

GV50(P) @Track Air Interface Protocol

GSM/GPRS/GNSS Tracker

TRACGV50AN001

Version: 7.04



International Telematics Solutions Innovator

www.queclink.com

Document Title	GV50(P) @Track Air Interface Protocol
Version	7.04
Date	2019-08-19
Status	Release
Document Control ID	TRACGV50AN001

General Notes

Queclink offers this information as a service to its customers, to support application and engineering efforts that use the products designed by Queclink. The information provided is based upon requirements specifically provided to Queclink by the customers. Queclink has not undertaken any independent search for additional relevant information, including any information that may be in the customer's possession. Furthermore, system validation of this product designed by Queclink within a larger electronic system remains the responsibility of the customer or the customer's system integrator. All specifications supplied herein are subject to change.

Copyright

This document contains proprietary technical information which is the property of Queclink Wireless Solutions Co., Ltd. The copying of this document, distribution to others, and communication of the contents thereof, are forbidden without express authority. Offenders are liable to the payment of damages. All rights are reserved in the event of a patent grant or registration of a utility model or design. All specifications supplied herein are subject to change without notice at any time.

Contents

Contents	2
0. Revision History	4
1. Overview	7
1.1. Scope of This Document	7
1.2. Terms and Abbreviations	7
2. System Architecture	8
3. Message Description	9
3.1. Message Format	9
3.2. Command And Acknowledgement	10
3.2.1. Server Connection	10
3.2.1.1. Bearer Setting Information	10
3.2.1.2. Backend Server Registration Information	11
3.2.1.3. Quick Start Setting	15
3.2.2. Device Configuration	17
3.2.2.1. Global Configuration	17
3.2.2.2. Auto-unlock PIN	21
3.2.2.3. Time Adjustment	22
3.2.2.4. Outside Working Hours	23
3.2.2.5. Protocol Watchdog	25
3.2.2.6. Settings for Preserving Device's Specified Logic States	27
3.2.3. Position Related Report	28
3.2.3.1. Fixed Report Information	28
3.2.3.2. Frequency Change of Fixed Report Information	31
3.2.4. Alarm Settings	33
3.2.4.1. Tow Alarm Configuration	33
3.2.4.2. Geo-Fence Information	35
3.2.4.3. Roaming Detection Configuration	37
3.2.4.4. Speed Alarm	41
3.2.4.5. Excessive Idling Detection	43
3.2.4.6. Start/Stop Report	44
3.2.4.7. Harsh Behavior Monitoring	46
3.2.4.8. Jamming Detection	48
3.2.4.9. Jamming Behavior Setting	50
3.2.5. IO Application	53
3.2.5.1. Digital Output	53
3.2.5.2. Digital Input Port Setting	56
3.2.5.3. External Power Supply Monitoring	58
3.2.5.4. Gradual Digital Output Configuration	60
3.2.6. Virtual Ignition Detection	63
3.2.6.1. Voltage Virtual Ignition Setting	63
3.2.6.2. Accelerometer Virtual Ignition Setting	64
3.2.6.3. Virtual Ignition Mode Selection	65

3.2.7. Other Settings	67
3.2.7.1. Real Time Operation	67
3.2.7.2. Hour Meter Count	71
3.2.7.3. White List	73
3.2.7.4. Command String Storage	74
3.2.7.5. User Defined Function	75
3.2.7.6. GPS-assisted Motion Measurement	79
3.3. Report	80
3.3.1. Position Related Report	80
3.3.2. Device Information Report	91
3.3.3. Report for Real Time Querying	93
3.3.3.1. +RESP:GTGPS	93
3.3.3.2. +RESP:GTALM	94
3.3.3.3. +RESP:GTALC	95
3.3.3.4. +RESP:GTALS	121
3.3.3.5. +RESP:GTCID	122
3.3.3.6. +RESP:GTCSQ	123
3.3.3.7. +RESP:GTVER	124
3.3.3.8. +RESP:GTBAT	124
3.3.3.9. +RESP:GTIOS	125
3.3.3.10. +RESP:GTTMZ	126
3.3.3.11. +RESP:GTGSV	126
3.3.3.12. +RESP:GTRSV	127
3.3.3.13. +RESP:GTBSV	128
3.3.4. Event Report	129
3.3.5. Buffer Report	145
3.3.6. Report with Google Maps Hyperlink	146
3.4. Heartbeat	147
3.5. Server Acknowledgement	148
4. HEX Format Report Message	149
4.1. Hex Report Mask	149
4.2. Acknowledgement +ACK	155
4.3. Location Report +RSP	158
4.4. Information Report +INF	166
4.5. Event Report +EVT	171
4.6. Heartbeat Data +HBD	188
4.7. Buffer Report in HEX Format	189
Appendix: Message Index	190

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 <i><Ignition Detection Mode></i> to AT+GTDIS . 2. Added the event report +RESP:GTIGN , +RESP:GTIGF and +RESP:GTIGL . 3. Added the parameters <i><Output ID></i> , <i><Output Status></i> , <i><Duration></i> and <i><Toggle Times></i> 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 .
	2017-05-07	Borg Jiang	1. Modified Bit 4 in <i><Event Mask></i> of AT+GTCFG for the event report +RESP:GTCID .
	2017-05-07	Borg Jiang	1. Modified the parameter <i><AT Command / Configuration Mask / Satellite information Mask></i> 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 <i><Protocol Format></i> to set the format of the report message. 2. Updated the parameter <i><Event Mask></i> of the command AT+GTCFG . 3. Updated the parameter <i><Known Roaming Event Mask></i> 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.
	2017-05-26	Borg Jiang	1. Added <i><CSQ RSSI></i> , <i><CSQ BER></i> and <i><Satellite Numbe></i> to position related report +RESP:GTFRI . 2. Used Bit 26 of <i><+RSP Mask></i> in AT+GTHRM as the corresponding mask to control the reporting of <i><CSQ RSSI></i> , <i><CSQ BER></i> in hex format location report +RSP . 3. Changed the parameter <i><Satellites in View></i> to <i><Satellite Number></i> .
	2017-06-12	Borg Jiang	1. Modified the default value of <i><+RSP Mask></i> in

			AT+GTHRM.
3.02	2017-06-21	Stefan Chang	1. Added the parameter <i><Backup Battery VCC></i> to the command AT+GTINF .
3.03	2017-08-18	Borg Jiang	1. Added <i><Special SACK Enable></i> to AT+GTSRI .
3.04	2017-08-29	Stefan Chang	1. Added the parameter <i><Backup Battery Percentage></i> to the report +RESP:GTFRI . 2. Added the parameter <i><Battery Level></i> of the <i><+RSP Mask></i> in the command AT+GTHRM .
3.05	2017-10-16	Stefan Chang	1. Added the parameter <i><AGPS Mode></i> to the command AT+GTCFG . 2. Changed the default <i><Mode></i> 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 <i><Output Direction></i> to AT+GTRTO .
	2017-12-18	Sun Xu	1. Modified the highest bit of the input port status of <i><Device Status></i> in the +RESP:GTFRI message to indicate the the status of the main power. 2. Changed <i><Digital Input Status></i> to <i><Input Status></i> with the value range of 00-81.
4.01	2018-01-10	Stefan Chang	1. Modified the description of <i><PDP Interval></i> in AT+GTDOG .
5.00	2018-01-29	Sun Xu	1. Added the device removal alarm message +RESP:GTDRM . 2. Set Bit 17 of <i><Event Mask></i> in AT+GTCFG and Bit 17 of <i><Known Roaming Event Mask></i> and <i><Unknown Roaming Event Mask></i> in AT+GTRMD to control the +RESP:GTDRM report (<i><Message Type></i> for hex format event report +RESP:GTDRM is 34).
	2018-02-11	Sun Xu	1. Changed the default value for Bit 17 of <i><Event Mask></i> in the AT+GTCFG command to 1.
	2018-02-24	Sun Xu	1. Changed the default value for <i><Known Roaming Event Mask></i> and <i><Unknown Roaming Event Mask></i> in the AT+GTRMD command and the +RESP:GTALC report to 23D0F.
6.00	2018-05-22	Sun Xu	1. Added the function of jamming detection (AT+GTJDC) and the function of jamming behavior setting (AT+GTJBS).
	2018-06-01	Sun Xu	1. Added the parameter <i><Output Mode></i> to the command AT+GTJBS .

