AT+GTEPS** in order for this mode to work.
- 3: Reserved.
- 4: Accelerometer mode (virtual ignition detection). Ignition state is related to the state of the accelerometer (please refer to the command **AT+GTAVS)**.

Note: The priority level of the hard-wired ignition signal is highest. This means even if <*Ignition Detection Mode*> is not set to 0, but hard-wired line has connected to the terminal, then the terminal will only measure the ignition state by Mode 0.

If the virtual ignition detection function and the corresponding bits of <*Event Mask*> in the **AT+GTCFG** command are enabled, **+RESP:GTVGN**, **+RESP:GTVGF** and **+RESP:GTVGL** will be reported to the backend server.

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

➢ **+ACK:GTDIS,**

Example: **+ACK:GTDIS,090200,135790246811220,,0005,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	

Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.5.3.External Power Supply Monitoring

The command **AT+GTEPS** is used to configure the parameters for external power supply monitoring. The device will measure and monitor the voltage of the external power supply. If the voltage of the external power supply matches the predefined alarm condition, the device will report the alarm message **+RESP:GTEPS** to the backend server to notify the status of the external power supply.

➢ **AT+GTEPS=**

Example: **AT+GTEPS=gv50,2,250,12000,3,2,1,1,0,0,1,,,,0007$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Mode	1	0|1|2	0
Min. Threshold	<=5	250 – 28000 mV	250
Max. Threshold	<=5	250 – 28000 mV	250
Sample Period	<=2	0|1 – 12(×2s)	0
Debounce Time	1	0 – 5 (×1s)	0
Output ID (GV50P)	1	0 – 1	0
Output Status (GV50P)	1	0|1	0
Duration (GV50P)	<=3	0 – 255(×100ms)	0
Toggle Times (GV50P)	<=3	0 – 255	0
Sync with FRI	1	0|1	0
Voltage Margin Error	3	0 – 100(×10mv)	0
Debounce Voltage Threshold	3	0 – 100 (×100mv)	0
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of the external power supply monitoring function.

- 0: Disable the external power supply monitoring function.

- 1: Enable the external power supply monitoring function. If the current voltage is within the range of (<*Min. Threshold*>, <*Max. Threshold*>), the **+RESP:GTEPS** alarm will be triggered.
- 2: Enable the external power supply monitoring function. If the current voltage is outside the range of (<*Min. Threshold*>, <*Max. Threshold*>), the **+RESP:GTEPS** alarm will be triggered.

✧ <*Min. Threshold*>: The lower limit to the voltage of the external power supply to trigger the alarm.

✧ <*Max. Threshold*>: The upper limit to the voltage of the external power supply to trigger the alarm.

✧ <*Sample Period*>: The sampling period for measuring the external power supply.

✧ <*Debounce Time*>: The time for debouncing external power voltage to avoid excessive voltage drop in the external power supply.

✧ <*Output ID*>: It specifies the ID of the output port to output specified wave shape when the **+RESP:GTEPS** alarm is triggered. If it is set to 0, there will be no wave output.

✧ <*Sync with FRI*>: Besides the **+RESP:GTEPS** alarm report, the device can also send the voltage of external power supply periodically along with the fixed report message.

- 0: Do not report external power supply voltage along with the fixed report message.
- 1: Report external power supply voltage along with the fixed report message.

✧ <*Voltage Margin Error*>: This parameter is used together with <*Min. Threshold*> and <*Max. Threshold*> parameters. It indicates the voltage margin error of <*Min. Threshold*> and <*Max. Threshold*>. If the current voltage detected falls within the range of the <*Voltage Margin Error*> of the <*Min. Threshold*> or the <*Voltage Margin Error*> of <*Max. Threshold*>, it will not trigger **+RESP:GTEPS** alarm report. For example, if the <*Min. Threshold*> is set to 6000mv, the <*Max. Threshold*> is set to 12000mv, and the <*Voltage Margin Error*> is set to ±100mv, the current voltage will not trigger **+RESP:GTEPS** alarm report when the current voltage meets the condition (5900mv < current voltage < 6100mv) or (11900mv < current voltage < 12100mv). The parameter improves the performance of **+RESP:GTEPS** alarm reports.

✧ <*Debounce Voltage Threshold*>: This parameter is used together with <*Debounce Time*>. If the voltage drops or bursts dramatically more than <*Debounce Voltage Threshold*>, the device will start to debounce voltage for the period of time specified by <*Debounce Time*>.

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

➢ **+ACK:GTEPS,**

Example: **+ACK:GTEPS,090200,135790246811220,,0007,20090214093254,11F0$**			
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' '-' '_'	

Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.6.Virtual Ignition Detection

3.2.6.1.Voltage Virtual Ignition Setting

The command **AT+GTVVS** is used to configure parameters for detecting ignition state by monitoring voltage. It will work when hard-wired ignition line is not connected and Voltage Virtual Ignition mode is enabled by **AT+GTDIS**.

➢ **AT+GTVVS=**

Example: **AT+GTVVS=gv50,13000,500,10,,,000B$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Ignition On Voltage	<=5	250 – 28000 mV	13500
Voltage Offset	<=4	200 – 2000 mV	600
Debounce	<=3	5 – 255sec	10
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Ignition On Voltage*>: The external power voltage in ignition on state. Different vehicles have different voltage in ignition on state. This parameter should be set very close to the original external power, so that the device can detect ignition event more accurately.

✧ <*Voltage Offset*>: The offset from <*Ignition On Voltage*> used to determine ignition off state. When the voltage of the external power is <*Voltage Offset*> lower than <*Ignition On Voltage*>, it will be considered in ignition off state.

Note: <*Ignition On Voltage*> and <*Voltage Offset*> values will be adjusted automatically according to measured external power voltage data, if necessary, to make the ignition judgement more precisely.

✧ <*Debounce*>: The debounce time before updating virtual ignition state according to the external power voltage. Unit: second.

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

➢ **+ACK:GTVVS,**

Example: **+ACK:GTVVS,090200,135790246811220,,0000,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.6.2.Accelerometer Virtual Ignition Setting

The command **AT+GTAVS** is used to configure parameters for detecting ignition state with an accelerometer. It will work when hard-wired ignition line is not connected and Accelerometer Virtual Ignition mode is enabled by **AT+GTDIS**.

➢ **AT+GTAVS=**

Example: **AT+GTAVS=gv50,20,30,,,,000B$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Sensor Rest Duration	<=3	1 – 255 sec	20
Sensor Motion Validity	<=3	1 – 255 sec	30
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Sensor Rest Duration*>: A time parameter to determine whether the device enters resting

state. The device will be considered in resting state after the motion sensor detects rest and the resting state is maintained for the period of time specified by the parameter <*Sensor Rest Duration*>.

✧ <*Sensor Motion Validity*>: A time parameter to determine whether the device enters moving state. The device will be considered in moving state after the motion sensor detects movement and the moving state is maintained for the period of time specified by the parameter <*Sensor Motion Validity*>.

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

➢ **+ACK:GTAVS,**

Example: **+ACK:GTAVS,090200,135790246811220,,0000,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.7.Other Settings

3.2.7.1.Real Time Operation

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

➢ **AT+GTRTO=**

Example: **AT+GTRTO=gv50,2,FRI,,,,,0015$** **AT+GTRTO=gv50,2,0000000000000003,,,,,0015$** **AT+GTRTO=gv50,A,,,,,,0015$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Sub Command	<=2	0 - E	

AT Command / Configuration Mask / Satellite information Mask	3|16|2	"SRI"| 0000000000000000 – FFFFFFFFFFFFFFFF| 00 - FF	
Output Direction	1	0-3	
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Sub Command*>: Valid values include 0-F.

- 0: ***GPS***. Get the GPS related information via the message **+RESP:GTGPS**.
- 1: ***RTL***. Request the terminal to report its current position immediately via the message **+RESP:GTRTL**.
- 2: ***READ***. Get the current configuration of the terminal via the message **+RESP:GTALS**, **+RESP:GTALC** or **+RESP:GTALM**.
- 3: ***REBOOT***. Reboot the terminal.
- 4: ***RESET***. Reset all parameters to factory settings and clear all buffered messages. Parameters configured by **AT+GTBSI**, **AT+GTSRI**, **AT+GTCFG**, **AT+GTTMA** and **AT+GTPIN** will not be reset.
- 5: Reserved.
- 6: ***CID***. Get the ICCID of the SIM card which is being used by the terminal via the message **+RESP:GTCID**.
- 7: ***CSQ***. Get the current GSM signal level of the terminal via the message **+RESP:GTCSQ**.
- 8: ***VER***. Get the version information of the device via the message **+RESP:GTVER**.
- 9: ***BAT***. Get the external adapter status of the terminal via the message **+RESP:GTBAT**.
- A: ***IOS***. Get status of all the IO ports via the message **+RESP:GTIOS**.
- B: ***TMZ***. Get the time zone settings via the message **+RESP:GTTMZ**.
- C: ***GIR***. Get cell information via the message **+RESP:GTGSM**.
- D: ***DELBUF***. Delete all the buffered reports.
- E: ***GSV***. Request the device to report the GPS/GLONASS/BeiDou fix level.
- F: Reserved.

✧ <*AT Command / Configuration Mask /* Satellite information Mask>:

- AT Command: To get single AT command configuration when <*Sub Command*> is set to 2, please use the format in the following example. Example: To get the configuration of **AT+GTFRI**, set AT+GTRTO=gv50,2,FRI,,,,,0015$, and get it via **+RESP:GTALS**.

  Exception: To get local time information, please use "TMZ" instead of "TMA".

- Configuration Mask: If <*Sub Command*> is set to 2, configuration information which varies depending on the selected configuration mask can be obtained via the message **+RESP:GTALC**. The configuration mask must be 16 bytes. If it's less than 16 bytes, add '0' in the high bytes of the configuration mask.

Configuration Mask Table:

Mask Bit	Item
Bit 40	AVS
Bit 39	VVS
Bit 38	GAM
Bit 37	Reserved
Bit 36	Reserved
Bit 35	Reserved
Bit 34	Reserved
Bit 33	UDF
Bit 32	CMD
Bit 31	Reserved
Bit 30	FFC
Bit 29	RMD
Bit 28	Reserved
Bit 27	SSR
Bit 26	Reserved
Bit 25	Reserved
Bit 24	OUT (GV50P) Reserved (GV50)
Bit 23	PDS
Bit 22	Reserved
Bit 21	HRM
Bit 20	WLT
Bit 19	Reserved
Bit 18	HBM
Bit 17	HMC
Bit 16	IDL

Bit 15	DOG
Bit 14	OWH
Bit 13	PIN
Bit 12	Reserved
Bit 11	SPD
Bit 10	GEO
Bit 9	FRI
Bit 8	TMZ
Bit 7	Reserved
Bit 6	DIS
Bit 5	EPS
Bit 4	TOW
Bit 3	CFG
Bit 2	Reserved
Bit 1	SRI
Bit 0	BSI

Set <*Sub Command*> to 4 to specify the configuration to be reset. To specify a configuration, use the last three letters of the protocol command. For example, to reset configuration of **AT+GTFRI** command, send the command "**AT+GTRTO=gv50,4,FRI,,,,,000F$**". Also, the buffered messages saved can be deleted with the command "**AT+GTRTO=gv50,4,BUF,,,,,000F$**". Configuration of commands **AT+GTBSI**, **AT+GTSRI**, **AT+GTQSS**, **AT+GTCFG**, **AT+GTTMA** and **AT+GTPIN** can not be reset by this command.

- Satellite Information Mask: If <*Sub Command*> is set to E, please get the satellite information message according to the following bitwise mask. The satellite information mask must be 2 bytes. If it is less than 2 bytes, add '0' in the high bytes of the satellite information mask. If this field is reserved, the device will report **+RESP:GTGSV**.

Bit 2	**+RESP:GTBSV**
Bit 1	**+RESP:GTRSV**
Bit 0	**+RESP:GTGSV**

✧ <*Output Direction*>: This parameter determines the destination that the response message of the RTO command will be reported to. This field is invalid for <*Sub Command*> 3(REBOOT), and 4(RESET).

- 0: The message will be output to the backend server.

- 1: Reserved
- 2: Reserved
- 3: If the command is received via SMS, the message will be output to the original SMS number; otherwise the message will be output to the backend server.

Note: If this function is used for getting configurations and the length of a message is over 160 bytes, the terminal will report to the user a warning message which reads "The configuration information is too long to report by SMS".

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

➢ **+ACK:GTRTO,**

Example: **+ACK:GTRTO,090200,135790246811220,,IOS,0015,20090214093254,11F1$**			
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' '-' '_'	
Sub Command	<=6	Sub Command String	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Sub Command*>: A string which indicates the sub command of **AT+GTRTO**.

3.2.7.2.Hour Meter Count

The command **AT+GTHMC** is used to measure the accumulated use time with each actuation of the ignition on. When the device sends the **+RESP:GTFRI**, **+RESP:GTIGN/+RESP:GTVGN** or **+RESP:GTIGF/+RESP:GTVGF** message, <*Hour Meter Count*> will be included in the report.

➢ **AT+GTHMC=**

Example: **AT+GTHMC=gv50,1,12345:12:34,,,,,,,,0018$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Hour Meter Enable	1	0|1	0

Initial Hour Meter Count	11	00000:00:00-99999:00:00	00000:00:00
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Hour Meter Enable*>: Enable or disable the hour meter count function. If the hour meter count function is enabled, hour meter count will be increased when the device detects the vehicle ignition on.
  - 0: Disable the hour meter count function.
  - 1: Enable the hour meter count function.
- <*Initial Hour Meter Count*>: It is formatted with 5 hour digits, 2 minute digits and 2 second digits, and ranges from 00000:00:00 – 99999:00:00. When the ignition is turned on for the first time, the <*Hour Meter Count*> which is reported in **+RESP:GTFRI**, **+RESP:GTIGN** or **+RESP:GTIGF** will be increased based on this value.

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

- **+ACK:GTHMC,**

Example: **+ACK:GTHMC,090200,135790246811220,,0018,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.7.3.White List

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

➢ **AT+GTWLT=**

Example: **AT+GTWLT=gv50,1,1,2,13813888888,13913999999,,,,,0018$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Call Filter	1	0 – 7	0
Start Index	<=2	1 – 10	
End Index	<=2	1 – 10	
Phone Number List	<=20*10		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Call Filter*>: Bitwise mask to configure the white list for specific use.

- Bit 0: White list for location by call function
- Bit 1: Reserved
- Bit 2: White list for SMS

For each bit, set it to 1 to enable the corresponding function, and 0 to disable the corresponding function. If a bit is set to 1, only the phone number(s) in the white list will be valid for the specified function. If a bit is set to 0, the corresponding white list will be ignored.

✧ <*Start Index*>, <*End Index*>: The index range of the white list to which the phone numbers are to be updated. For example, if the <*Start Index*> is set to 1 and the <*End Index*> is set to 2, then the first two phone numbers in the white list will be updated by the numbers provided in the parameter <*Phone Number List*>. The <*Start Index*> and <*End Index*> determine the total number of phone numbers that will be updated. If either one is empty, there should be no <*Phone Number List*>.

✧ <*Phone Number List*>: A list of comma-separated phone numbers to be updated to the white list. The number of the phone numbers are determined by <*Start Index*> and <*End Index*>.

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

➢ **+ACK:GTWLT,**

Example: **+ACK:GTWLT,090200,135790246811220,,0018,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

Note: Make sure the total size of the command is not greater than 160 bytes if it is sent via SMS.

3.2.7.4.Command String Storage

The **AT+GTCMD** command is used to store the commands which will be used by the command **AT+GTUDF**.

➢ **AT+GTCMD=**

Example: **AT+GTCMD=gv50,1,1,AT+GTRTO=gv50,0,,,,,,000B$,,,,,0005$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9', 'a' – 'z', 'A' – 'Z'	gv50
mode	1	0-1	0
Store cmd ID	3	0 – 31	
Command String	200	AT command	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: A numeral to indicate how to handle (add/delete) the stored command string.

- 0: Delete the stored command.

- 1: Add the stored command.

✧ <*Store cmd ID*>: A numeral to identify the stored command.

✧ <*Command String*>: The whole content of the stored command.

