GSM/GPRS/GPS Tracker **GV55Lite**

@Track Air Interface Protocol

Application Notes: **TRACGV55LiteAN001**

Revision: 1.05

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Contents

0. Revision history

Revision	Date	Author	Description of change
V1.01	2012-11-01	Mike	Release
V1.02	2013-02-18	Mike	1. Modify the description of bit 11 in +RSP Mask and +EVT Mask. 2. Modify the length of +ACK Mask and +HBD Mask in GTHRM command and reports. 3. Delete the reserveds in +ACK Mask, +HBD Mask, +RSP Mask and +EVT Mask. 4. Delete the <*Device name*> optional parameter in Hex report. 5. Modify description of RTO <*RESET*> to declare 'clear all buffer messages'.
	2013-02-25	Mike	1. Remove report format of GTGSM in Hex report 2. Modify description of <*GIR Trigger Type*> in Hex +INF 3. Modify all Hex report sample
V1.03	2013-05-8	Mike	1. Add <GSM interval>, <PDP interval> in GTDOG to reboot device in case of no GSM converage and unactivate GPRS for a time. 2. Add a new command AT+GTPDS for Preserve special device logical state Setting. 3. Add GTALS for RTO <Sub AT Command>
	2013-05-16	Mike	1. Add GTRMD function 2. Add GTFFC function
	2013-05-30	Mike	1. Modify parameters sequence of GTRMD
V1.04	2013-06-14	Mike	1. Modify parameters of **GTRMD** 2. Add new report message **+RESP:GTALM** to subpackage **+RESP:GTALL** when the length of **+RESP:GTALL** is too long.
	2013-06-24	Mike	1. Modify parameters of **GTRMD** 2. Modify parameters of **GTFFC**
	2013-07-02	Mike	1. Add new "Fixed Time or Mileage Report" mode in **AT+GTFRI**. 2. Add new FRI Mode --"Change the working mode to 'Fixed Time or Mileage Report' in **AT+GTFFC**.
	2013-07-16	Mike	Add description of **GTDOS**
	2013-07-17	Mike	Add <Connection Retry Pattern> of **GTSRI**
V1.05	2013-09-19	Mike	Add GTGPJ

			Add <Feature Switch Mask> of GTCFG

1. Overview

1.1. Scope of This Document

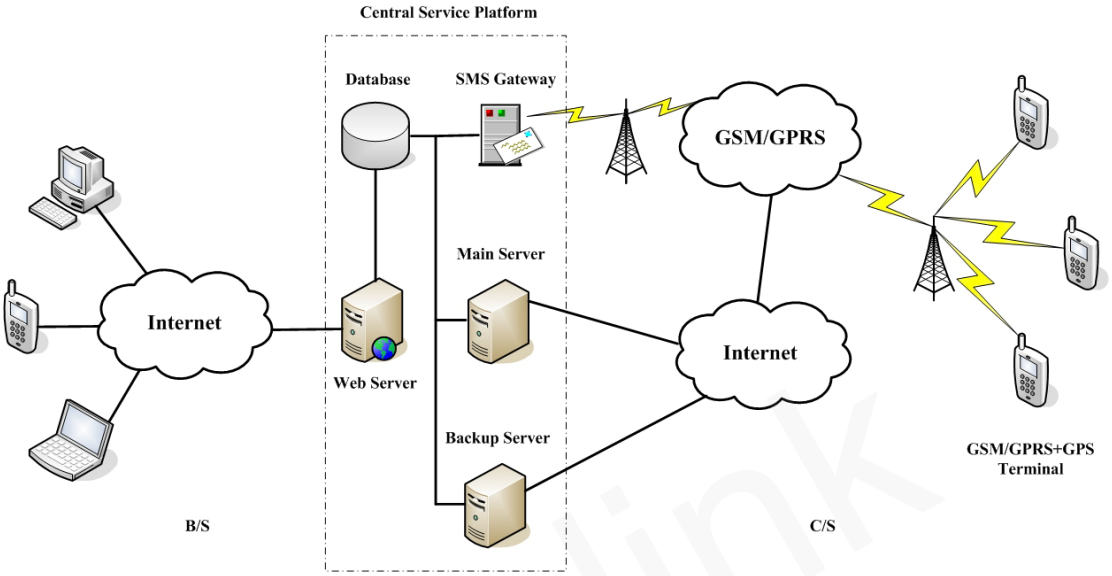
The @Track Air Interface Protocol is a digital communication interface based on printable ASCII characters over SMS or GPRS which is used for all communication between the backend server and the terminal. The backend server sends a command to the terminal and then the terminal confirms with an acknowledgement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

The purpose of this document is to describe how to build up the backend server based on the @Track Air Interface Protocol.