	2018-06-06	Sun Xu	<ol style="list-style-type: none"> 1. Added RJB to <Sub Command> in the AT+GTRTO command. 2. Used Bit 19 and Bit 31 of configuration mask in <AT Command / Configuration Mask / Satellite information Mask> in the AT+GTRTO command for JDC and JBS respectively.
6.01	2018-06-27	Batty Zhang	<ol style="list-style-type: none"> 1. Added the <MPF Validity Time> parameter to the AT+GTEPS command.
6.02	2018-07-25	Sun Xu	<ol style="list-style-type: none"> 1. Added parameters <Smart Voltage Adjustment> and <Ignition Off Debounce> to the command AT+GTVVS.
7.00	2018-09-28	Batty Zhang	<ol style="list-style-type: none"> 1. Added Mode 7 to <Ignition Detection Mode> in AT+GTDIS. 2. Added the command AT+GTVMS.
7.01	2018-10-10	Batty Zhang	<ol style="list-style-type: none"> 1. Added the command AT+GTGDO for gradual digital output configuration.
7.02	2018-12-14	Batty Zhang	<ol style="list-style-type: none"> 1. Changed the default value of <Sensor Motion Validity> in AT+GTAVS to 60sec. 2. Changed the default value of <Ignition On Voltage> in AT+GTVVS to 13500mV. 3. Changed the default value of <Voltage Offset> in AT+GTVVS to 600mV.
7.03	2019-07-02	Linus Li	<ol style="list-style-type: none"> 1. Added the parameter <Fail Interval> in the command AT+GTDOG.
7.04	2019-08-19	Linus Li	<ol style="list-style-type: none"> 1. Modified the description of the parameter <Mask> in the command AT+GTPDS.

1. Overview

1.1. Scope of This Document

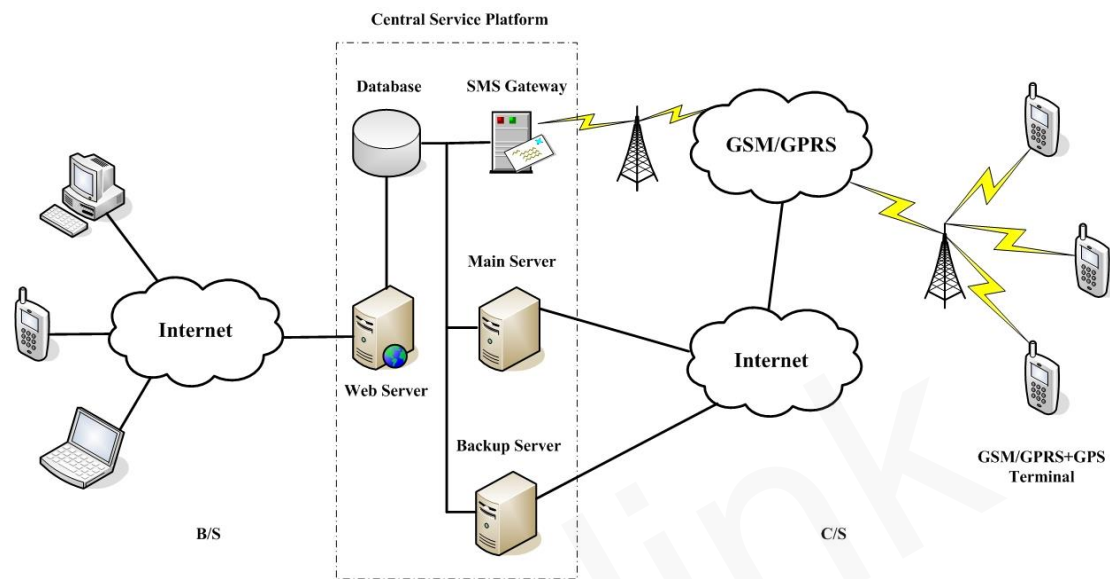
The @Track Air Interface Protocol is a digital communication interface based on printable ASCII characters over SMS or GPRS, which is used for all communications between the backend server and the terminal. The backend server sends a command to the terminal and then the terminal confirms the receipt 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:

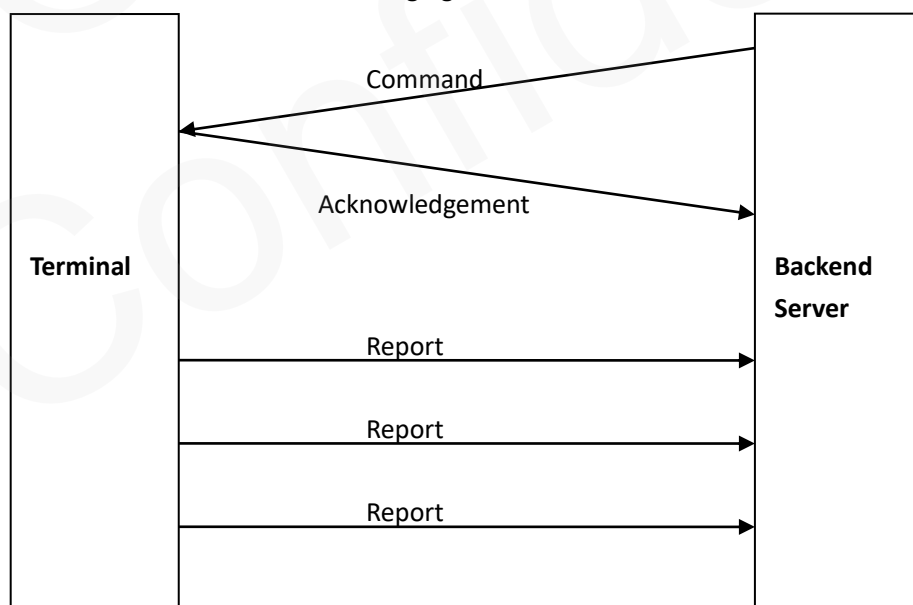


Figure 1: @Track Protocol Message Flow

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 – XXXFFF, 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. 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. 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 method of communication 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,,,,,00 01\$ AT+GTSRI=gv50,8,,1,116.226.44.17:7010/GV50/message,7011,116.226.45.229,7012,+861381 2341234,15,1,,,,,0001\$ AT+GTSRI=gv50,8,,1,some.host.name:7011/GV50/message,7011,116.226.45.229,7012,+8613 812341234,15,1,,,,,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 method of communication 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. If the terminal 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. If the terminal 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 terminal.
- 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 in the case of receiving commands via UDP.
- 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 messages 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:

Example 1:

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

Message:

```
GET /report/ACK:GTQSS,390200,00000000000000,GV50,FFFF,20160831170607,0
04A$ 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>
```

Example 2:

URL: www.queclink.com:8080/report

Message:

```
GET /reportACK:GTQSS,390200,00000000000000,GV50,FFFF,20160831170607,00
4B$ 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>

Example 3:

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. In this mode, the device will send the buffered messages after real time messages.
 - 2: High priority - Enable the buffer report function. In this 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 parameter 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 parameter defines the format of the report messages 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 **<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 with specified SACK messages when receiving the specified messages (i.e. **+RESP:GTCID**) from the terminal. It is valid when the parameter **<SACK Enable>** is disabled.
 - 0: The backend server will not reply with a specified SACK message when receiving a specified message from the terminal.
 - 1: The backend server will reply with a specified SACK message when receiving a specified 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 – XXXFFF, 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 – XXXFFF, 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	<=6	000000 – FFFFFFFF	23D0F
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
GNSS 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 GNSS 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 <Power Saving Mode> is set to 0, GNSS will always be on. If the parameter is set to 1, the fixed report, geo-fence and speed alarm report functions are suspended when the device is at rest or the engine is turned off (Auto parking fence and manual parking fence will not be suspended in this case). If the parameter 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**
- Bit 14 Reserved
- Bit 15 Reserved
- Bit 16 Reserved
- Bit 17 for **+RESP:GTDRM**

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 GNSS LED as configured.
 - 2: All LEDs (Cell LED and GNSS LED) work 10 minutes after power on and then will be off.
- ✧ **<Info Report Enable>**: Enable/disable the device information report (**+RESP:GTINF**). The device information includes state of the device, ICCID, GSM signal strength, voltage of external power supply, GNSS LED working mode, the last known time of GNSS fix, status of all digital inputs and outputs, time zone information and daylight saving setting.
 - 0: Disable the device information report.
 - 1: Enable the device information report.
- ✧ **<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 device 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 GNSS position successfully and reduces the time needed to get GNSS position.
 - 0: Disable the AGPS function.
 - 1: Enable the AGPS function.
- ✧ **<GSM Report>**: It specifies 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 GNSS position if cell information is available.
- 2: Report the message **+RESP:GTGSM** after getting GNSS position successfully every time if cell information is available.
- 3: Report the message **+RESP:GTGSM** regardless of whether getting GNSS 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.

- ✧ **<GNSS Lost Time>**: A time parameter for monitoring GNSS signals. If there is no GNSS signal or successful GNSS fix for **<GNSS Lost Time>** consecutively, the device will send the event report **+RESP:GTGSS** to indicate “GNSS signal lost”. When the GNSS 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”.

Note: If the device is rebooted, it will not report **+RESP:GTGSS** to indicate GNSS signal recovery even if it has reported **+RESP:GTGSS** to indicate “GNSS signal lost” before reboot.

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 – XXXFFF, 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 – XXXFFF, 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 receiving 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 GNSS. After a successful GNSS fix, the device will update the local time with the GNSS 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 – XXXFFF, 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 and it is outside of working hours, in all ASCII format reports except **+RESP:GTSOS**, the fields Latitude, Longitude, MCC, MNC, LAC, Cell ID and the reserved field after Cell ID will be empty. Meanwhile, in HEX format reports where location should be hidden, the fields Latitude and Longitude will be filled with 0x054C5638, and the fields MCC, MNC, LAC Cell ID and the reserved field after Cell ID will be filled with 0.

➤ **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 – 3	0
Duration (GV50P)	<=5	0 – 65535(×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. In this mode, the device will automatically check the current time against the working hours 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 denoted 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 – XXXFFF, 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
Fail Interval	4	0 5-1440 min	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.
- ✧ **<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 at which the reboot operation is performed when **<Interval>** is reached.
- ✧ **<Report Before Reboot>**: Whether to report the **+RESP:GTDG** 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 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.
- ✧ **<Fail Interval>**: The interval for rebooting the device when the device can not send message successfully. 0 means “Do not reboot the device”.

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

➤ **+ACK:GTDG,**

Example: +ACK:GTDG,090200,135790246811220,,0013,20090214093254,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXXFFF, X ∈ {'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	

Serial Number	4	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 states according to the value of *<Mask>*.
- 2: Reset all the specified logic states listed in *<Mask>* after receiving the command, and then preserve specified logic states according to the value of *<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 and final state of gradual progressive wave shape
- 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 – XXXFFF, 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 GNSS position and the last sent GNSS 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 GNSS position and the last sent GNSS 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 report when there is no GNSS fix.
 - 0: Enable report.
 - 1: Disable report.
- ✧ *<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 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 parameter SHOULD NOT be less than 15 seconds, otherwise position information will be sent via TCP short connection.
- ✧ *<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 GNSS 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 restore 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 – XXXFFF, 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 – 3	0
Tow Output Duration (GV50P)	<=5	0 – 65535 (×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/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 does not detect rest 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 3.2.5.1.
- ✧ <Tow Output Duration>: Please refer to the parameter <Duration> in Chapter 3.2.5.1.
- ✧ <Tow Output Toggle Times>: Please refer to the parameter <Toggle Times> in Chapter 3.2.5.1.

- ✧ **<Rest Duration>**: A time parameter to measure whether the device enters into rest state. The status of the device will be changed to rest if the motion sensor detects rest 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 state. 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 – 3	0
Duration (GV50P)	<=3	0 – 65535(×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 GNSS 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 – XXXFFF, 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 – FFFFFFFF	23D0F
Reserved	0		
Reserved	0		
Unknown Roaming Event Mask	<=6	000000 – FFFFFFFF	23D0F
Reserved	0		

Reserved	0		
Reserved	0		
Reserved	0		
Output ID (GV50P)	1	0 – 1	0
Output Status (GV50P)	1	0 – 3	0
Duration (GV50P)	<=5	0 – 65535(×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 following the empty value.
 - ✧ <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 following the empty value.
 - ✧ <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 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:** If more operators are needed, please adjust <Operator Start> and <Operator End> for appropriate setup. If some operators in <Operator List> are empty, then the corresponding operators will be deleted. For example, to delete the 4th, 5th and 6th operators of the <Operator List>, please set <Operator Start> to 4 and set <Operator End> to 6 and keep the

operators of <Operator List> empty.

Operators that are not in <Home Operator List>, <Roaming Operator List> or <Black List Operator> will be considered 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”, <Known Roaming Event Mask> will be valid; if the roaming status is “Unknown Roaming”, <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
- Bit 14 Reserved
- Bit 15 Reserved
- Bit 16 Reserved
- Bit 17 for **+RESP:GTDRM**

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 <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 – XXXFFF, 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 **AT+GTRMD** contains a large amount of configuration information in PLMN code list, make sure the command length does not exceed 180 bytes through proper *<Operator Start>* and *<Operator End>* 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 – 3	0
Duration (GV50P)	<=5	0 – 65535(×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 – XXXFFF, 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 – 3	0
Duration (GV50P)	<=5	0 – 65535(×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 state and the state 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 state, 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 GNSS. 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 GNSS fix works in an abnormal status for more than 1 minute, only 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 Stop status 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 – XXXFFF, 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 GNSS. 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 GNSS, 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

ΔV_{hb}	≤ 3	0 – 100km/h	0
ΔV_{ha}	≤ 3	0 – 100km/h	0
Reserved	0		
Medium Speed	≤ 3	60 – 100km/h	60
ΔV_{mb}	≤ 3	0 – 100km/h	0
ΔV_{ma}	≤ 3	0 – 100km/h	0
Reserved	0		
Reserved	0		
ΔV_{lb}	≤ 3	0 – 100km/h	0
ΔV_{la}	≤ 3	0 – 100km/h	0
Reserved	0		
Output ID (GV50P)	1	0 – 1	0
Output Status (GV50P)	1	0 – 3	0
Duration (GV50P)	≤ 5	0 – 65535($\times 100\text{ms}$)	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 GNSS only.
- ✧ **<High Speed>, <Medium Speed>**: If the last known speed of the device read from GNSS 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.
- ✧ **< ΔV_{hb} >**: 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”.
- ✧ **< ΔV_{ha} >**: 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 – XXXFFF, 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	\$	\$

3.2.4.8. Jamming Detection

The command **AT+GTJDC** is used to configure the parameters for jamming detection. When the

detection condition is matched, then the device will report **+RESP:GTJDR** or **+RESP:GTJDS** event message to the backend server according to the *<Mode>* parameter.

➤ **AT+GTJDC=**

Example: AT+GTJDC=gv50,1,20,,5,10,10,,1,1,0,0,,001A\$			
Parameter	Length (byte)	Range / Format	Default
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Mode	1	0 1 2	0
Signal Threshold	<=2	0 – 31	25
Reserved	0		
Jammed Cell Number Threshold	<=2	0 – 99	5
Enter Jamming Timer Threshold	<=3	0 – 300 sec	10
Quit Jamming Timer Threshold	<=4	0 – 3600 sec	10
Reserved	0		
Output ID (GV50P)	1	0 – 1	0
Output Status (GV50P)	1	0 – 3	0