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

➢ **+ACK:GTCMD**

Example: **+ACK:GTCMD, 090200,135790246811220,,0005,20100310172830,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	20		
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.7.5.User Defined Function

The **AT+GTUDF** command is used to bind input events and stored commands. The input events will trigger the corresponding stored commands.

➢ **AT+GTUDF=**

Example: **AT+GTUDF=gv50,1,1,FFFFFFFF,30,0,0,FFFFFFFF,1,,,,,0005$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9', 'a' – 'z', 'A' – 'Z'	gv50
Mode	1	0-2	0
Group ID	2	0 – 31	
Input ID Mask	16	0-FFFFFFFFFFFFFFFF	0
Debounce Time	5	0-86400(s)	0
Inzizo Mask	5	00000-FFFFF	0
Outzizo Mask	5	00000-FFFFF	0
Stocmd ID Mask	16	0-FFFFFFFF	0
Stocmd Ack	1	0|1	0
Reserved			
Reserved			
Reserved			
Reserved			
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of the user defined function.

- 0: Disable the group.
- 1: Enable the group.
- 2: Delete the group.

✧ <*Group ID*>: A numeral to identify the group of input events and the stored commands to be executed.

✧ <*Input ID Mask*>: Bitwise mask to indicate the input events included in the group.

Bit 0 (00000001): Select ID1
Bit 1 (00000002): Select ID2
Bit 2 (00000004): Select ID3
Bit 3 (00000008): Select ID4
For example:
Bit (00000003): Select ID1, and ID2
Bit (00000017): Select ID1, ID2, ID3, and ID5

ID	Mask Bit	Item
1	**Bit 0**	Power on finished
2	**Bit 1**	Ignition on
3	**Bit 2**	Ignition off
4	**Bit 3**	Attached to the GPRS network
5	**Bit 4**	Not attached to the GPRS network
6	**Bit 5**	Registered on the GSM network
7	**Bit 6**	Not registered on the GSM network
8	**Bit 7**	Network roaming
9	**Bit 8**	Network non-roaming
10	**Bit 9**	SIM card is locked
11	**Bit 10**	GPS is on
12	**Bit 11**	GPS is off
13	**Bit 12**	The device is stationary
14	**Bit 13**	The device is moving
15	**Bit 14**	External charge inserted
16	**Bit 15**	No external charge
17	**Bit 16**	Reserved
18	**Bit 17**	Reserved
19	**Bit 18**	Reserved
20	**Bit 19**	Reserved
21	**Bit 20**	Reserved
22	**Bit 21**	Reserved
23	**Bit 22**	SIM card is inserted
24	**Bit 23**	SIM card is not inserted
25	**Bit 24**	Reserved
26	**Bit 25**	Reserved
27	**Bit 26**	Inside the speed range
28	**Bit 27**	Outside the speed range

29	**Bit 28**	Messages need to be sent
30	**Bit 29**	No messages need to be sent

- ✧ <*Debounce Time*>: The debounce time for input events before the specified stored commands are executed.
- ✧ <*Inzizo Mask*>: Bitwise mask to indicate the input events which occur within the GEO-fence.

ID	Mask Bit	Item
1	**Bit 0**	Inside the Geo 0
2	**Bit 1**	Inside the Geo 1
3	**Bit 2**	Inside the Geo 2
4	**Bit 3**	Inside the Geo 3
5	**Bit 4**	Inside the Geo 4
6	**Bit 5**	Inside the Geo 5
7	**Bit 6**	Inside the Geo 6
8	**Bit 7**	Inside the Geo 7
9	**Bit 8**	Inside the Geo 8
10	**Bit 9**	Inside the Geo 9
11	**Bit 10**	Inside the Geo 10
12	**Bit 11**	Inside the Geo 11
13	**Bit 12**	Inside the Geo 12
14	**Bit 13**	Inside the Geo 13
15	**Bit 14**	Inside the Geo 14
16	**Bit 15**	Inside the Geo 15
17	**Bit 16**	Inside the Geo 16
18	**Bit 17**	Inside the Geo 17
19	**Bit 18**	Inside the Geo 18
20	**Bit 19**	Inside the Geo 19

- ✧ <*Outzizo Mask*>: Bitwise mask to indicate the input events which occur outside the GEO-fence.

ID	Mask Bit	Item
1	**Bit 0**	Outside the Geo 0
2	**Bit 1**	Outside the Geo 1
3	**Bit 2**	Outside the Geo 2
4	**Bit 3**	Outside the Geo 3
5	**Bit 4**	Outside the Geo 4
6	**Bit 5**	Outside the Geo 5
7	**Bit 6**	Outside the Geo 6
8	**Bit 7**	Outside the Geo 7
9	**Bit 8**	Outside the Geo 8
10	**Bit 9**	Outside the Geo 9
11	**Bit 10**	Outside the Geo 10

12	**Bit 11**	Outside the Geo 11
13	**Bit 12**	Outside the Geo 12
14	**Bit 13**	Outside the Geo 13
15	**Bit 14**	Outside the Geo 14
16	**Bit 15**	Outside the Geo 15
17	**Bit 16**	Outside the Geo 16
18	**Bit 17**	Outside the Geo 17
19	**Bit 18**	Outside the Geo 18
20	**Bit 19**	Outside the Geo 19

- <*Stocmd ID Mask*>: Bitwise mask of the stored command which will be executed after the state of the group becomes TRUE (i.e. all input events included in the group occur.).
- <*Stocmd Ack*>: A numeral to indicate whether to return an acknowledgement message after a stored command is executed.
  - 0: Do not send an acknowledgement message when a stored command is executed.
  - 1: Send an acknowledgement message when a stored command is executed.

Note: The maximum number of the stored commands to be executed in a group is five.

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

➢ **+ACK:GTUDF**

Example: **+ACK:GTUDF, 090200,135790246811220,,0005,20100310172830,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	20		
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.7.6.GPS-assisted Motion Measurement

The command **AT+GTGAM** is used for assisting in measuring motion with GPS if the sensor detects motionless state while the vehicle is ignition on.

➢ **AT+GTGAM=**

Example: **AT+GTGAM=gv50,1,1,10,10,10,5,,,,,0006$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**

Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Mode	1	0|1	0
Speed Mode	1	0|1	1
Motion Speed Threshold	<=2	5-50km/h	45
Motion Cumulative Time	<=3	10-100s	10
Motionless Cumulative Time	<=3	10-250s	60
GPS Fix Failure Timeout	<=4	5-1800s	60
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Mode*>: The working mode of this function.
  - 0: Disable this function.
  - 1: Enable this function.
- <*Speed Mode*>: It is combined with GPS speed to measure the status of movement.
  - 0: Disable the function.
  - 1: Enable the function.
- <*Motion Speed Threshold*>: The speed threshold which is combined with GPS speed to measure the status of movement.
- <*Motion Cumulative Time*>: If the average speed in <*Motion Cumulative Time*> is higher than <*Motion Speed Threshold*>, the device is considered to be in motion status.
- <*Motionless Cumulative Time*>: If the average speed in <*Motionless Cumulative Time*> is lower than <*Motion Speed Threshold*>, the device is considered to be in motionless status.
- <*GPS Fix Failure Timeout*>: If the time of GPS fix is more than <*GPS Fix Failure Timeout*>, the device will update motion status by motion sensor again.

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

- **+ACK:GTGAM,**

Example: **+ACK:GTGAM,090100,135790246811220,,0006,20161206092906,000A$**			
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' '-' '_'	
IOB ID	1	0 – 3	
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 size limit of an SMS message (160 bytes), it is recommended to carefully set the <*Report Composition Mask*> in **AT+GTCFG** to limit the length of the report which contains GPS position information in case of SMS transmission. Otherwise the report will be truncated to fit the length of an SMS message.

3.3.1.Position Related Report

- **+RESP:GTTOW**,

If the tow alarm is enabled by the command **AT+GTTOW**, the device will send the message **+RESP:GTTOW** to the backend server when the motion sensor detects tow.

- **+RESP:GTSPD**,

If the speed alarm is enabled, the device will send the message **+RESP:GTSPD** to the backend server when the speed of the device within the alarm range is detected.

- **+RESP:GTRTL**,

After the device receives the command **AT+GTRTO**, it will start GPS to get the current position and then send the message **+RESP:GTRTL** to the backend server.

- **+RESP:GTDOG**,

The protocol watchdog reboot message.

- **+RESP:GTIGL/+RESP:GTVGL**,

The location message is for ignition on and ignition off.

- **+RESP:GTHBM**,

If harsh behavior is detected, this message will be sent to the backend server.

All of the above report messages have the same format as shown below.

Example:

+RESP:GTTOW,090302,865083030002554,,,00,1,2,0.0,156,53.7,117.201483,31.832895,20170731072951,0460,0001,5504,582B,00,0.1,20170731152952,01E8$

+RESP:GTSPD,090302,865083030002554,,,01,1,1,2.1,132,31.3,117.201630,31.833045,20170731073042,0460,0001,5504,582B,00,0.1,20170731153043,01F1$

+RESP:GTRTL,090302,865083030002554,,,00,1,1,0.0,11,29.1,117.201647,31.833055,20170731073151,0460,0001,5504,582B,00,0.1,20170731153152,01F5$

+RESP:GTDOG,090302,865083030002554,,,01,1,1,0.0,11,29.1,117.201647,31.833055,20170731073300,0460,0001,5504,582B,00,0.1,20170731153301,01F7$

+RESP:GTIGL,090302,865083030002554,,,01,1,1,0.0,132,31.7,117.201622,31.833047,20170731073039,0460,0001,5504,582B,00,0.1,20170731153040,01F0$

+RESP:GTHBM,090302,865083030004642,,,21,1,1,73.7,214,44.4,117.234685,31.800972,20170731064758,0460,0001,5504,34B5,00,1037.0,20170731144758,3DBD$

+RESP:GTHBM,090302,865083030004642,,,20,1,1,67.7,213,48.0,117.233208,31.799128,20170731064810,0460,0001,5504,34B5,00,1037.3,20170731144810,3DBE$

+RESP:GTVGL,090302,865083030002117,,,41,1,0,0.0,22,74.4,117.294902,31.745697,20170707120858,0460,0000,560A,4D13,00,16.3,20170709095156,0424$

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' '-' '_'	
Reserved			
Report ID / Report Type	2	X(0-4)X(0-5)	
Number	1	0 – 1	
GPS Accuracy	<=2	0|1 – 50	
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	

GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Report ID / Report Type*>: The report ID and the report type in hex format. 4 high bits indicate report ID and 4 low bits indicate report type.

Report ID has different meanings in different messages below.

- The ID of the digital input port which triggers the reboot message **+RESP:GTDOG**. The valid value is 1.
- The speed level at which the harsh behavior is detected in the message **+RESP:GTHBM**. 3 represents high speed, 2 represents medium speed and 1 is for low speed
- If <*Ignition Detection Mode*> of the command **AT+GTDIS** is 2 or 4, the report ID is 2 or 4.

For other messages, it will always be 0.

Report type has different meanings in different messages below.

- In the message of speed alarm **+RESP:GTSPD**
  0: Outside the predefined speed range
  1: Inside the predefined speed range
- In the protocol watch dog reboot message **+RESP:GTDOG**
  1: Reboot message for time based working mode
  2: Reboot message for ignition on working mode
  3: Reserved
  4: Reboot message for GSM watchdog
  5: Reboot message for PDP watchdog
- In the harsh behavior monitoring message **+RESP:GTHBM**
  0: Harsh braking behavior
  1: Harsh acceleration behavior
- In the ignition message **+RESP:GTIGL and +RESP:GTVGL**
  0: Ignition off
  1: Ignition on

For other messages, it will always be 0.

✧ <*Number*>: The number of the GPS position(s) included in the report message. Generally, it is 1.

- <*GPS Accuracy*>: A numeral to indicate the GPS fix status and HDOP of the GPS position. 0 means the current GPS fix fails and the last known GPS position is used. A non-zero value (1 - 50) means the current GPS fix is successful and represents the HDOP of the current GPS position.
- <*Speed*>: The current speed. Unit: km/h
- <*Azimuth*>: The azimuth of the GPS fix.
- <*Altitude*>: The height above the sea level.
- <*Longitude*>: The longitude of the current position.
- <*Latitude*>: The latitude of the current position.
- <*GPS UTC Time*>: The UTC time obtained from the GPS chip.
- <*MCC*>: Mobile country code. It is 3 digits in length and ranges from 000–999.
- <*MNC*>: Mobile network code. It is 3 digits in length and ranges from 000–999.
- <*LAC*>: Location area code in hex format.
- <*Cell ID*>: Cell ID in hex format.
- <*Mileage*>: The current total mileage.

➢ **+RESP:GTFRI,**

If fixed report is enabled, the device will send the message **+RESP:GTFRI** to the backend server according to the working mode.

Example:
+RESP:GTFRI,090302,865083030004642,,13337,10,1,1,18.6,272,30.8,117.201342,31.855243,20170712074622,0460,0001,5504,29CF,00,347.8,00021:54:10,,,,220101,23,0,15,20170712154623,1854$
+RESP:GTFRI,090302,865083030004642,,13337,30,1,1,18.6,272,30.8,117.201342,31.855243,20170712074622,0460,0001,5504,29CF,00,347.8,00021:54:10,,,,220101,23,0,15,20170712154623,1854$

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' '-' '_'	
External Power Voltage	<=5	0 – 99999 mV	
Report ID / Report Type	2	X(1-5)X(0-6)	
Number	1	1	
GPS Accuracy	<=2	0|1 – 50	
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	

Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	
Mileage	<=9	0.0 – 4294967.0 km	
Hour Meter Count	11	HHHHH:MM:SS	
Reserved	0		
Reserved	0		
Backup Battery Percentage	<=3	0 – 100	
Device Status	6	000000 – FFFFFF	
CSQ RSSI	<=2	0 – 31|99	
CSQ BER	<=2	0 – 7	
Satellite Number	<=2	0 – 24	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*External Power Voltage*>: The voltage of the external power supply. If the command **AT+GTEPS** is used to configure the device to report the external power supply voltage periodically with fixed report, the device will send the current voltage along with the **+RESP:GTFRI** message to the backend server. If the device is not configured as such by the command **AT+GTEPS**, this field will be empty.
- <*Report ID / Report Type*>: It indicates the working mode of the fixed report and the type of the message.

  Report ID has the following meanings:
  - 1: Fixed time report
  - 2: Fixed distance report
  - 3: Fixed mileage report
  - 4: Fixed time and mileage report
  - 5: Fixed time or mileage report

Report type has the following meanings:

- 0: Normal fixed report
- 1: Corner report which indicates that the device just turns around a corner
- 2: FRI report frequency change which indicates the terminal enters into Geo-Fence or roaming status
- 3: Corner report when FRI report frequency changes
- 4: Mileage report when fixed report is mode 5
- 5: Reserved
- 6: Mileage report when fixed report is mode 5 and **AT+GTFFC** works

✧ <*Number*>: The number of the GPS position(s) included in the report message. Generally, it is 1.

✧ <*Hour Meter Count*>: If the hour meter count function is enabled by the command **AT+GTHMC**, total hours the meter has counted when the engine is on will be reported in this field. It is formatted with 5 hour digits, 2 minute digits and 2 second digits, and ranges from 00000:00:00 – 99999:00:00. If the function is disabled, this field will be empty.

✧ <*Backup Battery Percentage*>: The current volume of the backup battery in percentage.

✧ <*Device Status*>: The state of the device. From left to right, the first two characters indicate the current motion state of the device, the middle two characters indicate the status of input ports, and the last two characters indicate the status of output ports.

The current motion state of the device:

- 16 (**Tow**): The device attached vehicle is ignition off and it is towed.
- 1A (**Fake Tow**): The device attached vehicle is ignition off and it might be towed.
- 11 (**Ignition Off Rest**): The device attached vehicle is ignition off and it is motionless.
- 12 (**Ignition Off Motion**): The device attached vehicle is ignition off and it is moving before it is considered to be towed.
- 21 (**Ignition On Rest**): The device attached vehicle is ignition on and it is motionless.
- 22 (**Ignition On Motion**): The device attached vehicle is ignition on and it is moving.
- 41 (**Sensor Rest**): The device attached vehicle is motionless without ignition signal detected.
- 42 (**Sensor Motion**): The device attached vehicle is moving without ignition signal detected.