Duration (GV50P)	<=5	0 – 65535(×100ms)	0
Toggle Times (GV50P)	<=3	0 – 255	0
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

- ✧ *<Mode>*: The working mode of jamming detection function.
 - 0: Disable jamming detection function.
 - 1: Enable jamming detection function. If jamming is detected, the device will report **+RESP:GTJDR** message. This message is reported upon entering into “jamming”.
 - 2: Enable jamming detection function. If jamming is detected, the device will report **+RESP:GTJDS** message. This message is reported upon entering into “jamming” or quitting “jamming”.
- ✧ *<Signal Threshold>*, *<Jammed Cell Number Threshold>*: The built-in jamming detection algorithm uses these two parameters to measure whether the device is currently being jammed. The smaller the parameter, the more sensitive the detection is.
- ✧ *<Enter Jamming Timer Threshold>*: When the device detects jamming, the device will trigger the “enter jamming” event based on the *<Enter Jamming Timer Threshold>* parameter.
- ✧ *<Quit Jamming Timer Threshold>*: When the device quits jamming, the device will trigger the “quit jamming” event based on the *<Quit Jamming Timer Threshold>* parameter.

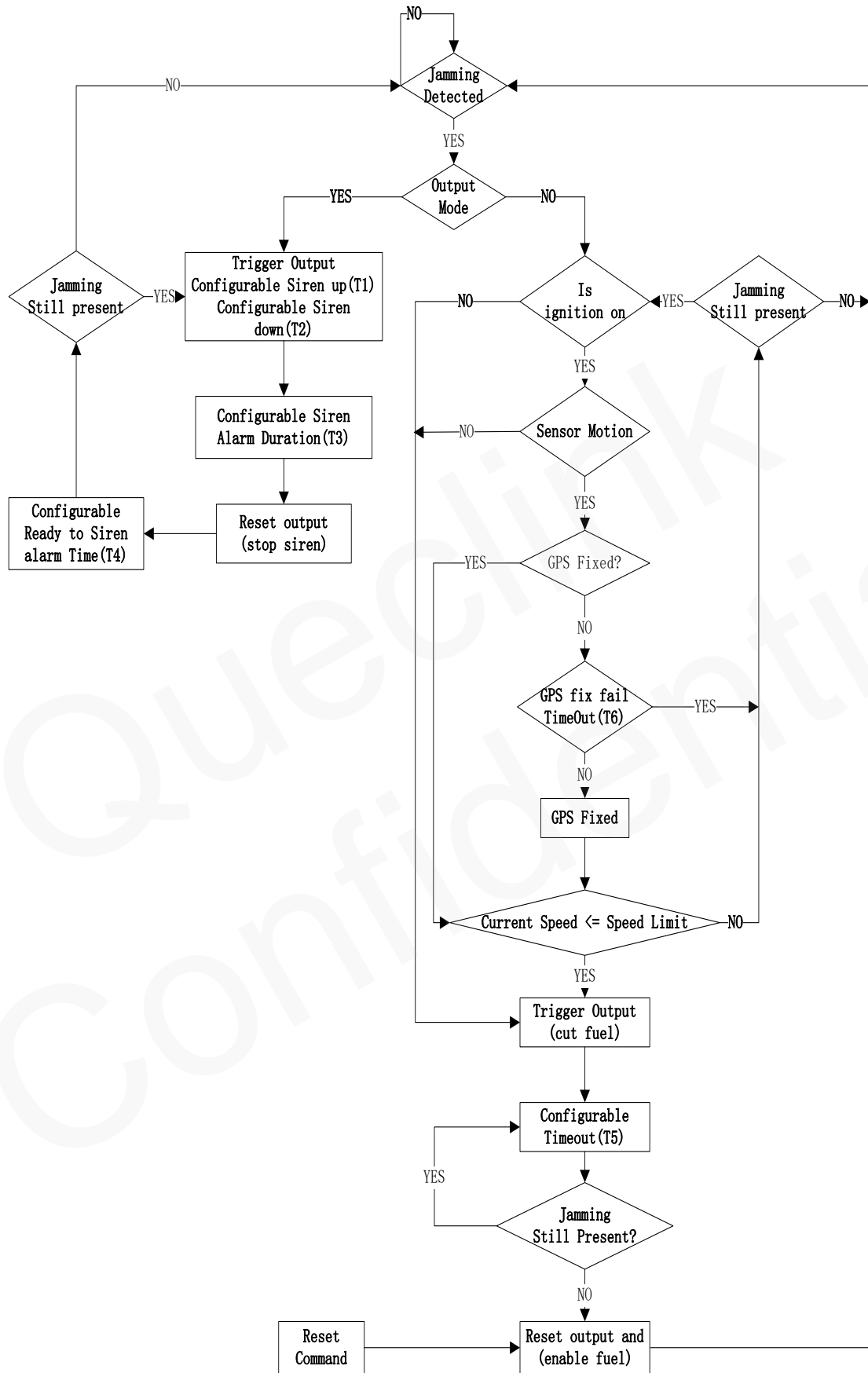
The acknowledgment message of the **AT+GTJDC** command:

➤ **+ACK:GTJDC,**

Example:			
+ACK:GTJDC,090600,135790246811220,GV50,0019,20090214093254,11F0\$			
Parameter	Length (byte)	Range / Format	Default
Protocol Version	6	XX0000 – XXXFFF, $X \in \{'A' - 'Z', '0' - '9'\}$	
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	\$	\$

3.2.4.9. Jamming Behavior Setting

The command **AT+GTJBS** is used for the Jamming Behavior Setting function and the Jamming Behavior Setting function is based on the Jamming Detection (**AT+GTJDC**) function. The output1 is used for “cut off fuel” when <Output Mode> is set to 0, and the output1 is used for “siren” alarm when <Output Mode> is set to 1.



➤ **AT+GTJBS=**

Example: AT+GTJBS=gv50,1,,10,10,60,30,3600,1,30,120,0,0,,001A\$			
Parameter	Length (byte)	Range / Format	Default
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Mode	1	0 1	0
Reserved	0		
Siren On Timer (T1)	5	1 – 65535(×100ms)	10
Siren Off Timer (T2)	5	1 – 65535(×100ms)	10
Siren Alarm Duration (T3)	5	1 – 65535(sec)	60
Preparing Alarm Timer (T4)	5	1 – 65535(sec)	30
Cut Fuel Timer (T5)	5	1 – 65535(sec)	3600
Motion Sensor	1	0 1	1
Speed Limit	3	0 – 999km/h	30
GNSS Fix Failure Timer (T6)	5	30-65535(sec)	120
Output 1 Init State	1	0 1	0
Output Mode	1	0 1	0
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

- ✧ <Mode>: The working mode of jamming behavior setting function.
 - 0: Disable this function.
 - 1: Enable this function.
- ✧ <Siren On Timer (T1)>: It specifies the length of time when the siren is on.
- ✧ <Siren Off Timer (T2)>: It specifies the length of time when the siren is off.
- ✧ <Siren Alarm Duration (T3)>: It indicates the length of time the siren alarm sounds.
- ✧ <Preparing Alarm Timer (T4)>: It indicates the length of time for preparing for alarm.
- ✧ <Cut Fuel Timer (T5)>: It indicates the fuel cut-off length of time.
- ✧ <Speed Limit>: The speed limit of cutting fuel.
- ✧ <Motion Sensor>: Whether the motion sensor needs to measure the motion status to cut off fuel when the GNSS fix failure timeout expires. If <Motion Sensor> is set to 0, the state machine will always measure the GNSS fix state.
 - 0: Disable motion sensor.
 - 1: Enable motion sensor.
- ✧ <GNSS Fix Failure Timer (T6)>: The length of time GNSS fix is considered valid. If GNSS fix

takes longer than the time specified by this parameter, it will be considered as GNSS fix failure.

- ✧ **<Output 1 Init State>**: It is used to set the initial state of output 1.
- ✧ **<Output Mode>**: A numeral to indicate the output port's function.
 - 0: The output1 is used for "cut off fuel".
 - 1: The output1 is used for "siren" alarm.

Note: When **AT+GTJBS** is enabled, the output port settings configured by other commands are invalid.

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

➤ **+ACK:GTJBS,**

Example: +ACK:GTJBS,090600,135790246811220,GV50,001A,20090214093254,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX8000 – XX80FF, 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 on GV50P.

Wave Shape 1:

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



Figure 2: Wave Shape 1

Wave Shape 2:

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

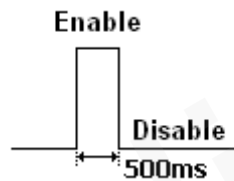


Figure 3: Wave Shape 2

Wave Shape 3:

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

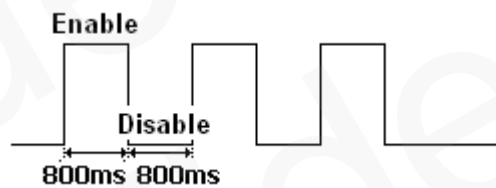


Figure 4: Wave Shape 3

➤ **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 – 3	0
Duration	<=5	0 – 65535(×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.
 - 2: Gradual-progressive-high-wave-shape Enable status. For detailed information, please refer to **AT+GTGDO**.
 - 3: Gradual-progressive-low-wave-shape Enable status. For detailed information, please refer to **AT+GTGDO**.
 - ✧ <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
- Note:** This parameter is also valid for the gradual-progressive-wave-shape related functions.

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=**

[illegible]

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) GNSS 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) GNSS 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 *<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**).
 - 7: Combined detection mode. In this mode, ignition on/off trigger conditions can be selected using *<Virtual Ignition On Mask>* and *<Virtual Ignition Off Mask>* parameters in the command **AT+GTVMS**.
Note: *<Virtual Ignition Off Mask>* must contain *<Virtual Ignition On Mask>* to prevent logic errors.

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 device, then the device will only measure the ignition status 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 – XXXFFF, 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 indicate 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 – 3	0
Duration (GV50P)	<=5	0 – 65535(×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	3	0 – 100 (×100mv)	0

Threshold			
MPF Validity Time	2	0 – 20 (×1s)	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 the **+RESP:GTEPS** alarm report.
- ✧ **<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>.
- ✧ **<MPF Validity Time>**: The validity time for detecting the device disconnecting main power supply. 0 means “Do not check the validity time”. If <MPF Validity Time> is not 0, and the device remains disconnected with main power supply for the period of time specified by this parameter, the device will report **+RESP:GTMPF** to the backend server. If it is detected that

the device disconnects the main power supply when *<MPF Validity Time>* is 0, the device will report **+RESP:GTMFP** to the backend server immediately.

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	\$	\$

3.2.5.4. Gradual Digital Output Configuration

The **AT+GTGDO** command is used to configure specified gradual progressive wave shape from the digital output port.

For progressive output, an increment/decrement step is added to the ON/OFF Time until the ON/OFF Time (including the time increment) becomes equal to (=) or greater than (>) the Cycle time. This phase is defined as progressive state. After the condition On/Off Time + Incremental/Decremental Step \geq Cycle Time is reached, the output becomes steady until it is deactivated by the command (**AT+GTOUT**). This phase in which the output is steady is defined as constant state. If the device reboots during constant state and the **AT+GTPDS** settings are configured and enabled, the device will restore the previous output state.

Next time progressive output is activated, the cycle described above starts over again regardless of the former progressive state.

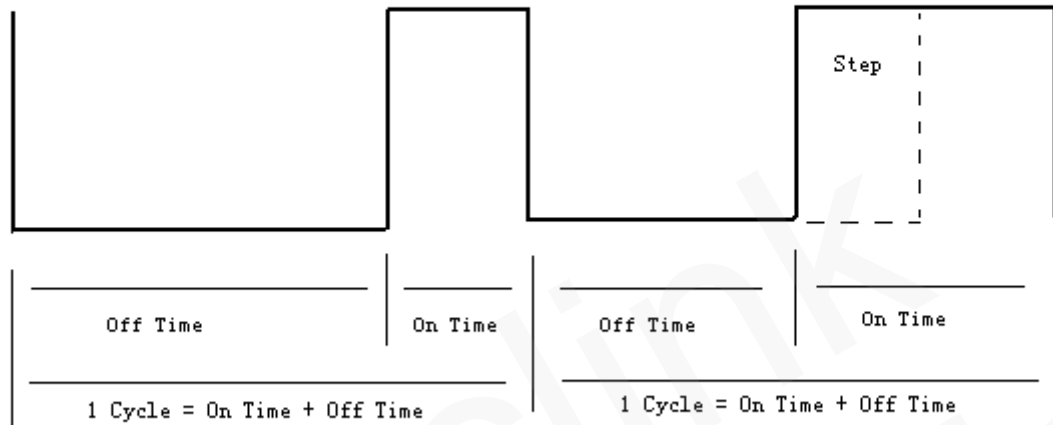
This command only works on GV50P.

The figure below shows the components of an output cycle. Here are some notes:

- ◆ The time for one complete cycle is equal to OFF phase time plus ON phase time which is prior to OFF time.
- ◆ For constant output, the ON Time and the Cycle Time should be the same.

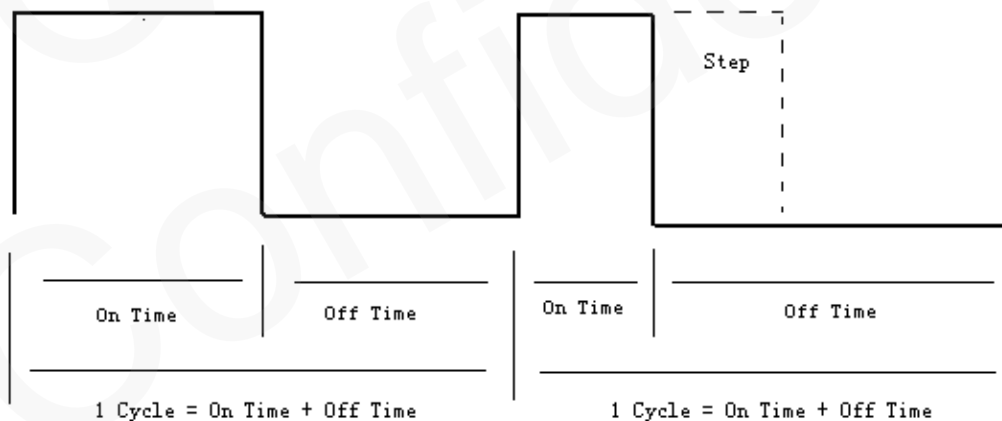
- ◆ For progressive output, when the <Output1 Status> is set to 2, an incremental step will be added to the ON time at the end of a cycle before the start of the next.

Gradual Progressive Wave Shape



- ◆ For progressive output, when the <Output1 Status> is set to 3, an indecremental step will be added to the OFF time at the end of a cycle before the start of the next.

Gradual Progressive Wave Shape



➤ AT+GTGDO=

Example:

AT+GTGDO=gv50,0,30,1,,,,,0004\$

Parameter	Length (Byte)	Range/Format	Default
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50

Time of First Active Phase (ON Time) / Time of First Inactive Phase (OFF Time)	<=3	0 - 100	0
Cycle Time (Total Time)	<=3	0 - 100	30
Incremental Step	<=3	0 - 100	1
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

- ✧ **<Time of First Active Phase>**: Time (in units of 100ms) that the output will be in active state during the first cycle when **<Output1 Status>** is set to 2.
- ✧ **<Time of First Inactive Phase>**: Time (in units of 100ms) that the output will be in inactive state during the first cycle when **<Output1 Status>** is set to 3.
- ✧ **<Cycle Time>**: Time (in units of 100ms) that forms a complete cycle (ON phase time + OFF phase time).
- ✧ **<Incremental Step>**: Time (in units of 100ms) that shall be added to the ON/OFF phase time before starting the next cycle. If this parameter value is 0, the cycles are equal.

Note: The value of <Time of First Active Phase> or <Time of First Inactive Phase> can not be greater than <Cycle Time>.

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

➤ **+ACK:GTGDO,**

Example:			
+ACK:GTGDO,090200,135790246811220,,0004,20090214093254,11F0\$			
Parameter	Length (Byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXXFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' ' ' ' _ '	
Serial Number	4	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
Smart Voltage Adjustment	1	0 1	1
Ignition Off Debounce	<=3	5 – 255 (× 2 sec)	10
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 on or ignition off state. If the voltage of the external power is higher than *<Ignition On Voltage>* - *<Voltage Offset>* and is maintained for *<Debounce>* seconds, the device will consider it as virtual ignition on state. If the voltage of the external power is lower than *<Ignition On Voltage>* - *<Voltage Offset>* and is maintained for *<Ignition Off Debounce>* seconds, the device will consider it as virtual 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 ignition judgement more precise.
- ✧ *<Debounce>*: The debounce time before updating virtual ignition on/off status according to

the external power voltage. Unit: second.

- ✧ **<Smart Voltage Adjustment>**: Enable/disable smart voltage adjustment algorithm.
 - 0: Disable the smart voltage adjustment algorithm. The values of **<Ignition On Voltage>** and **<Voltage Offset>** will keep static.
 - 1: Enable the smart voltage adjustment algorithm. The values of **<Ignition On Voltage>** and **<Voltage Offset>** will dynamically change according to the actual ignition on and off voltage.
- ✧ **<Ignition Off Debounce>**: The debounce time to wait before updating the virtual ignition off state according to the external power voltage.

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 – XXXFFF, 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	60

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 stationary state. The device will be considered in stationary state after the motion sensor detects rest and the stationary 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	\$	\$

3.2.6.3.Virtual Ignition Mode Selection

The command **AT+GTVMS** is used to configure the mode of detecting ignition state.

➤ **AT+GTVMS=**

Example: AT+GTVMS=gv50,7,,,,,FFFF\$

Parameter	Length (byte)	Range/Format	Default
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv50
Virtual Ignition Mode	1	0-4 7	1
Virtual Ignition On Mask	2	00-03	3
Virtual Ignition Off Mask	2	00-03	3
Virtual Ignition On Logic	1	0-1	1
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

✧ <Virtual Ignition 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) GNSS 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) GNSS 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 <Power Saving Mode> is set to Mode 1.

Note: Whenever the ignition detection mode is changed to Mode 1, restart the device for Mode 1 to take effect.

- 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**).
- 7: Combined detection mode. In this mode, ignition on/off trigger conditions can be selected using <Virtual Ignition On Mask> and <Virtual Ignition Off Mask> parameters.

Note: <Virtual Ignition Off Mask> must contain <Virtual Ignition On Mask> to prevent logic errors.

✧ <Virtual Ignition On Mask>: Bitwise mask to detect the ignition on event. The logic of each bit is controlled by the <Virtual Ignition On Logic> parameter.

Bit0 (01): Voltage virtual ignition detection

Bit1 (02): Motion status virtual ignition detection

✧ <Virtual Ignition Off Mask>: Bitwise mask to detect ignition off event. All bits matched are

considered as ignition off event.

Bit0 (01): Voltage virtual ignition detection

Bit1 (02): Motion status virtual ignition detection

For example:

Bit (00000003): Voltage virtual ignition detection and motion status virtual ignition detection combined mode. Only when ignition off is detected by both Mode 2 and Mode 4, the device is considered in ignition off state.

✧ **<Virtual Ignition On Logic>**: The logic of each bit in **<Virtual Ignition On Mask>**.

- 0: AND logic. All bits matched are considered as ignition on event.
- 1: OR logic. Any one bit matched is considered as ignition on event.

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

➤ **+ACK:GTVMS,**

Example:			
+ACK:GTVMS,090200,135790246811220,,0000,20090214093254,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXXFFF, X ∈ {'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

Note: If the virtual ignition detection function is enabled, **+RESP:GTVGN**, **+RESP:GTVGF** and **+RESP:GTVGL** can be reported to the backend server when the corresponding bit in **<Event Mask>** of the command **AT+GTCFG** is set to 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 - F	
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 GNSS related information via the message **+RESP:GTGPS**.
- 1: **RTL**. Request the terminal to report its current position immediately via the message **+RESP:GRTL**.
- 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: **RJB**. Reset jamming behavior.

✧ <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**.

Note: 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 42	GDO
Bit 41	VMS
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	JBS
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	JDC
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 – XXXFFF, 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		
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

✧ <Hour Meter Enable>: Enable/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>**.

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

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+GTUDEF**.

➤ **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	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

3.2.7.5. 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-FFFFFFFFFFFFFFF	0
Debounce Time	5	0-86400(s)	0
Inzizo Mask	5	00000-FFFFF	0
Outzizo Mask	5	00000-FFFFF	0
Stocmd ID Mask	8	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	GNSS is on
12	Bit 11	GNSS 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 – XXXFFF, 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 GNSS if the sensor detects stationary 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
GNSS 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>: Enable/disable the use of GNSS speed to assist with motion measurement based on motion sensor state.

- 0: Disable this feature.
- 1: Enable this feature.
- ✧ <Motion Speed Threshold>: The speed threshold which is combined with GNSS speed to measure the status of movement.
- ✧ <Motion Cumulative Time>: If the average speed is higher than <Motion Speed Threshold> for <Motion Cumulative Time>, the device is considered to be in moving state.
- ✧ <Motionless Cumulative Time>: If the average speed is lower than <Motion Speed Threshold> for <Motionless Cumulative Time>, the device is considered to be in stationary state.
- ✧ <GNSS Fix Failure Timeout>: If it takes GNSS more than <GNSS Fix Failure Timeout> to get a fix, 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 – XXXFFF, 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	\$	\$

3.3. 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 GNSS position information in the case of SMS transmission. Otherwise the report will be truncated to fit the length of an SMS message.

3.3.1. Position Related Report

➤ **+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 GNSS to get the current position and then send the message **+RESP:GTRTL** to the backend server.

➤ **+RESP:GTD0G,**

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:GTD0G,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 – XXXFFF, 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	
GNSS 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	
GNSS 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>**: It is a one-byte hexadecimal value represented by two ASCII bytes. The first byte (4 higher bits of the hexadecimal value) indicates Report ID and the second byte (4 lower bits of the hexadecimal value) indicates Report Type.

Report ID has different meanings in different messages below.

- The ID of the digital input port which triggers the reboot message **+RESP:GTDG**. 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 speed alarm message **+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
 - 6: Reboot message for send failure 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 GNSS position(s) included in the report message. Generally, it is 1.
- ✧ **<GNSS Accuracy>**: A numeral to indicate the GNSS fix status and HDOP of the GNSS position. 0 means the current GNSS fix fails and the last known GNSS position is used. A non-zero value (1 - 50) means the current GNSS fix is successful and represents the HDOP of the current GNSS position.
- ✧ **<Speed>**: The current speed. Unit: km/h
- ✧ **<Azimuth>**: The azimuth of the GNSS fix.
- ✧ **<Altitude>**: The height above the sea level.
- ✧ **<Longitude>**: The longitude of the current position.
- ✧ **<Latitude>**: The latitude of the current position.
- ✧ **<GNSS UTC Time>**: The UTC time obtained from the GNSS 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,,13337,10,1,1,18.6,272,30.8,117.201342,31.855243,20

170712074622,0460,0001,5504,29CF,00,347.8,00021:54:10,,,,220101,23,0,15,20170712154623,1854\$
 +RESP:GTFRI,090302,865083030004642,,13337,30,1,1,18.6,272,30.8,117.201342,31.855243,20
 170712074622,0460,0001,5504,29CF,00,347.8,00021:54:10,,,,220101,23,0,15,20170712154623,1854\$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXXFFF, 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	
GNSS 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	
GNSS UTC Time	14	YYMMDDHHMMSS	
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 Percentage	<=3	0 – 100	
Device Status	6	000000 – FFFFFFFF	

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 is a one-byte hexadecimal value represented by two ASCII bytes. The first byte (4 higher bits of the hexadecimal value) indicates Report ID and the second byte (4 lower bits of the hexadecimal value) indicates Report Type.

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+GTFRC** works

- ✧ **<Number>**: The number of the GNSS 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 status 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 status of the device:

- 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.
- 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.
- 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 output1. For the low bit, 0 means "Disable status", and 1 means "Enable status". The high bit is 0.

✧ <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 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 – XXXFFF, 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	
GNSS 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	
GNSS 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>: It is a one-byte hexadecimal value represented by two ASCII bytes. The first byte (4 higher bits of the hexadecimal value) indicates Report ID and the second byte (4 lower bits of the hexadecimal value) indicates 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 GNSS 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 – XXXFFF, X ∈ {'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' ' ' ' _ '	
Call Number	<=20	phone number	
GNSS 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	
GNSS 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 – XXXFFF, 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	
GNSS 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	
GNSS 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>*: It is a hexadecimal value represented by three ASCII bytes. The first two bytes indicates Report ID and the last byte indicates 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,,,B1,21,1000,30,1,2,0.0,347,43.5,117.201167,31.8329 33,20170720074950,0460,0001,5504,582B,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	
GNSS 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	
GNSS 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' '-' '_'	
Motion Status	2	11 12 16 1A 21 22 41 42	
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	\$	\$

✧ <Motion Status>: The current motion status of the device.

- 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.
- 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.
- 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 GNSS 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 GNSS information, it will send the GNSS 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 – XXXFFF, 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,0,250,250,0,0,0,0,0,0,0,0,0,0,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,,,,PD
S,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,,,,,0,3,00000000
00000000,0,,,00000000,0,,,,,0,4,0000000000000000,0,,,00000000,0,,,,,0,5,0000000000000000
0,0,,,00000000,0,,,,,0,6,0000000000000000,0,,,00000000,0,,,,,0,7,0000000000000000,0,,,0000
0000,0,,,,,0,8,0000000000000000,0,,,00000000,0,,,,,0,9,0000000000000000,0,,,00000000,0,,,,
0,10,0000000000000000,0,,,00000000,0,,,,,0,11,0000000000000000,0,,,00000000,0,,,,,0,12,00
0000000000000000,0,,,00000000,0,,,,,0,13,0000000000000000,0,,,00000000,0,,,,,0,14,00000000
00000000,0,,,00000000,0,,,,,0,15,0000000000000000,0,,,00000000,0,,,,,0,16,0000000000000000
```

```
00,0,,,00000000,0,,,,,0,17,0000000000000000,0,,,00000000,0,,,,,0,18,0000000000000000,0,,,0
0000000,0,,,,,0,19,0000000000000000,0,,,00000000,0,,,,,0,20,0000000000000000,0,,,0000000
0,0,,,,,0,21,0000000000000000,0,,,00000000,0,,,,,0,22,0000000000000000,0,,,00000000,0,,,,,0,
23,0000000000000000,0,,,00000000,0,,,,,0,24,0000000000000000,0,,,00000000,0,,,,,0,25,0000
000000000000,0,,,00000000,0,,,,,0,26,0000000000000000,0,,,00000000,0,,,,,0,27,0000000000
000000,0,,,00000000,0,,,,,0,28,0000000000000000,0,,,00000000,0,,,,,0,29,0000000000000000,
0,,,00000000,0,,,,,0,30,0000000000000000,0,,,00000000,0,,,,,0,31,0000000000000000,0,,,0000
0000,0,,,,,GAM,1,1,25,10,60,60,,,,,20170731154754,0213$
+RESP:GTALM,090302,865083030002554,,4,4,VVS,13500,600,10,,,AVS,20,30,,,,,2017073115475
4,0214$
```