The status of input ports: A bitwise hex integer to represent the logical status of an input. The lowest bit represents the status of the ignition detection input: 0 means “Disable status”, and 1 means “Enable status”. The highest bit represents the status of the main power: 0 means “The main power supply is disconnected”, and 1 means “The main power supply is connected”. The other bits are 0 which means “Disable status”.

The status of output port: A bitwise hex integer to represent the logical status of a digital output. The low bit represents the status of digital output 1. The high bit is 0. For the low bit, 0 means “Disable status”, and 1 means “Enable status”.

✧ <*CSQ RSSI*>: The level of signal strength.

CSQ RSSI	Signal Strength (dBm)
0	<-133
1	-111
2 – 30	-109 – -53

31	>-51
99	Unknown

✧ <*CSQ BER*>: The quality of the GSM signal. The range is 0-7.

✧ <*Satellite Number*>: The number of the visible satellites when fix is successful. This indicates the number of satellites being used.

➢ **+RESP:GTEPS,**

If the external power supply monitoring is enabled by the command **AT+GTEPS**, the device will send the message **+RESP:GTEPS** to the backend server when the voltage of the external power supply enters the alarm range.

All of the above report messages have the same format as shown below.

Example:
+RESP:GTEPS,090302,865083030002646,,12478,01,1,4,4.3,345,145.6,117.201383,31.831592,20170717055626,0460,0001,5504,582B,00,0.0,20170717135627,05C5$

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' '-' '_'	
External Power Voltage	<=5	0 – 99999mV	
Report ID / Report Type	2	X(0-2)X(0-1)	
Number	1	0 – 1	
GPS Accuracy	<=2	0|1 – 50	
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	

Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*External Power Voltage*>: The value of the external power voltage. When the voltage of the external input meets the alarm condition as set by the command **AT+GTEPS**, the device will send the current external input voltage with **+RESP:GTEPS** to the backend server
- <*Report ID / Report Type*>: The report ID and the report type in hex format. 4 high bits represent report ID and 4 low bits represent report type.
  The value of Report ID for the report message **+RESP:GTEPS** is 0.
  Report type has two meanings:
  - 0: Outside the predefined range.
  - 1: Inside the predefined range.
- <*Number*>: The number of the GPS position(s) included in the report message. Generally, it is 1.

➢ **+RESP:GTLBC,**

If the parameter <*Location by Call*> is enabled by the command **AT+GTCFG**, the device will get and send the current position to the backend server via the message **+RESP:GTLBC** when there is an incoming call.

Example:
+RESP:GTLBC,090302,865083030002554,,17756084712,1,0.0,144,66.7,117.201548,31.833038,20170731074232,0460,0001,5504,582B,00,20170731154233,020B$

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' '-' '_'	
Call Number	<=20	phone number	
GPS Accuracy	<=2	0|1 – 50	
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	

GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Call Number*>: The phone number of the incoming call which triggers the report message.

➢ **+RESP:GTGEO,**

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

Example:
+RESP:GTGEO,090302,865083030004642,,,11,1,1,63.9,324,48.8,117.206575,31.823115,20170731072626,0460,0001,5504,6575,00,1054.9,20170731152626,3E3C$

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' '-' '_'	
Reserved			
Report ID / Report Type	<=3	XX(0-13)X(0-1)	
Number	1	0 – 1	
GPS Accuracy	<=2	0|1 – 50	
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	

MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	0		
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Report ID / Report Type*>: The report ID and the report type in hex format. 6 high bits represent report ID and 2 low bits represent report type.

- Report ID: The ID of Geo Fence in HEX format. The range is 0X00 to 0X13.
- Report Type: 0 means “Exit from the Geo-Fence”, and 1 means “Enter the Geo-Fence”.

➢ **+RESP:GTGES**

The device will report **+RESP:GTGES** according to the parameters <*Trigger Mode*> and <*Trigger Report*> in **AT+GTGEO** after the ignition is turned off.

Example:
+RESP:GTGES,090302,865083030004642,,,B1,21,1000,30,1,2,0.0,347,43.5,117.201167,31.832933,20170720074950,0460,0001,5504,582B,00,657.6,20170720154950,2880$

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' '-' '_'	
Reserved			
Report ID / Report Type	<=3	X(0-13)X(0-1)	
Trigger Mode	<=3	0|21|22	
Radius	<=7	50 – 6000000m	
Check Interval	<=5	0|5 – 86400sec	
Number	1	0 – 1	
GPS Accuracy	<=2	0|1 – 50	

Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	0		
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Report Type*>: The current Parking-Fence is active or inactive.

- 0: The current Parking-Fence is inactive.
- 1: The current Parking-Fence is active.

3.3.2.Device Information Report

If the device information report function is enabled by the command **AT+GTCFG**, the device will send the device information via the message **+RESP:GTINF** to the backend server periodically.

➢ **+RESP:GTINF,**

Example: **+RESP:GTINF,090302,865083030002554,,11,89860116830009013972,26,0,,0,,3.98,,1,,,20170731074323,,,,00,00,+0800,0,20170731154326,020C$**			
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' '-' '_'	

State	2	11|12|21|22|41|42|1A|16	
ICCID	20		
CSQ RSSI	<=2	0 – 31|99	
CSQ BER	<=2	0 – 7	
Reserved	0		
External Power Voltage	<=5	0 – 99999mV	
Reserved	0		
Backup Battery VCC	<=4	0.00 – 4.50 V	
Reserved	0		
LED On	1	1|2	
Reserved	0		
Reserved	0		
Last Fix UTC Time	14	YYYYMMDDHHMMSS	
Reserved	0		
Reserved	0		
Reserved	0		
Input Status	2	00 – 81	
Digital Output (GV50P) / Reserved (GV50)	2	00 – 01	
Time Zone Offset	5	±HHMM	
Daylight Saving	1	0|1	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*State*>: The current motion state of the device.

- 16 (**Tow**): The device attached vehicle is ignition off and it is towed.
- 1A (**Fake Tow**): The device attached vehicle is ignition off and it might be towed.
- 11 (**Ignition Off Rest**): The device attached vehicle is ignition off and it is motionless.
- 12 (**Ignition Off Motion**): The device attached vehicle is ignition off and it is moving before it is considered to be towed.
- 21 (**Ignition On Rest**): The device attached vehicle is ignition on and it is motionless.
- 22 (**Ignition On Motion**): The device attached vehicle is ignition on and it is moving.
- 41 (**Sensor Rest**): The device attached vehicle is motionless without ignition signal

detected.

- 42 (**Sensor Motion**): The device attached vehicle is moving without ignition signal detected.

✧ <*ICCID*>: The ICCID of the SIM card.

✧ <*CSQ RSSI*>: The level of signal strength.

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

✧ <*CSQ BER*>: The quality of the GSM signal. The range is 0-7.

✧ <*External Power Voltage*>: The voltage of the external power supply.

✧ <*Backup Battery VCC*>: The voltage of the backup battery. The value of this field is only valid when the external power is not connected.

✧ <*Last Fix UTC Time*>: The UTC time of the latest successful GPS fix.

✧ <*Input Status*>: A bitwise hex integer to represent the logical status of an input. The lowest bit represents the status of the ignition detection input: 0 means "Disable status", and 1 means "Enable status". The highest bit represents the status of the main power: 0 means "The main power supply is disconnected", and 1 means "The main power supply is connected". The other bits are 0 which means "Disable status".

✧ <*Digital Output*>: A bitwise hex integer to represent the logical status of a digital output. For each bit, 0 means "Disable status", and 1 means "Enable status".

✧ <*Time Zone Offset*>: The offset of the local time zone from the UTC time.

✧ <*Daylight Saving*>: The current setting of the daylight saving.

- 0: Daylight saving is disabled.
- 1: Daylight saving is enabled.

3.3.3.Report for Real Time Querying

3.3.3.1.+RESP:GTGPS

After the device receives the command **AT+GTRTO** to read the GPS information, it will send the GPS information to the backend server via the message **+RESP:GTGPS**.

➢ **+RESP:GTGPS,**

Example: **+RESP:GTGPS,090302,865083030002554,,,,,003F,,,20170731074708,20170731154710,020E$**			
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' '-' '_'	
Reserved	0		
Reserved	0		
Reserved	0		
Report Composition Mask	4	0000 – FFFF	
Reserved	0		
Reserved	0		
Last Fix UTC Time	14	YYYYMMDDHHMMSS	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Report Composition Mask*>: Please refer to <*Report Composition Mask*> in the **AT+GTCFG** command.

3.3.3.2.+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 GPRS even if the report mode is forced SMS mode.

➢ **+RESP:GTALM,**

Example:

+RESP:GTALM,090302,865083030002554,,4,1,BSI,,,,,,,,SRI,4,,1,220.178.67.210,10041,0.0.0.0,0,,30,1,0,1,,,CFG,gv50,GV50A02V14,1,0.1,,,003F,0,,3D0F,,1,1,300,1,,,0,0017,0,TOW,0,10,1,300,0,0,0,0,2,3,2,,,,,,,,,EPS,0,250,250,0,0,0,0,0,0,0,0,0,,DIS,0,1,,1,,,,,,,,,,,,,,,,TMA,+0800,0,,,,,FRI,0,1,,1,0000,0000,,30,1000,1000,,0,600,,,,,,GEO,0,0,,,50,0,0,0,0,0,0,0,,,1,0,,,50,0,0,0,0,0,0,0,,,2,0,,,50,0,0,0,0,0,0,0,,,3,0,,,50,0,0,0,0,0,0,0,,,4,0,,,50,0,0,0,0,0,0,0,,,5,0,,,50,0,0,0,0,0,0,0,,,6,0,,,50,0,0,0,0,0,0,0,,,7,0,,,50,0,0,0,0,0,0,0,,,8,0,,,50,0,0,0,0,0,0,0,,,9,0,,,50,0,0,0,0,0,0,0,,,10,0,,,50,0,0,0,0,0,0,0,,,11,0,,,50,0,0,0,0,0,0,0,,,12,0,,,50,0,0,0,0,0,0,0,,,13,0,,,50,0,0,0,0,0,0,0,,,14,0,,,50,0,0,0,0,0,0,0,,,15,0,,,50,0,0,0,0,0,0,0,,,16,0,,,50,0,0,0,0,0,0,0,,,17,0,,,50,0,0,0,0,0,0,0,,,18,0,,,50,0,0,0,0,0,0,0,,,19,0,,,50,0,0,0,0,0,0,0,,,SPD,0,0,0,60,300,0,0,0,0,,,,,,,,,,,,PIN,0,,,,,,,OWH,0,1F,0900,1200,1300,1800,,,,0,0,0,0,,,,,DOG,0,60,30,0200,,1,,,60,60,,IDL,0,2,1,0,,,,0,0,0,0,,,,,HMC,0,00000:00:00,,,,,,,,HBM,0,,,100,0,0,,60,0,0,,,0,0,,0,0,0,0,,,,,WLT,0,,,,,,,,,,,,,,HRM,,,6F,FE17BF,FE17BF,F77D,EF,,,,,PDS,0,0,,,,,,,OUT,0,,,,,,,SSR,0,2,1,5,0,,,,RMD,0,,3D0F,,,3D0F,,,,,0,0,0,0,,,20170731154753,0211$

+RESP:GTALM,090302,865083030002554,,4,2,FFC,0,0,0,,,,,,,30,500,500,300,,0,,,,,1,0,0,,,,,,,30,5

00,500,300,,0,,,,,2,0,0,,,,,,,30,500,500,300,,0,,,,,3,0,0,,,,,,,30,500,500,300,,0,,,,,4,0,0,,,,,,,30,500,500,300,,0,,,,,CMD,0,0,,,,,,0,1,,,,,,0,2,,,,,,0,3,,,,,,0,4,,,,,,0,5,,,,,,0,6,,,,,,0,7,,,,,,0,8,,,,,,0,9,,,,,,0,10,,,,,,0,11,,,,,,0,12,,,,,,0,13,,,,,,0,14,,,,,,0,15,,,,,,0,16,,,,,,0,17,,,,,,0,18,,,,,,0,19,,,,,,0,20,,,,,,0,21,,,,,,0,22,,,,,,0,23,,,,,,0,24,,,,,,0,25,,,,,,0,26,,,,,,0,27,,,,,,0,28,,,,,,0,29,,,,,,0,30,,,,,,0,31,,,,,,20170731154753,0212$

+RESP:GTALM,090302,865083030002554,,4,3,UDF,0,0,0000000000000000,0,,,00000000,0,,,,,0,1,0000000000000000,0,,,00000000,0,,,,,0,2,0000000000000000,0,,,00000000,0,,,,,0,3,0000000000000000,0,,,00000000,0,,,,,0,4,0000000000000000,0,,,00000000,0,,,,,0,5,0000000000000000,0,,,00000000,0,,,,,0,6,0000000000000000,0,,,00000000,0,,,,,0,7,0000000000000000,0,,,00000000,0,,,,,0,8,0000000000000000,0,,,00000000,0,,,,,0,9,0000000000000000,0,,,00000000,0,,,,,0,10,0000000000000000,0,,,00000000,0,,,,,0,11,0000000000000000,0,,,00000000,0,,,,,0,12,0000000000000000,0,,,00000000,0,,,,,0,13,0000000000000000,0,,,00000000,0,,,,,0,14,0000000000000000,0,,,00000000,0,,,,,0,15,0000000000000000,0,,,00000000,0,,,,,0,16,0000000000000000,0,,,00000000,0,,,,,0,17,0000000000000000,0,,,00000000,0,,,,,0,18,0000000000000000,0,,,00000000,0,,,,,0,19,0000000000000000,0,,,00000000,0,,,,,0,20,0000000000000000,0,,,00000000,0,,,,,0,21,0000000000000000,0,,,00000000,0,,,,,0,22,0000000000000000,0,,,00000000,0,,,,,0,23,0000000000000000,0,,,00000000,0,,,,,0,24,0000000000000000,0,,,00000000,0,,,,,0,25,0000000000000000,0,,,00000000,0,,,,,0,26,0000000000000000,0,,,00000000,0,,,,,0,27,0000000000000000,0,,,00000000,0,,,,,0,28,0000000000000000,0,,,00000000,0,,,,,0,29,0000000000000000,0,,,00000000,0,,,,,0,30,0000000000000000,0,,,00000000,0,,,,,0,31,0000000000000000,0,,,00000000,0,,,,,GAM,1,1,25,10,60,60,,,,,20170731154754,0213$

+RESP:GTALM,090302,865083030002554,,4,4,VVS,13500,600,10,,,AVS,20,30,,,,20170731154754,0214$

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' '-' '_'	
Total Packets	1	4	
Current Packet	1	1 – 4	
Configurations	< 1500		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Total Packets*>: The total number of **+RESP:GTALM** message packets.
- <*Current Packet*>: The sequence number of the current packet.
- <*Configurations*>: The current configuration of the device.

Note: The length of every **+RESP:GTALM** message (including header and tail) must be less than or equal to (<=) 1400 characters.

3.3.3.3.+RESP:GTALC

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:GTALC**. This message is only sent via GPRS even if the report mode is forced SMS mode.

- **+RESP:GTALC,**

Example:

**+RESP:GTALC,090302,865083030002554,GV50A02V14,29B7EF7B,1,1,BSI,,,,,,,,SRI,3,,1,220.178.6
7.210,10042,0.0.0.0,0,,30,1,0,1,,,CFG,gv50,GV50A02V14,1,0.1,,,007F,1,,3D0F,,1,1,300,0,,,0,0017,
0,TOW,0,10,1,300,0,0,0,0,2,3,2,,,,,,,,,EPS,0,250,250,0,0,0,0,0,0,0,0,0,,DIS,0,1,,1,,,,,,,,,,,,,,,,TMA,+
0800,0,,,,,FRI,0,1,,1,0000,0000,,30,1000,1000,,0,600,,,,,GEO,0,0,,,50,0,0,0,0,0,0,0,,,1,0,,,50,0,0,0,
0,0,0,0,,,2,0,,,50,0,0,0,0,0,0,0,,,3,0,,,50,0,0,0,0,0,0,0,,,4,0,,,50,0,0,0,0,0,0,0,,,5,0,,,50,0,0,0,0,0,0,0
,,,6,0,,,50,0,0,0,0,0,0,0,,,7,0,,,50,0,0,0,0,0,0,0,,,8,0,,,50,0,0,0,0,0,0,0,,,9,0,,,50,0,0,0,0,0,0,0,,,10,0,
,,50,0,0,0,0,0,0,0,,,11,0,,,50,0,0,0,0,0,0,0,,,12,0,,,50,0,0,0,0,0,0,0,,,13,0,,,50,0,0,0,0,0,0,0,,,14,0,,,
50,0,0,0,0,0,0,0,,,15,0,,,50,0,0,0,0,0,0,0,,,16,0,,,50,0,0,0,0,0,0,0,,,17,0,,,50,0,0,0,0,0,0,0,,,18,0,,,5
0,0,0,0,0,0,0,0,,,19,0,,,50,0,0,0,0,0,0,0,,,SPD,0,0,0,60,300,0,0,0,0,,,,,,,,,,,,PIN,0,,,,,,,OWH,0,1F,090
0,1200,1300,1800,,,,0,0,0,0,,,,,DOG,0,60,30,0200,,1,,,60,60,,IDL,0,2,1,0,,,,0,0,0,0,,,,,HMC,0,0000
0:00:00,,,,,,,,,HBM,0,,,100,0,0,,60,0,0,,,0,0,,0,0,0,0,,,,,WLT,0,,,,,,,,,,,,,,,HRM,,,6F,FE17BF,FE17BF,F7
7D,EF,,,,,PDS,0,0,,,,,,,OUT,0,,,,,,,SSR,0,2,1,5,0,,,,RMD,0,,,
,,,3D0F,,,3D0F,,,,,0,0,0,0,,,20170719165937,0076$**
**+RESP:GTALC,090302,865083030002554,GV50A02V14,140000000,1,2,FFC,0,0,0,,,,,,,30,500,500,
300,,0,,,,,1,0,0,,,,,,,30,500,500,300,,0,,,,,2,0,0,,,,,,,30,500,500,300,,0,,,,,3,0,0,,,,,,,30,500,500,300,,
0,,,,,4,0,0,,,,,,,30,500,500,300,,0,,,,,CMD,0,0,,,,,,0,1,,,,,,0,2,,,,,,0,3,,,,,,0,4,,,,,,0,5,,,,,,0,6,,,,,,0,7,,,,,,
0,8,,,,,,0,9,,,,,,0,10,,,,,,0,11,,,,,,0,12,,,,,,0,13,,,,,,0,14,,,,,,0,15,,,,,,0,16,,,,,,0,17,,,,,,0,18,,,,,,0,19,,,,,,0
,20,,,,,,0,21,,,,,,0,22,,,,,,0,23,,,,,,0,24,,,,,,0,25,,,,,,0,26,,,,,,0,27,,,,,,0,28,,,,,,0,29,,,,,,0,30,,,,,,0,31,,,,,,
20170719165937,0077$**
**+RESP:GTALC,090302,865083030002554,GV50A02V14,200000000,1,3,UDF,0,0,00000000000000
00,0,,,00000000,0,,,,,0,1,0000000000000000,0,,,00000000,0,,,,,0,2,0000000000000000,0,,,0000
0000,0,,,,,0,3,0000000000000000,0,,,00000000,0,,,,,0,4,0000000000000000,0,,,00000000,0,,,,,0,
5,0000000000000000,0,,,00000000,0,,,,,0,6,0000000000000000,0,,,00000000,0,,,,,0,7,00000000
00000000,0,,,00000000,0,,,,,0,8,0000000000000000,0,,,00000000,0,,,,,0,9,0000000000000000,0
,,,00000000,0,,,,,0,10,0000000000000000,0,,,00000000,0,,,,,0,11,0000000000000000,0,,,000000
00,0,,,,,0,12,0000000000000000,0,,,00000000,0,,,,,0,13,0000000000000000,0,,,00000000,0,,,,,0,
14,0000000000000000,0,,,00000000,0,,,,,0,15,0000000000000000,0,,,00000000,0,,,,,0,16,00000
00000000000,0,,,00000000,0,,,,,0,17,0000000000000000,0,,,00000000,0,,,,,0,18,000000000000
0000,0,,,00000000,0,,,,,0,19,0000000000000000,0,,,00000000,0,,,,,0,20,0000000000000000,0,,,
00000000,0,,,,,0,21,0000000000000000,0,,,00000000,0,,,,,0,22,0000000000000000,0,,,0000000
0,0,,,,,0,23,0000000000000000,0,,,00000000,0,,,,,0,24,0000000000000000,0,,,00000000,0,,,,,0,2
5,0000000000000000,0,,,00000000,0,,,,,0,26,0000000000000000,0,,,00000000,0,,,,,0,27,000000**

0000000000,0,,,00000000,0,,,,,0,28,0000000000000000,0,,,00000000,0,,,,,0,29,0000000000000000,0,,,00000000,0,,,,,0,30,0000000000000000,0,,,00000000,0,,,,,0,31,0000000000000000,0,,,00000000,0,,,,,20170719165938,0078$
+RESP:GTALC,090302,865083030002554,GV50A02V14,1C000000000,0,4,GAM,1,1,25,10,60,60,,,,,VVS,13500,600,10,,,AVS,20,30,,,,20170719165938,0079$

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' '-' '_'	
Configuration Mask	<=16	0000000000000000 – FFFFFFFFFFFFFFFF	
Next Packet	1	0-1	0
Current Packet	<=2	1-20	1
BSI	3	BSI	BSI
APN	<=40		
APN User Name	<=30		
APN Password	<=30		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
SRI	3	SRI	SRI
Report Mode	1	0 – 6 | 8	
Reserved	0		
Buffer Mode	1	0|1|2	
Main Server IP / Domain Name	<=60		
Main Server Port	<=5	0 – 65535	
Backup Server IP	<=15		
Backup Server Port	<=5	0 – 65535	
SMS Gateway	<=20		
Heartbeat Interval	<=3	0|2 – 360min	

SACK Enable	1	0|1	
Protocol Format	1	0|1	0
SMS ACK Enable	1	0|1	0
Reserved	0		
Reserved	0		
CFG	3	CFG	CFG
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
ODO Enable	1	0|1	
ODO Initial Mileage	<=9	0.0 – 4294967.0Km	
Reserved	0		
Reserved	0		
Report Composition Mask	4	0000 – FFFF	
Power Saving Mode	1	0 – 2	
Reserved	4	0000 – FFFF	0000
Event Mask	4	0000 – FFFF	
Reserved	0		
LED On	1	1|2	
Info Report Enable	1	0|1	
Info Report Interval	<=5	30 – 86400sec	
Location by Call	1	0|1|2|3	
Reserved	0		
Reserved	0		
Reserved	0		0
GSM Report	4	0000 – FFFF	
GPS Lost Time	2	0 – 30min	0
TOW	3	TOW	TOW
Tow Enable	1	0|1	
Engine Off to Tow	<=2	5 – 15min	
Fake Tow Delay	<=2	0 – 10min	

Tow Interval	<=5	30 – 86400sec	
Tow Output ID	1	0 – 2	
Tow Output Status	1	0|1	
Tow Output Duration	<=3	0 – 255(×100ms)	
Tow Output Toggle Times	<=3	0 – 255	
Rest Duration	<=3	1 – 255(×15sec)	
Motion Duration	<=2	1 – 10(×100ms)	
Motion Threshold	1	2 – 4	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
EPS	3	EPS	EPS
Mode	1	0|1|2	
Min. Threshold	<=5	250 – 28000 mV	
Max. Threshold	<=5	250 – 28000 mV	
Sample Period	<=2	0|1 – 12(×2s)	
Debounce Time	1	0 – 5(×1s)	
Output ID	1	0 – 1	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Sync with FRI	1	0|1	
Voltage Margin Error	3	0 – 100(×10mv)	0
Debounce Voltage Threshold	3	0 – 100 (×100mv)	0

Reserved	0		
DIS	3	DIS	DIS
Ignition Detection	1	0	0
Sample Period	<=2	0|1 – 12(×2s)	
Reserved	0		
Ignition Detection Mode	1	0-4	1
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
TMZ	3	TMZ	TMZ
Time Zone	5	–|+HHMM	
Daylight Saving	1	0|1	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
FRI	3	FRI	FRI

Mode	1	0 – 5	
Discard No Fix	<=2	0|1	
Reserved	0		
Period Enable	1	0|1	
Begin Time	4	HHMM	
End Time	4	HHMM	
Reserved	0		
Send Interval	<=5	5 – 86400sec	
Distance	<=5	300 – 65535m	
Mileage	<=5	300 – 65535m	
Reserved	0		
Corner Report	<=3	0 – 180	
IGF Report Interval	<=5	0|5 - 86400sec	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
GEO	3	GEO	GEO
GEO ID0	1	0	0
Mode	1	0 – 3	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
Radius	<=7	50 – 6000000m	
Check Interval	<=5	0 | 5 – 86400sec	
Output ID	1	0 – 1	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0

Reserved	0		
Reserved	0		
GEO ID1	1	1	1
Mode	1	0 – 3	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
Radius	<=7	50 – 6000000m	
Check Interval	<=5	0 | 5 – 86400sec	
Output ID	1	0 – 1	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID2	1	2	2
Mode	1	0 – 3	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
Radius	<=7	50 – 6000000m	
Check Interval	<=5	0 | 5 – 86400sec	
Output ID	1	0 – 1	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		

GEO ID3	1	3	3
Mode	1	0 – 3	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
Radius	<=7	50 – 6000000m	
Check Interval	<=5	0 | 5 – 86400sec	
Output ID	1	0 – 1	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID4	1	4	4
Mode	1	0 – 3	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
Radius	<=7	50 – 6000000m	
Check Interval	<=5	0 | 5 – 86400sec	
Output ID	1	0 – 1	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID5	1	5	5
Mode	1	0 – 3	0

Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0
Output ID	1	0 – 1	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID6	1	6	6
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0
Output ID	1	0 – 1	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID7	1	7	7
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000

Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0
Output ID	1	0 – 3	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID8	1	8	8
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0
Output ID	1	0 – 1	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID9	1	9	9
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0

Output ID	1	0 – 1	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID10	2	10	10
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0
Output ID	1	0 – 1	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID11	2	11	11
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0
Output ID	1	0 – 1	0
Output Status	1	0|1	0

Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID12	2	12	12
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0
Output ID	1	0 – 1	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID13	2	13	13
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0
Output ID	1	0 – 1	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0

Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID14	2	14	14
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0
Output ID	1	0 – 1	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID15	2	15	15
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0
Output ID	1	0 – 1	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0

Reserved	0		
Reserved	0		
GEO ID16	2	16	16
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0
Output ID	1	0 – 1	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID17	2	17	17
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0
Output ID	1	0 – 1	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		

GEO ID18	2	18	18
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0
Output ID	1	0 – 1	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID19	2	19	19
Mode	1	0 – 3	0
Longitude	<=11	(–)xxx.xxxxxx	0.000000
Latitude	<=10	(–)xx.xxxxxx	0.000000
Radius	<=7	50 – 6000000m	50
Check Interval	<=5	0 | 5 – 86400sec	0
Output ID	1	0 – 1	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
SPD	3	SPD	SPD
Mode	1	0|1|2	

Min. Speed	<=3	0 – 400km/h	
Max. Speed	<=3	0 – 400km/h	
Validity	<=4	0 – 3600sec	
Send Interval	<=4	30 – 3600sec	
Output ID	1	0 – 1	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
PIN	3	PIN	PIN
Enable Auto-unlock PIN	1	0|1	
PIN	1	'0' – '9'	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
OWH	3	OWH	OWH
Mode	1	0|1	
Day of Work	<=2	0 – 7F	

Working Hours Start1	4	HHMM	
Working Hours End1	4	HHMM	
Working Hours Start2	4	HHMM	
Working Hours End2	4	HHMM	
Reserved	0		
Reserved	0		
Reserved	0		
Digital Output ID	1	0 – 2	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
DOG	3	DOG	DOG
Mode	1	0|1|2	
Ignition Frequency	<=3	10 – 120min	
Interval	<=2	1 – 30	
Time	4	HHMM	
Reserved	0		
Report Before Reboot	1	0|1	
Input ID	1	0|1|2	
Reserved	0		
GSM Interval	4	0 | 5-1440 min	60
PDP Interval	4	0 | 5-1440 min	60
Reserved	0		
IDL	3	IDL	IDL
Mode	1	0|1	
Time to Idling	2	1 – 30 min	

Time to Movement	1	1 – 5 min	
Debounce Distance	<=4	0|100-9999m	0
Reserved	0		
Reserved	0		
Reserved	0		
Output ID	1	0 – 1	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
HMC	3	HMC	HMC
Hour Meter Enable	1	0|1	
Initial Hour Meter Count	11	00000:00:00-99999:00:00	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
HBM	3	HBM	HBM
Mode	1	0 – 1	0
Reserved	0		
Reserved	0		
High Speed	<=3	100 – 400km/h	
ΔVhb	<=3	0 – 100km/h	

ΔVha	<=3	0 – 100km/h	
Reserved	0		
Medium Speed	<=3	100 – 400km/h	
ΔVmb	<=3	0 – 100km/h	
ΔVma	<=3	0 – 100km/h	
Reserved	0		
Reserved	0		
ΔVlb	<=3	0 – 100km/h	
ΔVla	<=3	0 – 100km/h	
Reserved	0		
Output ID	1	0 – 1	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
WLT	3	WLT	WLT
Call Filter	1	0 – 7	0
Phone Number List	<=20*10		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
PDS	3	PDS	PDS
Mode	1	0|1|2	0
Mask	4	0000-FFFF	0
Reserved	0		
Reserved	0		

Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
OUT	3	OUT	OUT
DOS Report	1	0-1	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
SSR	3	SSR	SSR
Mode	1	0|1	0
Time to Stop	2	1 – 30 min	2
Time to Start	1	1 – 5 min	1
Start Speed	2	1 – 10 Km/h	5
Long Stop	3	0 – 255 min	0
Reserved	0		
Reserved	0		
Reserved	0		
RMD	3	RMD	RMD
Mode	1	0|1	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Home Operator List	<=6*10		
Reserved	0		
Reserved	0		

Roaming Operator List	<=6*100		
Reserved	0		
Reserved	0		
Black List Operator	<=6*20		
Reserved	0		
Reserved	0		
Known Roaming Event Mask	<=6	000000 – FFFFFF	3D03
Reserved	0		
Reserved	0		
Unknown Roaming Event Mask	<=6	000000 – FFFFFF	3D03
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Output ID	1	0 – 1	0
Output Status	1	0|1	
Duration	<=3	0～255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Reserved	0		
Reserved	0		
FFC	3	FFC	FFC
Priority	1	0	0
Mode	1	0-3	0
FRI Mode	1	0-5	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

Reserved	0		
FRI IGN Report Interval	<=5	0|5 – 86400s	30
FRI Report Distance	<=5	50-65535m	500
FRI Report Mileage	<=5	50-65535m	500
FRI IGF Report Interval	<=5	5-86400s	300
Reserved	0		
Corner Report	<=3	0 – 180	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Priority	1	1	1
Mode	1	0-3	0
FRI Mode	1	0-5	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
FRI IGN Report Interval	<=5	5-86400s	30
FRI Report Distance	<=5	50-65535m	500
FRI Report Mileage	<=5	50-65535m	500
FRI IGF Report Interval	<=5	5-86400s	300
Reserved	0		
Corner Report	<=3	0 – 180	0
Reserved	0		
Reserved	0		

Reserved	0		
Reserved	0		
Priority	1	2	2
Mode	1	0-3	0
FRI Mode	1	0-5	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
FRI IGN Report Interval	<=5	5-86400s	30
FRI Report Distance	<=5	50-65535m	500
FRI Report Mileage	<=5	50-65535m	500
FRI IGF Report Interval	<=5	5-86400s	300
Reserved	0		
Corner Report	<=3	0 – 180	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Priority	1	3	3
Mode	1	0-3	0
FRI Mode	1	0-5	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

Reserved	0		
FRI IGN Report Interval	<=5	5-86400s	30
FRI Report Distance	<=5	50-65535m	500
FRI Report Mileage	<=5	50-65535m	500
FRI IGF Report Interval	<=5	5-86400s	300
Reserved	0		
Corner Report	<=3	0 – 180	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Priority	1	4	4
Mode	1	0-3	0
FRI Mode	1	0-5	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
FRI IGN Report Interval	<=5	5-86400s	30
FRI Report Distance	<=5	50-65535m	500
FRI Report Mileage	<=5	50-65535m	500
FRI IGF Report Interval	<=5	5-86400s	300
Reserved	0		
Corner Report	<=3	0 – 180	0
Reserved	0		
Reserved	0		

Reserved	0		
Reserved	0		
UDF	3	UDF	UDF
Mode	1	0-2	0
Group ID	2	0 – 31	
Input ID Mask	16	0-FFFFFFFFFFFFFFFF	0
Debounce Time	5	0-86400(s)	0
Inzizo Mask	5	00000-FFFFF	0
Outzizo Mask	5	00000-FFFFF	0
Stocmd ID Mask	16	0-FFFFFFFF	0
Stocmd Ack	1	0|1	0
Reserved			
Reserved			
Reserved			
Reserved			
GAM	3	GAM	GAM
Mode	1	0|1	1
Speed Mode	1	0|1	1
Motion Speed Threshold	<=2	5-50km/h	25
Motion Cumulative Time	<=3	10-100s	10
Motionless Cumulative Time	<=3	10-250s	60
GPS Fix Failure Timeout	<=4	5-1800s	60
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
VVS	3	VVS	VVS
Ignition On Voltage	<=5	250 – 28000 mV	13500

Voltage Offset	<=4	200 – 2000 mV	600
Debounce	<=3	5 – 255sec	10
Reserved	0		
Reserved	0		
AVS	3	AVS	AVS
Sensor Rest Duration	<=3	1 – 255 sec	20
Sensor Motion Validity	<=3	1 – 255 sec	30
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Next Packet*>: Whether the following information packet is the last one or not.
- 0: The following packet is the last information packet.
- 1: The following packet is not the last information packet.