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXXFFF, X ∈ {'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' ' ' ' _ '	
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,,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,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,,1,0,,50,0,0,0,
0,0,0,0,,2,0,,50,0,0,0,0,0,0,,3,0,,50,0,0,0,0,0,0,,4,0,,50,0,0,0,0,0,0,,5,0,,50,0,0,0,0,0,0,
,,6,0,,50,0,0,0,0,0,0,,7,0,,50,0,0,0,0,0,0,,8,0,,50,0,0,0,0,0,0,,9,0,,50,0,0,0,0,0,0,,10,0,
,,50,0,0,0,0,0,0,,11,0,,50,0,0,0,0,0,0,,12,0,,50,0,0,0,0,0,0,,13,0,,50,0,0,0,0,0,0,,14,0,,
50,0,0,0,0,0,0,,15,0,,50,0,0,0,0,0,0,,16,0,,50,0,0,0,0,0,0,,17,0,,50,0,0,0,0,0,0,,18,0,,5
0,0,0,0,0,0,0,,19,0,,50,0,0,0,0,0,0,,SPD,0,0,0,60,300,0,0,0,,,,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,0,0,0000000000000000
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
0000000000,0,,00000000,0,,,,0,17,0000000000000000,0,,00000000,0,,,,0,18,0000000000000
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,,00000000
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,,,,0,29,00000000000000
000,0,,00000000,0,,,,0,30,0000000000000000,0,,00000000,0,,,,0,31,0000000000000000,0,,0
0000000,0,,,,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	
GNSS 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 – 3	
Tow Output Duration	<=5	0 – 65535(×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($\times 2s$)	
Debounce Time	1	0 – 5($\times 1s$)	
Output ID	1	0 – 1	
Output Status	1	0 – 3	
Duration	≤ 5	0 – 65535($\times 100ms$)	
Toggle Times	≤ 3	0 – 255	
Sync with FRI	1	0 1	
Voltage Margin Error	3	0 – 100($\times 10mv$)	0
Debounce Voltage Threshold	3	0 – 100 ($\times 100mv$)	0
MPF Validity Time	2	0 – 20 ($\times 1s$)	
DIS	3	DIS	DIS
Ignition Detection	1	0	0
Sample Period	≤ 2	0 1 – 12($\times 2s$)	
Reserved	0		
Ignition Detection Mode	1	0-4 7	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 – 3	
Duration	<=5	0 – 65535(×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 – 3	
Duration	<=5	0 – 65535(×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 – 3	
Duration	<=5	0 – 65535(×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 – 3	