✧ <*Current Packet*>: It indicates the index of **+RESP:GTALC**.

3.3.3.4.+RESP:GTALS

After the device receives the command **AT+GTRTO** to get sub AT command configuration information, it will send the configuration information to the backend server via the message **+RESP:GTALS**. Configuration information varies with different AT commands. For example, to get FRI configuration, set AT+GTRTO=gv50,2,FRI,,,,,0015$.

➢ **+RESP:GTALS,**

Example: **+RESP:GTALS,090302,865083030002554,,FRI,0,1,,1,0000,0000,,30,1000,1000,,0,600,,,,,20170731155450,0218$**			
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' '-' '_'	
Sub AT Command	3	'a' – 'z' 'A' – 'Z' '	
Mode	1	0 – 4	
Discard No Fix	<=2	0|1	
Reserved	0		
Period Enable	1	0|1	
Start Time	4	HHMM	
End Time	4	HHMM	
Reserved	0		
Send Interval	<=5	5 – 86400sec	
Distance	<=5	50 – 65535m	
Mileage	<=5	50 – 65535m	
Reserved	0		
Corner Report	<=3	0 – 180	
IGF Report Interval	<=5	0|5-86400sec	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.3.3.5.+RESP:GTCID

After the device receives the command **AT+GTRTO** to read the ICCID of the SIM card, or when TCP connection reconnects and the device is turned on, the device will send the ICCID to the backend server via the message **+RESP:GTCID**.

- **+RESP:GTCID,**

Example:
+RESP:GTCID,090302,865083030002554,,89860116830009013972,20170731155533,021A$

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' '-' '_'	
ICCID	20		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.3.3.6.+RESP:GTCSQ

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

➢ **+RESP:GTCSQ,**

Example: **+RESP:GTCSQ,090302,865083030002554,,23,0,20170731155603,021C$**			
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' '-' '_'	
CSQ RSSI	<=2	0 – 31|99	
CSQ BER	<=2	0 – 7	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*CSQ RSSI*>: The level of signal strength.

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

99	Unknown

✧ <*CSQ BER*>: The quality of the GSM signal. The range is 0-7.

3.3.3.7.+RESP:GTVER

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

➢ **+RESP:GTVER,**

Example: **+RESP:GTVER,090302,865083030002554,,GV50,020E,0105,20170731155607,021E$**			
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' '-' '_'	
Device Type	10	'0' – '9' 'a' – 'z' 'A' – 'Z'	
Software Version	4	0000 – FFFF	
Hardware Version	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Device Type*>: The type of the device.

✧ <*Software Version*>: The software version of the device. 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 of the device. 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**.

3.3.3.8.+RESP:GTBAT

After the device receives the command **AT+GTRTO** to read the power supply information, it will send the power supply information to the backend server via the message **+RESP:GTBAT**.

➢ **+RESP:GTBAT,**

Example: +RESP:GTBAT,090302,865083030002554,,,0,,3.98,,1,20170731155611,0220$			
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' '-' '_'	
Reserved	0		
External Power Voltage	<=5	0 – 99999mV	
Reserved	0		
Backup Battery VCC	<=4	0.0 – 4.5 V	
Reserved	0		
LED On	1	1|2	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.3.3.9.+RESP:GTIOS

After the device receives the command **AT+GTRTO** to get the status of all the IO ports, it will send the status to the backend server via the message **+RESP:GTIOS**.

- **+RESP:GTIOS,**

Example: +RESP:GTIOS,090302,865083030002554,,0,0,0,00,00,20170731155616,0222$			
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' '-' '_'	
Reserved	0		
Reserved	0		
Reserved	0		

Input Status	2	00 – 81	
Digital Output Status	2	00 – 01	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.3.3.10.+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,090302,865083030002554,,+0800,0,20170731155620,0224$**			
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' '-' '_'	
Time Zone Offset	5	±HHMM	
Daylight Saving	1	0|1	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.3.3.11.+RESP:GTGSV

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

- **+RESP:GTGSV,**

Example: **+RESP:GTGSV,090302,865083030002554,,12,19,33,19,20,6,34,17,29,2,36,41,31,9,0,12,39,5,30,23,0,25,26,28,0,20170731155831,0227$**			
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	2	> =0	
SV Power	2	> =0	
……			
SV ID	2	> =0	
SV Power	2	> =0	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*SV Count*>: The number of satellites the GPS finds.
- <*SV ID*>: Satellite ID. In case of no satellite, fill zero in the field.
- <*SV Power*>: Satellite power. In case of no satellite, fill zero in the field.

3.3.3.12.+RESP:GTRSV

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

➢ **+RESP:GTRSV,**

Example: **+RESP:GTRSV,090302,865083030002554,,0,20170731155834,0229$**			
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	0-32	
SV ID	2	> =0	
SV Power	2	> =0	
……			

SV ID	2	> =0	
SV Power	2	> =0	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- ✧ <*SV Count*>: The number of satellites the GLONASS finds.
- ✧ <*SV ID*>: Satellite ID. In case of no satellite, fill zero in the field.
- ✧ <*SV Power*>: Satellite power. In case of no satellite, fill zero in the field.

3.3.3.13.+RESP:GTBSV

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

- ➢ **+RESP:GTBSV,**

Example: **+RESP:GTBSV,090302,865083030002554,,9,8,31,3,30,6,31,1,26,2,31,4,0,9,26,5,32,7,18,20170731155838,022B$**			
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	0-37	
SV ID	2	> =0	
SV Power	2	> =0	
……			
SV ID	2	> =0	
SV Power	2	> =0	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- ✧ <*SV Count*>: The number of satellites the BeiDou finds.
- ✧ <*SV ID*>: Satellite ID. In case of no satellite, fill zero in the field.

✧ <*SV Power*>: Satellite power. In case of no satellite, fill zero in the field.

3.3.4.Event Report

The following event reports are triggered when certain events occur.
+RESP: GTPNA: Power on report
+RESP: GTPFA: Power off report
+RESP: GTMPN: The report for connecting main power supply
+RESP: GTMPF: The report for disconnecting main power supply
+RESP: GTSTT: The report for the change of the device's motion state
+RESP: GTPDP: GPRS connection establishment report
+RESP: GTIGN: Ignition on report
+RESP: GTIGF: Ignition off report
+RESP: GTIDN: Enter into idling status
+RESP: GTIDF: Leave idling status
+RESP: GTGSM: The report for the information of the serving cell and the neighbor cells
+RESP: GTGSS: GPS signal status
+RESP: GTSTR: Vehicle enters into start status
+RESP: GTSTP: Vehicle enters into stop status
+RESP: GTLSP: Vehicle enters into long stop status
+RESP: GTDOS: Wave shape 1 output status changes
+RESP: GTRMD: The report for entering or leaving GSM roaming state
+RESP: GTVGN: Virtual ignition on report
+RESP: GTVGF: Virtual ignition off report

In **+RESP:GTMPN**, **+RESP:GTMPF**, **+RESP:GTSTT**, **+RESP:GTIGN**, **+RESP:GTIGF**, **+RESP:GTIDN**, **+RESP:GTIDF**, **+RESP:GTSTR**, **+RESP:GTSTP**, **+RESP:GTVGN**, **+RESP:GTVGF**, **+RESP:GTLSP** and **+RESP:GTGSS** event reports, the last known GPS information and the current GSM network information are included.

- **+RESP:GTPNA,**
- **+RESP:GTPFA,**
- **+RESP:GTPDP,**

Example:
+RESP:GTPFA,090302,865083030002554,,20170731153304,01F8$
+RESP:GTPNA,090302,865083030002554,,20170731153318,01F9$
+RESP:GTPDP,090302,865083030002554,,20170731153326,01FA$

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' '-' '_'	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- **+RESP:GTMPN,**
- **+RESP:GTMPF,**

Example:
+RESP:GTMPF,090302,865083030002554,,0,0.0,144,66.7,117.201548,31.833038,20170731080153,0460,0001,5504,582B,00,20170731160155,022D$
+RESP:GTMPN,090302,865083030002554,,0,1.7,30,64.2,117.201528,31.833023,20170731080156,0460,0001,5504,582B,00,20170731160159,022E$

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' '-' '_'	
GPS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

➢ **+RESP:GTSTT,**

Example: **+RESP:GTSTT,090302,865083030002554,,41,0,0.0,24,63.3,117.201525,31.833040,20170731080235,0460,0001,5504,582B,00,20170731160236,022F$**			
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' '-' '_'	
State	2	11|12|21|22|41|42|16	
GPS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*State*>: The current movement state of the device.

- 16 (**Tow**): The device attached vehicle is ignition off and it is towed.
- 11 (**Ignition Off Rest**): The device attached vehicle is ignition off and it is motionless.
- 12 (**Ignition Off Motion**): The device attached vehicle is ignition off and it is moving before it is considered to be towed.
- 21 (**Ignition On Rest**): The device attached vehicle is ignition on and it is motionless.
- 22 (**Ignition On Motion**): The device attached vehicle is ignition on and it is moving.
- 41 (**Sensor Rest**): The device attached vehicle is motionless without ignition signal detected.

- 42 (**Sensor Motion**): The device attached vehicle is moving without ignition signal detected.

➢ **+RESP:GTIGN,**

Example: **+RESP:GTIGN,090302,865083030002554,,1377,0,0.0,24,63.3,117.201525,31.833040,20170731080420,0460,0001,5504,582B,00,,0.1,20170731160423,0233$**			
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' '-' '_'	
Duration of Ignition Off	<=6	0 – 999999 sec	
GPS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	
Hour Meter Count	11	HHHHH:MM:SS	
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Duration of Ignition Off*>: Duration since last time the ignition is turned off. If the duration is greater than 999999 seconds, it will be reported as 999999 seconds.

✧ <*Hour Meter Count*>: If the hour meter count function is enabled by the command

AT+GTHMC, total hours the meter has counted when the engine is on will be reported in this field. If the function is disabled, this field will be empty. It is formatted with 5 hour digits, 2 minute digits and 2 second digits, and ranges from 00000:00:00 – 99999:00:00.

➢ **+RESP:GTVGN,**

Example:
+RESP:GTVGN,090302,865083030002117,,00,4,824,0,0.0,22,74.4,117.294902,31.745697,20170707120858,0460,0000,560A,6703,00,00001:00:09,16.3,20170709203840,0502$

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' '-' '_'	
Reserved	2	00	
Reprot Type	1	0-4	
Duration of Ignition Off	<=6	0 – 999999 sec	
GPS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km /h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	
Hour Meter Count	11	HHHHH:MM:SS	
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- ✧ <*Report Type*>: This parameter indicates the reason which input triggers this ignition event.
  - 0: Reserved
  - 1: Reserved
  - 2: External power voltage mode (virtual ignition detection)
  - 3: Reserved
  - 4: Accelerometer mode (virtual ignition detection)
- ✧ <*Duration of Ignition Off*>: Duration since last time the ignition is off. If the duration is greater than 999999 seconds, it will be reported as 999999 seconds.
- ✧ <*Hour Meter Count*>: If the hour meter count function is enabled by the command **AT+GTHMC**, total hours the meter counted when the engine is on will be reported in this field. If the function is disabled, this field will be empty. It is formatted with 5 hour digits, 2 minute digits and 2 second digits and ranges from 00000:00:00– 99999:00:00.

➢ **+RESP:GTIGF,**

Example: **+RESP:GTIGF,090302,865083030002554,,115,0,0.0,24,63.3,117.201525,31.833040,20170731080617,0460,0001,5504,582B,00,,0.1,20170731160618,0238$**			
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' '-' '_'	
Duration of Ignition On	<=6	0 – 999999 sec	
GPS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	

Hour Meter Count	11	HHHHH:MM:SS	
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Duration of Ignition On*>: Duration since last time the ignition is on. If the duration is greater than 999999 seconds, it will be reported as 999999 seconds.
- <*Hour Meter Count*>: If the hour meter count function is enabled by the command **AT+GTHMC**, total hours the meter has counted when the engine is on will be reported in this field. If the function is disabled, this field will be empty. It is formatted with 5 hour digits, 2 minute digits and 2 second digits, and ranges from 00000:00:00 – 99999:00:00.

➢ **+RESP:GTVGF,**

Example: **+RESP:GTVGF,090302,865083030002117,,00,4,32,0,0.0,22,74.4,117.294902,31.745697,20170707120858,0460,0000,560A,6703,00,00001:00:41,16.3,20170709203912,0504$**			
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' '-' '_'	
Reserved	2	00	
Reprot Type	1	0-4	
Duration of Ignition On	<=6	0 – 999999 sec	
GPS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km /h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	

LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	
Hour Meter Count	11	HHHHH:MM:SS	
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Duration of Ignition On*>: Duration since last time the ignition is on. If the duration is greater than 999999 seconds, it will be reported as 999999 seconds.
- <*Hour Meter Count*>: If the hour meter count function is enabled by the command **AT+GTHMC**, total hours the meter counted when the engine is on will be reported in this field. If the function is disabled, this field will be empty. It is formatted with 5 hour digits, 2 minute digits and 2 second digits, and ranges from 00000:00:00– 99999:00:00.

- **+RESP:GTIDN,**
- **+RESP:GTSTR,**
- **+RESP:GTSTP,**
- **+RESP:GTLSP,**

Example:
+RESP:GTIDN,090302,865083030004642,,,,0,0.0,291,48.3,117.177670,31.820310,20170731075611,0460,0001,5502,465D,00,1061.0,20170731155614,3EAD$
+RESP:GTSTR,090302,865083030004642,,,,0,36.4,271,35.0,117.201547,31.829752,20170731074759,0460,0001,5504,582C,00,1057.6,20170731154802,3E80$
+RESP:GTSTP,090302,865083030004642,,,,0,0.0,291,48.3,117.177670,31.820310,20170731075941,0460,0001,5502,465D,00,1061.0,20170731155944,3EB5$
+RESP:GTLSP,090302,865083030004642,,,,0,0.0,203,52.5,117.201760,31.832648,20170728181824,0460,0001,5504,582B,00,1006.0,20170729021852,3B23$

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' '-' '_'	
Reserved	0		
Reserved	0		
GPS Accuracy	<=2	0	0, Last known

Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

➢ **+RESP:GTIDF,**

Example: **+RESP:GTIDF,090302,865083030004642,,22,444,0,56.7,292,50.9,117.172603,31.822037,20170731080338,0460,0001,5502,465D,00,1061.5,20170731160338,3EBF$**			
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' '-' '_'	
Motion State	2	11|12|16|22	
Duration of Idling Status	<=6	0 – 999999 sec	
GPS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	

Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Motion State*>: The motion state when the vehicle leaves idling status.
- <*Duration of Idling Status*>: The period of time that the vehicle has been in idling status. If the duration is greater than 999999 seconds, it will be reported as 999999 seconds.

➢ **+RESP:GTGSM**

Example:
+RESP:GTGSM,090302,865083030002117,FRI,0460,0000,560a,0981,33,,0460,0000,560a,091d,27,,0460,0000,560a,6702,26,,0460,0000,560a,0980,26,,0460,0000,560a,5161,18,,0460,0000,560a,4d13,17,,0460,0000,560a,091d,18,00,20170709204918,0508$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X∈{'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Fix Type	3	SOS|RTL|LBC|FRI|GIR	
MCC1	4	0XXX	
MNC1	4	0XXX	
LAC1	4		
Cell ID1	4		
RX Level1	2	0-63	
Reserved	2		
MCC2	4	0XXX	
MNC2	4	0XXX	

LAC2	4		
Cell ID2	4		
RX Level2	2	0-63	
Reserved	2		
MCC3	4	0XXX	
MNC3	4	0XXX	
LAC3	4		
Cell ID3	4		
RX Level3	2	0-63	
Reserved	2		
MCC4	4	0XXX	
MNC4	4	0XXX	
LAC4	4		
Cell ID4	4		
RX Level4	2	0-63	
Reserved	2		
MCC5	4	0XXX	
MNC5	4	0XXX	
LAC5	4		
Cell ID5	4		
RX Level5	2	0-63	
Reserved	2		
MCC6	4	0XXX	
MNC6	4	0XXX	
LAC6	4		
Cell ID6	4		
RX Level6	2	0-63	
Reserved	2		
MCC	4	0XXX	
MNC	4	0XXX	

LAC	4		
Cell ID	4		
RX Level	2	0-63	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Fix Type*>: A string to indicate what kind of GPS fix this cell information is for.
  "RTL": This cell information is for RTL request.
  "LBC": This cell information is for LBC request.
  "FRI": This cell information is for FRI request.
  "GIR": This cell information is for the sub command "**C**" in the **AT+GTRTO** command.
- <*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 is a 6-bit value coded in 1 dB 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.

Note:

1. It may include information of several neighbor cells (or even no neighbor cell information). If no neighbor cell is found, all the fields of the neighbor cell will be empty.
2. "ffff" in the fields of <*LAC(i)*> and <*Cell ID(i)*> means the terminal doesn't know the value.
3. This message cannot be sent via SMS.

➢ **+RESP:GTGSS**

Example: **+RESP:GTGSS,090302,865083030002117,,1,5,22,,0,20.1,352,79.6,117.281003,31.749642,20170709231353,0460,0000,560A,60BA,00,20170710071354,05B2$**			
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' '-' '_'	
GPS Signal Status	1	0 | 1	
Satellite Number	2	0 - 24	
Device State	2	11|12|21|22|41|42|16	
Reserved	0		
GPS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*GPS Signal Status*>: 0 means “Lost GPS signal or no successful GPS fix”, and 1 means “GPS signal recovered and successful GPS fix”.
- <*Satellite Number*>: The number of the visible satellites when fix is successful. If fix fails, the parameter field is empty.
- <*Device State*>: The current movement state of the device.
  - 16 (**Tow**): The device attached vehicle is ignition off and it is towed.
  - 11 (**Ignition off Rest**): The device attached vehicle is ignition off and it is motionless.
  - 12 (**Ignition off Motion**): The device attached vehicle is ignition off and it is moving before it is considered to be towed.
  - 21 (**Ignition On Rest**): The device attached vehicle is ignition on and it is motionless.

- 22 (**Ignition On Motion**): The device attached vehicle is ignition on and it is moving.
- 41 (**Sensor Rest**): The device attached vehicle is motionless without ignition signal detected.
- 42 (**Sensor Motion**): The device attached vehicle is moving without ignition signal detected.

➢ **+RESP:GTDOS**

Example: **+RESP:GTDOS,090302,865083030002554,,1,1,0,0.0,24,63.3,117.201525,31.833040,20170731081256,0460,0001,5504,582B,00,20170731161258,023E$**			
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' '-' '_'	
Wave1 Output ID	1	1-2	
Wave1 Ouptut Active	1	0|1	
GPS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Wave1 Output ID*>: The ID of the wave shape 1 output.

✧ <*Wave1 Output Active*>: The wave shape 1 output status.

If the GSM roaming state of the device changes, the **+RESP:GTRMD** message will report the current roaming state. The message is defined as an event message.

➢ **+RESP:GTRMD,**

Example: **+RESP:GTRMD,090302,865083030002554,,2,0,0.0,24,63.3,117.201525,31.833040,20170731081347,0460,0001,5504,582B,00,20170731161350,0241$**			
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'	
Roaming State	1	0-3	
GPS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Roaming State*>: A numeral to indicate the roaming status.

- 0: Home
- 1: Known Roaming
- 2: Unknown Roaming
- 3: Blocking Report

3.3.5.Buffer Report

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

- ✧ GSM network is not available.
- ✧ GPRS context activation for the TCP or UDP connection fails.
- ✧ Establishment of the TCP connection with the backend server fails.

The buffered messages will be sent to the backend server when the connection to the server recovers. The buffered reports are saved to the built-in non-volatile memory in case the device is reset. The terminal can buffer up to 600 messages.

Detailed information about buffer report is listed below.

- ✧ Only **+RESP** messages except **+RESP:GTALM**, **+RESP:GTPDP**, **+RESP:GTALS** and **+RESP:GTALC** are buffered.
- ✧ In the buffer report, the original header string "**+RESP**" is replaced by "**+BUFF**" while the other content including the original sending time and count number is kept unchanged.
- ✧ Buffered messages will be sent only via GPRS by TCP or UDP connection. They cannot be sent via SMS. If the current report 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.

Example:

The following is an example of the buffered message:

+BUFF:GTFRI,090302,865083030004642,GV50,13501,31,1,1,40.6,15,50.7,117.246848,31.815552,20170718071842,0460,0001,5504,34B5,00,591.8,00032:07:37,,,,220101,20,0,10,2017071815184 2,24CD$

3.3.6.Report with Google Maps Hyperlink

If <*Location by Call*> in the command **AT+GTCFG** is set to 2, the device will send its current location to the incoming phone call's number via SMS with a Google Maps hyperlink.

➢ **Google Maps Hyperlink**

Example: **gv50:** **<http://maps.google.com/maps?q=31.222073,121.354335** **F1 D2009/01/01T00:00:00>**			
Parameter	**Length (byte)**	**Range/Format**	**Default**

Device Name	<=20	'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	(–)xx.xxxxxx	
Longitude	<=11	(–)xxx.xxxxxx	
GPS Fix	<=3	F0|F1 – F50	
GPS UTC Time	20	DYYYY/MM/DDTHH:MM:SS	

✧ <*GPS Fix*>: The accuracy of the location information. F0 means no GPS fix.

3.4. Heartbeat

Heartbeat is used to maintain the contact between the device and the backend server in GPRS communication. The heartbeat package is sent to the backend server at the interval specified by <*Heartbeat Interval*> in the **AT+GTSRI** command.

➢ **+ACK:GTHBD**

Example: **+ACK:GTHBD,090302,865083030004642,,20170718163021,252F$**			
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' '-' '_'	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
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,090302,11F0$** **+SACK:GTHBD,,11F0$**

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Protocol Version*>: The device type and the protocol version that the backend server supports. This field is optional. The backend server could 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	0000 – FFFF	
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. HEX Format Report Message

From this version, the @Tracker protocol starts to support report messages in HEX format. For all the commands, they are still using the ASCII format as described above. By default, the device uses ASCII format report messages. The backend server could use the **AT+GTQSS** or **AT+GTSRI** command to enable the HEX format report messages by setting the <*Protocol Format*> to 1.

All the report messages are sorted into 5 categories and messages in the same category use the same header string, including acknowledgement to command (**+ACK**), location report (**+RSP**), event report (**+EVT**), information report (**+INF**) and the heartbeat data (**+HBD**).

The composition of the HEX report message could be customized by the **AT+GTHRM** command. The actual length of each HEX report message varies depending on mask settings in **AT+GTHRM**.

The device uses CRC16 method to calculate the checksum of the report data and appends the checksum to the end of the data. The backend server could use this checksum to verify the integrity of the received data.

At the end of each HEX report message, the device uses 0x0D and 0x0A to mark the end.

The HEX report messages are transmitted in network byte order (big-endian).

4.1. Hex Report Mask

The **AT+GTHRM** command consists of <*+ACK Mask*>, <*+RSP Mask*>, <*+EVT Mask*>, <*+INF Mask*>, <*+HBD Mask*> and <*+CRD Mask*> to control the composition of the corresponding HEX report message. In each HEX report message, the corresponding mask for the report indicates which part is reported.

- **AT+GTHRM=**

Example: **AT+GTHRM=gv50,,EF,FFFFFFFF,FFFFFFFF,FFFF,FF,FE0F,,,,0018$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Reserved	0		
Reserved	0		
+ACK Mask	2	00– FF	6F
+RSP Mask	8	00000000 – FFFFFFFF	FE17BF
+EVT Mask	8	00000000 – FFFFFFFF	FE17BF

+INF Mask	<=8	00000000 – FFFFFFFF	F77D
+HBD Mask	2	00 – FF	EF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*+ACK Mask*>: Component mask of the acknowledgement received.

Mask Bit	Item
Bit 7	Reserved
Bit 6	<*Count Number*>
Bit 5	<*Send Time*>
Bit 4	<*Device Name*>
Bit 3	<*Firmware Version*>
Bit 2	<*Protocol Version*>
Bit 1	<*Device Type*>
Bit 0	<*Length*>

✧ <*+RSP Mask*>: Component mask of the location report message.

Mask Bit	Item
Bit 31	Reserved
Bit 30	Reserved
Bit 29	Reserved
Bit 28	Reserved
Bit 27	Reserved
Bit 26	<*CSQ RSSI / CSQ BER*>
Bit 25	Reserved
Bit 24	Reserved
Bit 23	<*Total Hour Meter Count*>

Bit 22	*<Current Hour Meter Count>*
Bit 21	*<Total Mileage>*
Bit 20	*<Current Mileage>*
Bit 19	*<Satellite Information>*
Bit 18	*<Motion Status>*
Bit 17	*<Digital IO Status>*
Bit 16	Reserved
Bit 15	Reserved
Bit 14	Reserved
Bit 13	Reserved
Bit 12	*<External Power Voltage>*
Bit 11	*<Battery Level>*
Bit 10	*<Firmware Version>*
Bit 9	*<Protocol Version>*
Bit 8	*<Device Type>*
Bit 7	*<Length>*
Bit 6	*<Device Name>*
Bit 5	*<Count Number>*
Bit 4	*<Send Time>*
Bit 3	*<MCC / MNC / LAC / Cell ID / Reserved>*
Bit 2	*<Altitude>*
Bit 1	*<Azimuth>*
Bit 0	*<Speed>*

✧ *<+EVT Mask>*: Component mask of the event report message.

Mask Bit	Item
Bit 31	Reserved
Bit 30	Reserved
Bit 29	Reserved
Bit 28	Reserved
Bit 27	Reserved

Bit 26	Reserved
Bit 25	Reserved
Bit 24	Reserved
Bit 23	*<Total Hour Meter Count>*
Bit 22	*<Current Hour Meter Count>*
Bit 21	*<Total Mileage>*
Bit 20	*<Current Mileage>*
Bit 19	*<Satellite Information>*
Bit 18	*<Motion Status>*
Bit 17	*<Digital IO Status>*
Bit 16	Reserved
Bit 15	Reserved
Bit 14	Reserved
Bit 13	Reserved
Bit 12	*<External Power Voltage>*
Bit 11	Reserved
Bit 10	*<Firmware Version>*
Bit 9	*<Protocol Version>*
Bit 8	*<Device Type>*
Bit 7	*<Length>*
Bit 6	*<Device Name>*
Bit 5	*<Count Number>*
Bit 4	*<Send Time>*
Bit 3	*<MCC / MNC / LAC / Cell ID / Reserved>*
Bit 2	*<Altitude>*
Bit 1	*<Azimuth>*
Bit 0	*<Speed>*

✧ *<+INF Mask>*: Component mask of the information report message. Bit 8 to Bit 15 indicate which groups of items are included when the device reports the message **+RESP:GTINF**. Bit 16 to Bit 31 are valid only when Bit 7 is 1.

Mask Bit	**Item**

Bit 15	**+RESP:GTGIR**
Bit 14	**+RESP:GTTMZ**
Bit 13	**+RESP:GTCSQ**
Bit 12	**+RESP:GTCID**
Bit 11	**+RESP:GTBAT**
Bit 10	**+RESP:GTGPS**
Bit 9	**+RESP:GTIOS**
Bit 8	**+RESP:GTVER**
Bit 7	*<INF Expansion Mask>*
Bit 6	*<Count Number>*
Bit 5	*<Send Time>*
Bit 4	*<Firmware Version>*
Bit 3	*<Protocol Version>*
Bit 2	*<Device Type>*
Bit 1	*<Device Name>*
Bit 0	*<Length>*

✧ *<INF Expansion Mask>*: Component mask of the information report message. Bit 0 to Bit 15 indicate which groups of information items are included when the device reports the message **+RESP:GTINF**.

Mask Bit	Item
Bit 15	Reserved
Bit 14	Reserved
Bit 13	Reserved
Bit 12	Reserved
Bit 11	Reserved
Bit 10	Reserved
Bit 9	Reserved
Bit 8	Reserved
Bit 7	Reserved
Bit 6	Reserved
Bit 5	**+RESP:GTBSV**

Bit 4	**+RESP:GTRSV**
Bit 3	Reserved
Bit 2	Reserved
Bit 1	Reserved
Bit 0	**+RESP:GTGSV**

✧ <*+HBD Mask*>: Component mask of the heartbeat data.

Mask Bit	Item
Bit 7	<*UID*>
Bit 6	<*Count Number*>
Bit 5	<*Send Time*>
Bit 4	<*Device Name*>
Bit 3	<*Firmware Version*>
Bit 2	<*Protocol Version*>
Bit 1	<*Device Type*>
Bit 0	<*Length*>

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

➢ **+ACK:GTHRM,**

Example: **+ACK:GTHRM, 390200,135790246811220,,0019,20090214093254,11F0$**			
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' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

4.2. Acknowledgement +ACK

➢ **+ACK,**

Example: **2B 41 43 4B 01 EF 24 09 01 03 03 02 56 50 22 00 0A 00 27 07 00 07 F9 07 DD 01 1E 0A 15 0A 01 01 F9 19 0D 0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+ACK	+ACK
Message Type	1		
Report Mask	1	00 – FF	
Length	1		
Device Type	1	09	09
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
ID	1		
Serial Number	2	0000 – FFFF	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

✧ <*Message Type*>: It indicates the ID of the command that the device receives.

Command	**ID**
AT+GTBSI	0
AT+GTSRI	1
AT+GTQSS	2
Reserved	3
AT+GTCFG	4
AT+GTTOW	5
AT+GTEPS	6
AT+GTDIS	7

AT+GTOUT	8
Reserved	9
AT+GTTMA	10
AT+GTFRI	11
AT+GTGEO	12
AT+GTSPD	13
Reserved	14
Reserved	15
AT+GTRTO	16
Reserved	17
Reserved	18
Reserved	19
Reserved	20
AT+GTUPD	21
AT+GTPIN	22
Reserved	23
AT+GTOWH	24
AT+GTDOG	25
Reserved	26
Reserved	27
AT+GTIDL	28
AT+GTHBM	29
AT+GTHMC	30
Reserved	31
Reserved	32
Reserved	33
AT+GTWLT	34
AT+GTHRM	35
Reserved	36
AT+GTPDS	38

Reserved	39
AT+GTSPA	40
AT+GTSSR	41
Reserved	42
Reserved	43
AT+GTRMD	44
AT+GTFFC	45
AT+GTCMD	46
AT+GTUDF	47
AT+GTGAM	48
AT+GTVVS	49
AT+GTAVS	50

- <*Report Mask*>: Please refer to the <*+ACK Mask*> in **AT+GTHRM**.
- <*Length*>: The length of the whole acknowledgement message from header to the tail characters.
- <*Unique ID*>: If Bit 4 of <*+ACK Mask*> is 0, the IMEI of the device is used as the unique ID of the device. IMEI is a 15-digit string. In the HEX format message, each 2 digits are encoded into one byte as an integer.