Duration	<=5	0 – 65535(×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 – 3	
Duration	<=5	0 – 65535(×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 – 3	0
Duration	<=5	0 – 65535(×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 – 3	0
Duration	<=5	0 – 65535(×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 – 3	0
Duration	<=5	0 – 65535(×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 – 3	0
Duration	<=5	0 – 65535(×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 – 3	0
Duration	<=5	0 – 65535(×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 – 3	0
Duration	<=5	0 – 65535(×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 – 3	0
Duration	<=5	0 – 65535(×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 – 3	0
Duration	<=5	0 – 65535(×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 – 3	0
Duration	<=5	0 – 65535(×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 – 3	0
Duration	<=5	0 – 65535(×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 – 3	0
Duration	<=5	0 – 65535(×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 – 3	0
Duration	<=5	0 – 65535(×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 – 3	0
Duration	<=5	0 – 65535(×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 – 3	0

Duration	<=5	0 – 65535(×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 – 3	0
Duration	<=5	0 – 65535(×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 – 3	
Duration	<=5	0 – 65535(×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 – 3	
Duration	<=5	0 – 65535(×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
Fail Interval	4	0 5-1440 min	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 – 3	
Duration	<=5	0 – 65535(×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		
HBM	3	HBM	HBM
Mode	1	0 – 1	0
Reserved	0		
Reserved	0		
High Speed	<=3	100 – 400km/h	
ΔV_{hb}	<=3	0 – 100km/h	
ΔV_{ha}	<=3	0 – 100km/h	
Reserved	0		
Medium Speed	<=3	100 – 400km/h	
ΔV_{mb}	<=3	0 – 100km/h	
ΔV_{ma}	<=3	0 – 100km/h	
Reserved	0		
Reserved	0		
ΔV_{lb}	<=3	0 – 100km/h	

ΔVla	≤3	0 – 100km/h	
Reserved	0		
Output ID	1	0 – 1	
Output Status	1	0 – 3	
Duration	≤5	0 – 65535(×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 – FFFFFFFF	23D0F
Reserved	0		

Reserved	0		
Unknown Roaming Event Mask	<=6	000000 – FFFFFFFF	23D0F
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Output ID	1	0 – 1	0
Output Status	1	0 – 3	
Duration	<=5	0 – 65535(×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-FFFFFFFFFFFFFFF	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
GNSS 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
Smart Voltage Adjustment	1	0 1	1
Ignition Off Debounce	<=3	5 – 255 (× 2 sec)	10
AVS	3	AVS	AVS
Sensor Rest Duration	<=3	1 – 255 sec	20
Sensor Motion Validity	<=3	1 – 255 sec	60
Reserved	0		
Reserved	0		
Reserved	0		
VMS	3	VMS	VMS
Virtual Ignition Mode	1	0-4 7	1
Virtual Ignition On Mask	2	00-03	3
Virtual Ignition Off Mask	2	00-03	3

Virtual Igniton On Logic	1	0-1	1
Reserved	0		
GDO	3	GDO	GDO
Time of First Active Phase (ON Time) / Time of First Inactive Phase (OFF Time)	<=3	0 - 100	0
Cycle Time (Total Time)	<=3	0 - 100	30
Incremental Step	<=3	0 - 100	1
Reserved	0		
Reserved	0		
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 – XXXFFF, 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 – XXXFFF, 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 – XXXFFF, 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:GTVR

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:GTVR**.

➤ +RESP:GTVR,

Example: +RESP:GTVR,090302,865083030002554,,GV50,020E,0105,20170731155607,021E\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXXFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
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 – XXXFFF, 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 – XXXFFF, 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 – 03	
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 – XXXFFF, 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 GNSS 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 – XXXFFF, $X \in \{'A' - 'Z', '0' - '9'\}$	
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 GNSS finds.
- ✧ <SV ID>: Satellite ID. If there is no satellite, the field will be filled with zero.
- ✧ <SV Power>: Satellite power. If there is no satellite, the field will be filled with zero.

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 – XXXFFF, $X \in \{'A' - 'Z', '0' - '9'\}$	
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 GLONASS finds.
- ✧ <SV ID>: Satellite ID. If there is no satellite, the field is filled with zero.
- ✧ <SV Power>: Satellite power. If there is no satellite, the field is filled with zero.

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 BeiDou finds.
- ✧ <SV ID>: Satellite ID. If there is no satellite, the field is filled with zero.

✧ <SV Power>: Satellite power. If there is no satellite, the field is filled with zero.

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 status
- +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:** GNSS 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
- +RESP:GTDRM:** Device removal 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 GNSS 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 – XXXFFF, 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,
- +RESP:GTDRM,

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\$

+RESP:GTDRM,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 – XXXFFF, X ∈ {'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' ' ' '_'	
GNSS 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	
GNSS 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	\$	\$
----------------	---	----	----

If the <Mode> in the **AT+GTJDC** command is set to 1, the device will report the **+RESP:GTJDR** message when jamming is detected.

➤ **+RESP:GTJDR,**

Example:

+RESP:GTJDR,090600,135790246811220,,0,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,20090214093254,11F0\$

Parameter	Length (byte)	Range / Format	Default
Protocol Version	6	XX0000 – XXXFFF, $X \in \{'A' - 'Z', '0' - '9'\}$	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_' '?'	
GNSS 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	
GNSS 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	\$	\$

If the <Mode> in the **AT+GTJDC** command is set to 2, the device will report the **+RESP:GTJDS** message when jamming is detected.

➤ **+RESP:GTJDS,**

Example:

+RESP:GTJDS,040408,135790246811220,,2,0,4.3,92,70.0,121.354335,31.222073,200902140132

54,0460,0000,18d8,6141,00,20090214093254,11F0\$			
Parameter	Length (byte)	Range / Format	Default
Protocol Version	6	XX0000 – XXXFFF, $X \in \{'A' - 'Z', '0' - '9'\}$	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_' '?'	
Jamming Status	1	1 2	
GNSS 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	
GNSS 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	\$	\$

✧ <Jamming Status>: The current jamming status of the device.

- 1: Quit the jamming state.
- 2: Enter the jamming state.

➤ +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 – XXXFFF, $X \in \{'A' - 'Z', '0' - '9'\}$	

		'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' ' ' '_'	
Motion Status	2	11 12 16 21 22 41 42	
GNSS 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	
GNSS 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	\$	\$

✧ <Motion Status>: The current motion status of the device.

- 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.
- 16 (**Tow**): The device attached vehicle is ignition off and it is 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,,1377,0,0.0,24,63.3,117.201525,31.833040,20170731

080420,0460,0001,5504,582B,00,,0.1,20170731160423,0233\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXXFFF, X ∈ {'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Duration of Ignition Off	<=6	0 – 999999 sec	
GNSS 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	
GNSS UTC Time	14	YYMMDDHHMMSS	
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	YYMMDDHHMMSS	
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 – XXXFFF, X ∈ {'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Reserved	2	00	
Report Type	1	0-4 7	
Duration of Ignition Off	<=6	0 – 999999 sec	
GNSS 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	
GNSS UTC Time	14	YYMMDDHHMMSS	
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	YYMMDDHHMMSS	
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)
 - 7: Combined detection mode
- ✧ *<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 – XXXFFF, 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	
GNSS 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	
GNSS 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 – XXXFFF, X ∈ {'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Reserved	2	00	
Report Type	1	0-4 7	
Duration of Ignition On	<=6	0 – 999999 sec	
GNSS 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	
GNSS 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,,,,0,0.0,291,48.3,117.177670,31.820310,20170731075
611,0460,0001,5502,465D,00,1061.0,20170731155614,3EAD$
+RESP:GTSTR,090302,865083030004642,,,,0,36.4,271,35.0,117.201547,31.829752,2017073107
4759,0460,0001,5504,582C,00,1057.6,20170731154802,3E80$
+RESP:GTSTP,090302,865083030004642,,,,0,0.0,291,48.3,117.177670,31.820310,20170731075
941,0460,0001,5502,465D,00,1061.0,20170731155944,3EB5$
+RESP:GTLSP,090302,865083030004642,,,,0,0.0,203,52.5,117.201760,31.832648,20170728181
824,0460,0001,5504,582B,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		
GNSS 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	
GNSS 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 Status	2	11 12 16 22	
Duration of Idling Status	<=6	0 – 999999 sec	
GNSS 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	
GNSS 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 Status>: The motion status 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 GNSS 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:

- 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.
- "ffff" in the fields of **<LAC(i)>** and **<Cell ID(i)>** means the terminal doesn't know the value.
- 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 – XXXFFF, X ∈ {'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	≤20	'0' – '9' 'a' – 'z' 'A' – 'Z' ' ' ' _ '	

GNSS Signal Status	1	0 1	
Satellite Number	2	0 - 24	
Motion Status	2	11 12 16 21 22 41 42	
Reserved	0		
GNSS 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	
GNSS 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	\$	\$

- ✧ <GNSS Signal Status>: 0 means “Lost GNSS signal or no successful GNSS fix”, and 1 means “GNSS signal recovered and successful GNSS fix”.
- ✧ <Satellite Number>: The number of the visible satellites when fix is successful. If fix fails, the parameter field is empty.
- ✧ <Motion Status>: The current motion status of the device.
 - 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.
 - 16 (**Tow**): The device attached vehicle is ignition off and it is 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 – XXXFFF, X ∈ {'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Wave1 Output ID	1	1	
Wave1 Output Active	1	0-3	
GNSS 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	
GNSS 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	
GNSS 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	
GNSS 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:GTFR1,090302,865083030004642,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,,,,220101,20,0,10,20170718151842,24CD\$

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	
GNSS Fix	<=3	F0 F1 – F50	
GNSS UTC Time	20	DYYYY/MM/DDTHH:MM:SS	

✧ *<GNSS Fix>*: The accuracy of the location information. F0 means no GNSS 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 – XXXFFF, 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 @Track 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:GTVR
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 – XXXFFF, 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
AT+GTJDC	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
Reserved	51
AT+GTJBS	52
AT+GTVMS	53
AT+GTGDO	54

- ✧ **<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:GTDG**, **+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 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	
GNSS Accuracy	1	0 1 – 50	
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS 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 specific 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:GTDGOG	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 mask of digital input1 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 current motion status of the device. 0x1A is a state which is before 0x16 state.
- ✧ <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	121390847			
121.390847				
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	31164503			
31.164503				
HEX	01	DB	88	57

- ✧ <Altitude>: The altitude from GNSS. If the altitude is negative, it is represented in 2's complement format. Unit: meter.
- ✧ <GNSS UTC Time>: The UTC time obtained from the GNSS 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.

GNSS 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

- ✧ <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

- ✧ <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
HEX	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	
GNSS Accuracy	1	0 1 – 50	
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS 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	
GNSS Accuracy	1	0 1 – 50	
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS 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:

2B494E4601FFFD003100D85632530300023704090301020B01050000000000000000000000
00000000000000011000D0007E1060F0814200001007F001E02580000000000100000105B00898
601168300090140121900000800000704600001550467F400220460000155044EE90021046000
015504582C001D04600001550467F3001B0460000155045DAD001A046000015504582D00130
46000015504582B0019081C1E131A1129292006241327161D1E16000B08270A2403230D2A012
0022207220C2C04001100052207E1060F10142203B6377C0D0A

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	+RESP:GTGPS
Motion Status	1	0x11 0x12 0x21 0x22 0x41 0x42 0x16 0x1A	
Reserved	1	00	
Satellite Number	1		
Power Saving Enable / OWH Mode / Outside Working Hours	1		
Last Fix UTC Time	7	YYYYMMDDHHMM SS	
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 Saving Enable	1		+RESP:GTTMZ
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		+RESP:GTGSV
SV Count	1		
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	YYYYMMDDHHMM SS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

✧ <Message Type>: The ID of a specific 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 Bit 0 – Bit 15 of <+INF Mask> in **AT+GTHRM**.

✧ <Expansion Mask>: Please refer to Bit 16 – Bit 31 of <+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	<i><Reserved></i>
Bit 6	<i><Reserved></i>
Bit 5	<i><LED On></i> equal to 2
Bit 4	<i><LED On></i> equal to 1
Bit 3	<i><Reserved></i>
Bit 2	<i><Reserved></i>
Bit 1	<i><Reserved></i>
Bit 0	<i><Reserved></i>

- ✧ *<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 GNSS 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>: The number of cells. It also indicates the number of cell information groups. One cell information group 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:GTJDR, +RESP:GTIDN, +RESP:GTSTR, +RESP:GTSTP, +RESP:GTLSP and +RESP:GTDRM 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	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS 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 a specific 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
+RESP:GTJDR	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
+RESP:GTJDS	33

.....
+RESP:GTDRM	34
.....
+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 **<Current Mileage>** and **<Total Mileage>** fields will always be present regardless of the **<+EVT 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 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	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYMMDDHHMMSS	
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	YYMMDDHHMMSS	
Count Number	2	0000 – FFFF	

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

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

➤ **+EVT,**

Example:

2B 45 56 54 1D 01 FF D7 FF 00 68 04 04 0E 17 06 67 76 32 30 30 2D 54 53 00 00 00 00 00 00 00 00 09 00 21 18 01 01 00 00 01 01 00 FA 00 34 06 FC 59 79 01 E5 BC 1D 07 DD 09 02 02 19 36 04 60 00 01 55 04 58 2B 00 00 1A 04 00 00 00 43 02 00 00 00 00 00 00 00 00 00 00 00 00 07 DD 09 02 0A 19 38 00 59 B1 88 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	04	04
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI	
External Power Supply Voltage	2		
Analog Input1 Mode	2		
Analog Input1 Voltage	2		
Digital Input Status	1	00 – 1F	
Digital Output Status	1	00 – 1F	
Motion Status	1	0x11 0x12 0x21 0x22 0x41 0x42 0x16 0x1A	
External GNSS Antenna Status Satellites in View	1		
Jamming Status	1	1 2	
Number	1	1	
GNSS Accuracy	1	0	0

Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS 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

✧ **<Jamming Status>**: The current Jamming status of the device.

- 1: Quit the jamming state.
- 2: Enter the jamming state.

The event report messages **+RESP:GTVGN** and **+RESP:GTVGF** use the format below. For these messages, the **<Current Mileage>** and **<Total Mileage>** fields will always be present regardless of the **<+EVT 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 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	
Report Type	1	0-4 7	
Duration of Ignition On or Ignition Off	4	0 – 999999 sec	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS 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 *<+EVT 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 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	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS 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	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS 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		

GNSS Signal Status	1	0 1	
Reserved	4	00000000	00000000
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS 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

✧ <GNSS Signal Status>: 0 means “GNSS signal lost or no successful GNSS fix”, and 1 means “GNSS signal recovered and successful GNSS 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 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	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS 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 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	
GNSS Accuracy	1	0 1	
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS 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 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	
GNSS Accuracy	1	0	0

Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS 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>** 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 will not report device name or IMEI information. If the mask of **<UID>** is set to 1, then the heartbeat message will report device name or IMEI information according to the mask of **<Device Name>** in **<+HBD Mask>** of **AT+GTHRM**.

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+GTBSI

+ACK:GTBSI

AT+GTSRI

+ACK:GTSRI

AT+GTQSS

+ACK:GTQSS

AT+GTCFG

+ACK:GTCFG

AT+GTOUT

+ACK:GTOUT

AT+GTDIS

+ACK:GTDIS

AT+GTEPS

+ACK:GTEPS

AT+GTFRI

+ACK:GTFRI

AT+GTGEO

+ACK:GTGEO

AT+GTTOW

+ACK:GTTOW

AT+GTSPD

+ACK:GTSPD

AT+GTIDL

+ACK:GTIDL

AT+GTHBM

+ACK:GTHBM

AT+GTJDC

+ACK:GTJDC

AT+GTJBS

+ACK:GTJBS

AT+GTTMA

+ACK:GTTMA

AT+GTOWH

+ACK:GTOWH

AT+GTDOG

+ACK:GTDOG

AT+GTPIN

+ACK:GTPIN

AT+GTRTO

+ACK:GTRTO

AT+GTHMC
+ACK:GTHMC
AT+GTWLT
+ACK:GTWLT
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
AT+GTVMS
+ACK:GTVMS
AT+GTGDO
+ACK:GTGDO

✧ **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:GTVR
+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:GTIDE
+RESP:GTVGF
+RESP:GTGSM
+RESP:GTGSS
+RESP:GTSTR
+RESP:GTSTP
+RESP:GTLSP
+RESP:GTRMD
+RESP:GTDRM
+RESP:GTJDR
+RESP:GTJDS

✧ **Heartbeat**

+ACK:GTHBD
+SACK:GTHBD

✧ **Server Acknowledgement**

+SACK