IMEI	**86**	**80**	**34**	**00**	**10**	**00**	**39**	**7**
HEX	**56**	**50**	**22**	**00**	**0A**	**00**	**27**	**07**

If Bit 4 of <*+ACK Mask*> is 1, the device name is used as the unique ID of the device. For the device name, please refer to the <*Device Name*> in **AT+GTCFG**. Device name is an 8-byte string. If the length of <*Device Name*> is more than 8 bytes, only the first 8 bytes will be acquired. In the Hex format message, each byte is encoded into one byte as an integer. If the device name is less than 8 bytes, the remaining bytes are set to 0.

Device Name	**g**	**v**	**5**	**0**				
HEX	**67**	**76**	**35**	**30**	**00**	**00**	**00**	**00**

- <*ID*>: The ID of the sub-command of **AT+GTRTO** or the ID of **AT+GTGEO**. For others, set it to 0.
- <*Send Time*>: The local time to send the acknowledgement message. 7 bytes in total. The first 2 bytes are for year, and the remaining 5 bytes are for month, day, hour, minute and second respectively.

Send Time	**2011**		**01**	**31**	**06**	**29**	**11**
HEX	**07**	**DB**	**01**	**1F**	**06**	**1D**	**0B**

- <*Checksum*>: The CRC16 checksum for data from <*Message Type*> to <*Count Number*>.

4.3. Location Report +RSP

Location report messages including **+RESP:GTTOW**, **+RESP:GTEPS**, **+RESP:GTFRI**, **+RESP:GTSPD**, **+RESP:GTRTL**, **+RESP:GTDOG**, **+RESP:GTIGL**, **+RESP:GTVGL**, **+RESP:GTGES** and **+RESP:GTHBM** use the format below.

- **+RSP,**

Example:
2B 52 53 50 07 00 FE 0F BF 00 5D 09 01 03 03 02 56 50 22 00 0A 00 27 07 5F 01 00 22 08 30 01 01 00 24 00 00 AE 00 28 06 FC 0F 06 01 E5 F6 04 07 DD 01 1E 00 14 04 04 60 00 00 55 0A 1A 11 00 00 07 00 00 00 00 07 00 0C 0C 23 00 00 00 0C 0C 23 07 DD 01 1E 08 14 05 00 C7 DE 11 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+RSP	+RSP
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	09	09
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0~100	
External Power Voltage	2		
Input Status	1	00 – 81	
Digital Output Status	1	00 – 01	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellite Number	1		
Report ID / Report Type	1		
Number	1	0 – 1	
GPS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9km/h	

Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 – 65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
CSQ RSSI	1	0 – 31 | 99	
CSQ BER	1	0 – 7	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

✧ <*Message Type*>: The ID of a location report message.

Message	ID
+RESP:GTRTL	0
+RESP:GTTOW	1
Reserved	2
+RESP:GTLBC	3
+RESP:GTEPS	4
Reserved	5
Reserved	6
+RESP:GTFRI	7

+RESP:GTGEO	8
+RESP:GTSPD	9
Reserved	10
+RESP:GTRTL	11
+RESP:GTDOG	12
Reserved	13
Reserved	14
+RESP:GTHBM	15
+RESP:GTIGL	16
……	……
+RESP:GTVGL	26

- <*Report Mask*>: Please refer to the <*+RSP Mask*> in **AT+GTHRM**.
- <*Unique ID*>: If Bit 6 of <*+RSP Mask*> is 0, the IMEI of the device is used as the unique ID of the device. IMEI is a 15-digit string. In the HEX format message, each 2 digits are encoded into one byte as an integer.

IMEI	**86**	**80**	**34**	**00**	**10**	**00**	**39**	**7**
HEX	**56**	**50**	**22**	**00**	**0A**	**00**	**27**	**07**

If Bit 6 of <*+RSP Mask*> or Bit 4 of <*+ACK Mask*> is 1, the device name is used as the unique ID of the device. For the device name, please refer to the <*Device Name*> in **AT+GTCFG**. Device name is an 8-byte string. If the length of <*Device Name*> is more than 8 bytes, only the first 8 bytes will be acquired. In the Hex format message, each byte is encoded into one byte as an integer. If the device name is less than 8 bytes, the rest of the bytes are set to 0.

Device Name	**g**	**v**	**5**	**0**				
HEX	**67**	**76**	**35**	**30**	**00**	**00**	**00**	**00**

- <*Input Status*>: The masks of digital input 1 and the external power state.

Input Status Mask	**ID**
Ignition Detection	0x01
Reserved	
Reserved	
Reserved	
……	……
Main Power	0x80

- <*Digital Output Status*>: The mask of digital output1 status.

Output Status Mask	**ID**
Digital Output1	0x01
Reserved	
Reserved	
Reserved	

- <*Motion Status*>: The device's current state of motion. 0x1A is a status which is before 0x16 status.
- <*Satellite Number*>: The number of the visible satellites when fix is successful. This indicates the number of satellites being used. The low nibble is for <*Satellites*>.
- <*Report ID / Report Type*>: The high nibble is for <*Report ID*> and the low nibble is for <*Report Type*>.
- <*Speed*>: 3 bytes in total. The first 2 bytes are for the integer part of the speed and the last byte is for the fractional part. The fractional part has 1 digit.
- <*Longitude*>: The longitude of the current position. 4 bytes in total. The device converts the longitude to an integer with 6 implicit decimals and reports this integer in HEX format. If the value of the longitude is negative, it is represented in 2's complement format.

Longitude 121.390847	**121390847**			
HEX	**07**	**3C**	**46**	**FF**

- <*Latitude*>: The latitude of the current position. 4 bytes in total. The device converts the latitude to an integer with 6 implicit decimals and reports this integer in HEX format. If the value of the latitude is negative, it is represented in 2's complement format.

Latitude 31.164503	**31164503**			
HEX	**01**	**DB**	**88**	**57**

- <*Altitude*>: The altitude from GPS. If the altitude is negative, it is represented in 2's complement format. Unit: meter.
- <*GPS UTC Time*>: The UTC time obtained from the GPS chip. 7 bytes in total. The first 2 bytes are for year, and the remaining 5 bytes are for month, day, hour, minute and second respectively.

GPS UTC Time	**2011**		**07**	**14**	**08**	**24**	**13**
HEX	**07**	**DB**	**07**	**0E**	**08**	**18**	**0D**

- <*Current Mileage*>: 3 bytes in total. The first 2 bytes are for the integer part of the current mileage and the last byte is for the fractional part. The fractional part has 1 digit.

Current Mileage	**0**	**0**

HEX	**00**	**00**	**00**

✧ <*Total Mileage*>: 5 bytes in total. The first 4 bytes are for the integer part of the total mileage and the last byte is for the fractional part. The fractional part has 1 digit.

Total Mileage	**0**				**0**
HEX	**00**	**00**	**00**	**00**	**00**

✧ <*Total Hour Meter Count*>: 6 bytes in total. The first 4 bytes are the hour part, the fifth byte is the minute part, and the sixth byte is the second part.

Total Hour Meter Count	**0**				**0**	**0**
HEX	**00**	**00**	**00**	**00**	**00**	**00**

✧ <*CSQ RSSI*>: The level of signal strength.

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

✧ <*CSQ BER*>: The quality of the GSM signal. The range is 0-7.

The location report message **+RESP:GTLBC** uses the format below.

Example:
2B 52 53 50 03 00 FE 1F BF 00 66 09 01 03 03 02 56 50 22 00 0A 00 27 07 62 2E 46 01 00 21 08 00 70 02 15 44 50 29 3F 01 01 00 00 03 00 81 00 40 06 FC 59 86 01 E5 BC 2D 07 DD 01 1E 03 28 08 04 60 00 00 56 78 5D 7B 00 00 00 01 00 00 00 0B 05 00 04 32 00 00 00 0E 2A 29 07 DD 01 1E 0B 28 09 01 82 6A 27 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+RSP	+RSP
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	09	09
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0~100	
External Power Voltage	2		

Input Status	1	00 – 81	
Digital Output Status	1	00 – 01	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellite Number	1		
Report ID / Report Type	1		
Number Length / Number Type	1		
Phone Number	<=10		
Number	1	1 – 15	
GPS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
CSQ RSSI	1	0 – 31 | 99	
CSQ BER	1	0 – 7	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	

Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

✧ <*Number Length / Number Type*>: The high nibble is for <*Number Length*> and the low nibble is for <*Number Type*>. <*Number Length*> is total length of <*Number Length / Number Type*> and <*Phone Number*>. <*Number Type*> indicates if there is a '+' sign before the phone number. 1 means "with the sign", 0 means "without the sign".

	Number Length	**Number Type**
HEX	**7**	**0**

✧ <*Phone Number*>: Not more than 10 bytes. In each byte, the high nibble and low nibble are used to represent one digit of the phone number respectively. If there is no digit for the last low nibble to represent, fill it with 0xF.

Phone Number 02154450293	**02**	**15**	**44**	**50**	**29**	**3**
HEX	**02**	**15**	**44**	**50**	**29**	**3F**

The location report message **+RESP:GTGEO** uses the format below.

➢ **+RSP,**

Example:
2B 52 53 50 08 04 FE 17 BF 00 60 09 03 00 02 08 56 32 53 03 00 02 40 06 30 5A 00 00 11 05 33 01 01 00 04 09 00 43 00 20 06 FC 5A EA 01 E5 BC 34 07 E1 06 0C 01 2B 2D 04 60 00 01 55 04 58 2B 00 00 00 00 00 01 5B 5C 03 00 00 14 00 00 30 3B 09 1D 16 00 07 E1 06 0C 09 2B 2E 16 1E 94 AC 0D 0A

Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+RSP	+RSP
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	09	09
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device Name	
Battery Level	1	0~100	
External Power Voltage	2		
Input Status	1	00 – 81	

Digital Output Status	1	00 – 01	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellite Number	1		
Report ID / Report Type	1		
Number	1	1 – 15	
GPS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 – 65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
CSQ RSSI	1	0 – 31 | 99	
CSQ BER	1	0 – 7	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

✧ <*Report ID / Report Type*>: Bit 0 is used for Report Type. Bit 1 – 3 are used as high 3 bits of

Report ID, and Bit 4 – 7 are used as low 4 bits of Report ID.

- Report ID: The ID of Geo Fence in HEX format. The range is 0 to 19.
- Report Type: 0 means “Exit from the Geo-Fence”; 1 means “Enter the Geo-Fence”.

4.4. Information Report +INF

Information report messages include **+RESP:GTINF**, **+RESP:GTGPS**, **+RESP:GTCID**, **+RESP:GTCSQ**, **+RESP:GTVER**, **+RESP:GTBAT**, **+RESP:GTIOS**, **+RESP:GTTMZ** and **+RESP:GTGIR**. These messages use the same format as shown below. However, only **+RESP:GTINF** includes all the items while others only include information related to themselves.

➢ **+INF,**

Example:
2B494E4601FFFD003100D8563253030002370409030102 0B0105000000000000000000000000000000000000000000011000D0007E1060F0814200001007F001E025800000000001000001 05B00898601168300090140121900000800000704600001550467F40022046000015504582C001D04600001550467F3001B0460000155045DAD001A046000015504582D00130460000155045 82B0019081C1E131A11292920062413271 61D1E16000B08270A2403230D2A0120022072 20C2C04001100052207E1060F10142203B6377C0D0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+INF	+INF
Message Type	1		
Report Mask	2	0000 – FFFF	
INF Expansion Mask	2	0000 - FFFF	
Length	2		
Unique ID	8	IMEI / Device name	
Device Type	1	09	**+RESP:GTVER**
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Hardware Version	2	0000 – FFFF	
Reserved	2	0000	
Reserved	2	0000	
Reserved	1	00	
Reserved	2	0000	**+RESP:GTIOS**
Reserved	2	0000	

Reserved	1	00	
Reserved	2	0000	
Reserved	2	0000	
Reserved	2	0000	
Input Status	1	00 – 81	
Digital Output Status	1	00 – 01	
Reserved	1	00	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	**+RESP:GTGPS**
Reserved	1	00	
Satellite Number	1		
Power Saving Enable / OWH Mode / Outside Working Hours	1		
Last Fix UTC Time	7	YYYYMMDDHHMMSS	
Reserved	1	00	
FRI Discard No Fix	1	0|1	
Response Report Item Mask	2		
IGN Interval	4		
IGF Interval	4		
Reserved	4	00000000	
Reserved	1	00	
LED On	1		**+RESP:GTBAT**
External Power Voltage	2	0	
Backup Battery VCC	2	0 – 4500mV	
Reserved	1	00	
ICCID	10	ICCID	**+RESP:GTCID**
CSQ RSSI	1	0 – 31 | 99	**+RESP:GTCSQ**
CSQ BER	1	0 – 7	
Time Zone Offset Sign / Daylight	1		**+RESP:GTTMZ**

Saving Enable			
Time Zone Offset	2	HHMM	
GIR Trigger Type	1		**+RESP:GTGIR**
Cell Number	1		
MCC	2		
MNC	2		
LAC	2		
Cell ID	2		
TA	1		
RX Level	1		
SV Count	1		**+RESP:GTGSV**
SV ID	1		
SV Power	1		
……			
SV ID	1		
SV Power	1		
SV Count	1		**+RESP:GTRSV**
SV ID	1		
SV Power	1		
……			
SV ID	1		
SV Power	1		
SV Count	1		**+RESP:GTBSV**
SV ID	1		
SV Power	1		
……			
SV ID	1		
SV Power	1		
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	

Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

✧ <*Message Type*>: The ID of an information report message.

Message	ID
+RESP:GTINF	1
+RESP:GTGPS	2
+RESP:GTCID	4
+RESP:GTCSQ	5
+RESP:GTVER	6
+RESP:GTBAT	7
+RESP:GTIOS	8
+RESP:GTTMZ	9
+RESP:GTGIR	10
+RESP:GTGSV	11
……	……
+RESP:GTRSV	21
+RESP:GTBSV	22

✧ <*Report Mask*>: Please refer to Bit0-Bit15 of the <*+INF Mask*> in **AT+GTHRM**.

✧ <*Expansion Mask*>: Please refer to Bit16-Bit31 of the <*+INF Mask*> in **AT+GTHRM**.

✧ <*Unique ID*>: If Bit 1 of <*+INF Mask*> is 0, the IMEI of the device is used as the unique ID of the device. IMEI is a 15-digit string. In the HEX format message, each 2 digits are encoded into one byte as an integer.

IMEI	**86**	**80**	**34**	**00**	**10**	**00**	**39**	**7**
HEX	**56**	**50**	**22**	**00**	**0A**	**00**	**27**	**07**

If Bit 1 of <*+INF Mask*> or Bit 4 of <*+ACK Mask*> is 1, the device name is used as the unique ID of the device. For the device name, please refer to the <*Device Name*> in **AT+GTCFG**. Device name is an 8-byte string. If the length of the <*Device Name*> is more than 8 bytes, only the first 8 bytes will be acquired. In the Hex format message, each byte is encoded into one byte as an integer. If the device name is less than 8 bytes, the rest of the bytes are set to 0.

Device Name	**g**	**v**	**5**	**0**				
HEX	**67**	**76**	**35**	**30**	**00**	**00**	**00**	**00**

- <*Power Saving Enable / OWH Mode / outside Working Hours*>: The highest bit, bit 7 is reserved, bit 5 and bit 6 are for <*Power Saving Enable*>, bit 4 and bit 3 are for <*OWH Mode*>, and bit 2 is for <*Outside Working Hours*>. Bit 0 is reserved. <*Outside Working Hours*> is used to indicate whether the device is currently outside working hours. 1 means "outside working hours".
- <*LED On*>: Bit 4 and Bit 5 are for <*LED On*> which indicates whether the LEDs are turned on.

Mask Bit	Item
Bit 7	<*Reserved*>
Bit 6	<*Reserved*>
Bit 5	<*LED On*> equal to 2
Bit 4	<*LED On*> equal to 1
Bit 3	<*Reserved*>
Bit 2	<*Reserved*>
Bit 1	<*Reserved*>
Bit 0	<*Reserved*>

- <*ICCID*>: ICCID is a 20-digit string. In the HEX format message, every 4 bits are used to represent one digit of the 20 digits of the ICCID.

ICCID	**89**	**86**	**00**	**00**	**09**	**09**	**17**	**21**	**49**	**53**
HEX	**89**	**86**	**00**	**00**	**09**	**09**	**17**	**21**	**49**	**53**

- <*Time Zone Offset Sign / Daylight Saving Enable*>: Bit 1 is for <*Daylight Saving Enable*> which indicates whether the daylight saving function is currently enabled. Bit 0 is for <*Time Zone Offset Sign*> which indicates the positive or negative offset of the local time from UTC. 1 means "negative offset".
- <*GIR Trigger Type*>: A string to indicate what kind of GPS fix this cell information is for.
  "RTL": This cell information is for RTL requirement.
  "LBC": This cell information is for LBC requirement.
  "TOW": This cell information is for TOW requirement.
  "FRI": This cell information is for FRI requirement.
  "GIR": This cell information is for the sub command "**C**" in the **AT+GTRTO** command.

Fix Type	ID
INF	0
Reserved	1
RTL	2
LBC	3
TOW	4
FRI	5

GIR	6

✧ <*Cell Number*>: It expresses the number of the IMSI. The IMSI consists of MCC, MNC, LAC, and Cell ID.

4.5. Event Report +EVT

Event report messages including **+RESP:GTPNA**, **+RESP:GTPFA**, **+RESP:GTSTT**, **+RESP:GTPDP**, **+RESP:GTIDN**, **+RESP:GTSTR**, **+RESP:GTSTP** and **+RESP:GTLSP** use the format below.

➢ **+EVT,**

Example:
2B 45 56 54 09 00 FE 1F BF 00 5E 09 01 03 03 02 56 50 22 00 0A 00 27 07 5F 00 00 01 00 22 0C 01 00 00 00 02 00 28 00 35 06 FC 5E 38 01 E5 E0 E4 07 DD 01 1D 0C 34 30 04 60 00 00 55 0A 03 58 00 00 01 07 00 00 00 01 07 00 2D 0A 00 00 00 00 2D 0A 07 DD 01 1D 14 34 31 00 53 78 1D 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	09	09
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
External Power Voltage	2		
Input Status	1	00 – 81	
Digital Output Status	1	00 – 01	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellite Number	1		
Number	1	1	
GPS Accuracy	1	0	0

Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

✧ <*Message Type*>: The ID of an event report message.

Message	ID
+RESP:GTPNA	1
+RESP:GTPFA	2
+RESP:GTMPN	3
+RESP:GTMPF	4
Reserved	5
Reserved	6
Reserved	7
Reserved	8
+RESP:GTSTT	9

Reserved	10
Reserved	11
+RESP:GTPDP	12
+RESP:GTIGN	13
+RESP:GTIGF	14
+RESP:GTUPD	15
+RESP:GTIDN	16
+RESP:GTIDF	17
Reserved	18
Reserved	19
Reserved	20
+RESP:GTGSS	21
Reserved	22
Reserved	23
+RESP:GTDOS	25
+RESP:GTGES	26
+RESP:GTSTR	28
+RESP:GTSTP	29
+RESP:GTLSP	30
Reserved	31
+RESP:GTRMD	32
Reserved	33
……	……
+RESP:GTVGN	45
+RESP:GTVGF	46

- <*Report Mask*>: Please refer to the <*+EVT Mask*> in **AT+GTHRM**.
- <*Unique ID*>: If Bit 6 of <*+EVT Mask*> is 0, the IMEI of the device is used as the unique ID of the device. IMEI is a 15-digit string. In the HEX format message, each 2 digits are encoded into one byte as an integer.

IMEI	**86**	**80**	**34**	**00**	**10**	**00**	**39**	**7**
HEX	**56**	**50**	**22**	**00**	**0A**	**00**	**27**	**07**

If Bit 6 of <*+EVT Mask*> or Bit 4 of <*+ACK Mask*> is 1, the device name is used as the unique ID of the device. For the device name, please refer to the <*Device Name*> in **AT+GTCFG**. Device name is an 8-byte string. If the length of the <*Device Name*> is more than 8 bytes, only the first 8 bytes will be acquired. In the Hex format message, each byte is encoded into one byte as an integer. If the device name is less than 8 bytes, the rest of the bytes are set to 0.

Device Name	**g**	**v**	**5**	**0**				
HEX	**67**	**76**	**35**	**30**	**00**	**00**	**00**	**00**

The event report messages **+RESP:GTIGN** and **+RESP:GTIGF** use the format below. For these messages, the <*Mileage*> field will always be present regardless of the <*Report Item Mask*> setting.

- **+EVT,**

Example:
2B 45 56 54 0D 00 FE 1F BF 00 62 09 01 03 03 02 56 50 22 00 0A 00 27 07 57 00 00 01 00 22 08 00 00 00 00 01 00 00 00 04 00 6B 00 38 06 FC 59 7D 01 E5 BC 00 07 DD 01 1D 0C 07 24 04 60 00 00 56 78 5D 7B 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 07 DD 01 1D 14 07 27 00 3E 0F 13 0D 0A

Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	09	09
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
External Power Voltage	2		
Input Status	1	00 –81	
Digital Output Status	1	00 – 01	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellite Number	1		
Duration of Ignition On or Ignition Off	4	0 – 999999 sec	

Number	1	1	
GPS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

The event report messages **+RESP:GTVGN** and **+RESP:GTVGF** use the format below. For these messages, the <*Mileage*> field will always be present regardless of the <*Report Item Mask*> setting.

- **+EVT,**

Example:
2B 45 56 54 0D 00 FE 1F BF 00 62 09 01 03 03 02 56 50 22 00 0A 00 27 07 57 00 00 01 00 22 08 00 00 00 00 01 00 00 00 04 00 6B 00 38 06 FC 59 7D 01 E5 BC 00 07 DD 01 1D 0C 07 24 04 60 00 00 56 78 5D 7B 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 07 DD 01 1D 14 07 27 00 3E 0F 13 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT

Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	09	09
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
External Power Voltage	2		
Input Status	1	00 – 81	
Digital Output Status	1	00 – 01	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellite Number	1		
Reserved	2	0000	
Reprot Type	1	0-4	
Duration of Ignition On or Ignition Off	4	0 – 999999 sec	
Number	1	1	
GPS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00

Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

The event report message **+RESP:GTUPD** uses the format below. For this message, the <*Protocol Version*> and <*Firmware Version*> will always be present regardless of the <*Report Item Mask*> setting.

- **+EVT,**

Example:
2B 45 56 54 0F 00 FE 1F BF 00 61 09 01 03 03 02 56 50 22 00 0B 31 5C 01 62 2C C9 00 00 41 05 01 2C 00 01 00 00 00 01 00 00 00 43 06 FC 59 ED 01 E5 BC 09 07 DD 01 1F 0A 05 0E 04 60 00 01 55 04 58 2B 00 00 00 00 00 00 00 03 04 00 00 00 00 00 30 34 00 02 07 DD 01 1F 03 00 30 00 27 F7 0C 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	09	09
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
External Power Voltage	2		
Input Status	1	00 – 81	
Digital Output Status	1	00 – 01	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	

Satellite Number	1		
Code	2		
Retry	1		
Number	1	1	
GPS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

The event report message **+RESP:GTIDF** uses the format below.

- **+EVT,**

Example:
2B 45 56 54 11 00 FE 1F BF 00 62 09 01 03 03 02 56 50 22 00 0A 00 27 07 5D 00 00 00 03 12 07 00 00 03 FF 01 00 00 01 01 00 99 00 21 06 FC 59 75 01 E5 BB BD 07 DD 01 1E 09 1C 07 04 60 00 00 56 78 5D 7B 00 00 00 02 00 00 00 0B 07 00 0B 28 00 00 00 00 00 00 07 DD 01 1E 11 1C 0A 03 C9 2A A1 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	09	09
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
External Power Voltage	2		
Input Status	1	00 – 81	
Digital Output Status	1	00 – 01	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellite Number	1		
Duration of Idling	4		
Number	1	1	
GPS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00

Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

The event report message **+RESP:GTGSS** uses the format below.

- **+EVT,**

Example:
2B 45 56 54 15 00 FE 1F BF 00 63 09 01 03 03 02 56 50 22 00 0A 00 27 07 50 00 00 00 03 1A 05 00 00 00 00 00 01 00 00 02 04 00 2A 00 35 06 FC 59 9A 01 E5 BC 2C 07 DD 01 1E 09 25 24 04 60 00 00 56 78 5D 7B 00 00 00 02 00 00 00 0B 07 00 0B 28 00 00 00 00 00 00 07 DD 01 1E 12 04 19 03 D7 64 41 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	09	09
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
External Power Voltage	2		
Input Status	1	00 – 81	
Digital Output Status	1	00 – 01	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellite Number	1		

GPS Signal Status	1	0 | 1	
Reserved	4	00000000	00000000
Number	1	1	
GPS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Reserved	4	00000000	00000000
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

✧ <*GPS Signal Status*>: 0 means “GPS signal lost or no successful GPS fix”, and 1 means “GPS signal recovered and successful GPS fix”.

The event report message **+RESP:GTDOS** uses the format below.

➢ **+EVT,**

Example:
2B 45 56 54 19 00 FE 1F BF 00 60 09 01 05 05 05 56 50 22 00 0F 5B 2E 00 5F 00 00 01 01 21 0A 01

01 01 00 00 00 00 00 85 00 38 06 FC 59 AA 01 E5 BB CE 07 DD 07 0B 08 07 29 04 60 00 00 56 78 20 79 00 00 00 02 00 00 00 00 02 00 00 00 00 00 00 00 00 00 07 DD 07 0B 10 07 2B 02 0D 42 59 0D 0A			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	09	09
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
External Power Supply Voltage	2		
Input Status	1	00 – 81	
Digital Output Status	1	00 – 01	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellite Number	1		
Wave1 Output ID	1	1-2	
Wave1 Ouptut Active	1	0|1	
Number	1	1	
GPS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	

MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

The event report message **+RESP:GTGES** uses the format below.

- **+EVT,**

Example:
2B 45 56 54 1A 00 FE 1F BF 00 68 09 01 05 05 05 56 50 22 00 0F 5B 2E 00 5F 00 00 00 01 11 0B 01 15 00 00 00 32 00 00 00 1E 01 01 00 00 00 00 85 00 37 06 FC 59 9A 01 E5 BB D7 07 DD 07 0B 08 1C 11 04 60 00 00 56 78 20 79 00 00 00 02 00 00 00 00 02 00 00 00 00 00 00 00 00 00 07 DD 07 0B 10 1C 11 02 17 D2 D2 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	09	09
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
External Power Supply Voltage	2		
Input Status	1	00 – 81	

Digital Output Status	1	00 – 01	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellite Number	1		
Trigger GEO ID	2	0-19	
Trigger GEO Enable	1	0|1	
Trigger Mode	1	0|21|22	
Radius	4	50 – 6000000m	
Check Interval	4	0|5 – 86400sec	
Number	1	1	
GPS Accuracy	1	0|1	
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	

Tail Characters	2	0x0D 0x0A	0x0D 0x0A

✧ <*Trigger GEO ID* / *Trigger GEO Enable*>: The <*Trigger GEO ID*> and <*Trigger GEO Enable*> in hex format. High bit means <*Trigger GEO ID*> and low bit means <*Trigger GEO Enable*>.

➢ *Trigger GEO ID*: The ID of Geo-Fence. The range is 0 – 19.

➢ *Trigger GEO Enable*: The zone's Geo-Fence function is enabled or disabled.

- 0: The zone's Geo-Fence function is disabled.
- 1: The zone's Geo-Fence function is enabled.

The event report message **+RESP:GTRMD** uses the format below.

➢ **+EVT,**

Example:
2B 45 56 54 20 00 FE 1F BF 00 5F 09 01 06 06 06 56 50 22 00 0F 5B 2E 00 50 01 F0 00 01 11 00 01 01 00 00 00 00 00 00 00 30 05 4C 56 38 05 4C 56 38 07 DE 01 06 06 0A 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 2C 19 0A 00 00 00 45 12 21 07 DE 01 06 0E 0B 2C 1C 7B 39 AD 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	09	09
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
External Power Supply Voltage	2		
Input Status	1	00 – 81	
Digital Output Status	1	00 – 01	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellite Number	1		Satellite Number
Roam State	1	0-3	
Number	1	1	
GPS Accuracy	1	0	0

Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

4.6. Heartbeat Data +HBD

➢ **+HBD,**

Example: **2B 48 42 44 EF 20 09 01 03 03 02 56 50 22 00 0A 00 27 07 07 DD 01 1D 14 02 13 00 39 D2 5B 0D 0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+HBD	+HBD
Report Mask	1	00 – FF	
Length	1		
Device Type	1	09	09

Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

- <*Report Mask*>: Please refer to the <*+HBD Mask*> in **AT+GTHRM**.
- <*Unique ID*>: If Bit 4 of <*+HBD Mask*> is 0, the IMEI of the device is used as the unique ID of the device. IMEI is a 15-digit string. In the HEX format message, each 2 digits are encoded into one byte as an integer.

IMEI	**86**	**80**	**34**	**00**	**10**	**00**	**39**	**7**
HEX	**56**	**50**	**22**	**00**	**0A**	**00**	**27**	**07**

If Bit 4 of <*+HBD Mask*> or Bit 4 of <*+ACK Mask*> is 1, the device name is used as the unique ID of the device. For the device name, please refer to the <*Device Name*> in **AT+GTCFG**. Device name is an 8-byte string. If the length of the <*Device Name*> is more than 8 bytes, only the first 8 bytes will be acquired. In the Hex format message, each byte is encoded into one byte as an integer. If the device name is less than 8 bytes, the rest of the bytes are set to 0.

Device Name	**g**	**v**	**5**	**0**				
HEX	**67**	**76**	**35**	**30**	**00**	**00**	**00**	**00**

If the mask of <*UID*> in the <*+HBD Mask*> of **AT+GTHRM** is set to 0, the heartbeat message reported will not include IMEI information. If the mask of <*UID*> is set to 1, the heartbeat message reported will include IMEI information.

4.7. Buffer Report in HEX Format

When HEX format messages go into the local buffer, the device will replace the 2nd byte of the report messages with 'B'. Thus, **+BSP** is buffered report for **+RSP**, **+BNF** is buffered report for **+INF** and **+BVT** is buffered report for **+EVT**. The remaining part of the report messages are kept unchanged.

Appendix: Message Index

✧ **Command and ACK**

AT+GTPDS
+ACK:GTPDS
AT+GTSSR
+ACK:GTSSR
AT+GTRMD
+ACK:GTRMD
AT+GTFFC
+ACK:GTFFC
AT+GTCMD
+ACK:GTCMD
AT+GTUDF
+ACK:GTUDF
AT+GTVVS
+ACK:GTVVS
AT+GTAVS
+ACK:GTAVS
AT+GTHRM
+ACK:GTHRM

✧ **Position Related Report**

+RESP:GTTOW
+RESP:GTEPS
+RESP:GTFRI
+RESP:GTGEO
+RESP:GTSPD
+RESP:GTRTL
+RESP:GTLBC
+RESP:GTDOG
+RESP:GTIGL
+RESP:GTVGL
+RESP:GTHBM
+RESP:GTDOS
+RESP:GTGES

✧ **Device Information Report**

+RESP:GTINF

✧ **Report for Querying**

+RESP:GTGPS
+RESP:GTALC
+RESP:GTCID
+RESP:GTCSQ
+RESP:GTVER
+RESP:GTBAT

+RESP:GTIOS
+RESP:GTTMZ
+RESP:GTALS
+RESP:GTALM
+RESP:GTGSV
+RESP:GTRSV
+RESP:GTBSV

✧ **Event Report**

+RESP:GTPNA
+RESP:GTPFA
+RESP:GTSTT
+RESP:GTPDP
+RESP:GTIGN
+RESP:GTIGF
+RESP:GTIDN
+RESP:GTVGN
+RESP:GTIDF
+RESP:GTVGF
+RESP:GTGSM
+RESP:GTGSS
+RESP:GTSTR
+RESP:GTSTP
+RESP:GTLSP
+RESP:GTRMD

✧ **Heartbeat**

+ACK:GTHBD
+SACK:GTHBD

✧ **Server Acknowledgement**

+SACK