1.2. Terms and Abbreviation

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
HDOP	Horizontal Dilution of Precision
ICCID	Integrated Circuit Card Identity
IP	Internet Protocol
PLMN	Public Land Mobile Network
SMS	Short Message Service
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
UTC	Coordinated Universal Time

2. System Architecture



The backend server can be accessed by many terminals and should have the following abilities:

- ✧ The backend server should be able to access the internet and listen to the connection originating from the terminal.
- ✧ The backend server should be able to support a 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. Each message has the following format:

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 character '$'.
The characters 'XXX' identify the deferent message.
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 ASCII characters: '0'–'9', 'a'–'z', 'A'–'Z'.
Detailed descriptions of each message format are located in the specific 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 to perform 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:

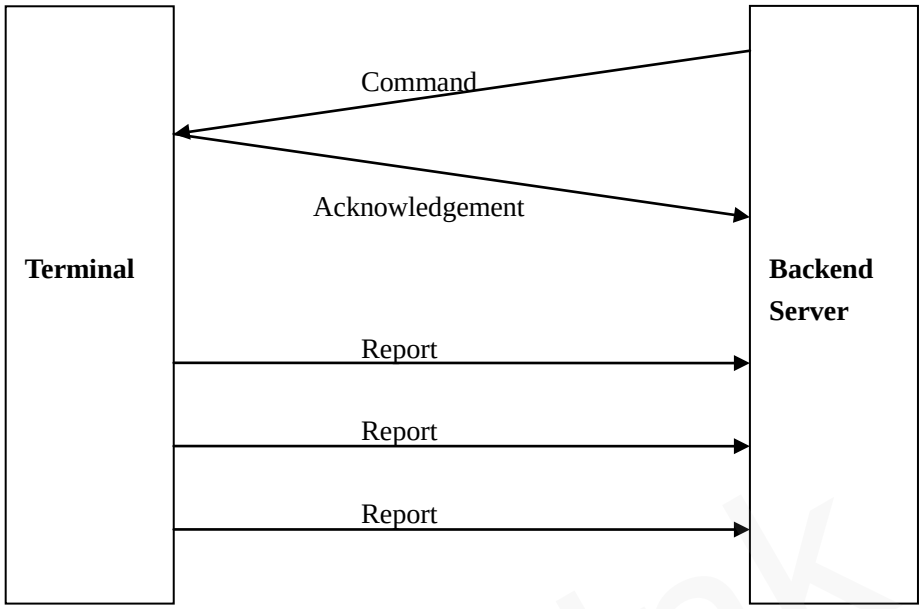


Figure **1**: @Tracker Protocol messages flow

3.2. Command And Acknowledgement

3.2.1. Bearer Setting Information

The command **AT+GTBSI** is used to configure the GPRS parameters.

➢ **AT+GTBSI=**

Example: **AT+GTBSI=gv55L,cmnet,,,,,,,0000$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
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 character of password is ‘0’ – 9’, ‘a’ –‘z’, ‘A’ –‘Z’. The default value is “gv55L”.
✧ <*APN*>: Access point name (APN).
✧ <*APN User Name*>: the GPRS APN user name. If the parameter field is empty, the current value of this parameter will be cleared.
✧ <*APN Password*>: the GPRS APN password. If the parameter field is empty, the current value of this parameter will be cleared.
✧ <*Reserved*>: Not used at present. Please keep empty.
✧ <*Serial Number*>: the serial number for the command. It will be invoked in the ACK message of the command.
✧ <*Tail Character*>: a character to indicate the end of the command. And it must be “$”.

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

➢ **+ACK:GTBSI,**

Example: **+ACK:GTBSI,100101,135790246811220,,0000,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Protocol Version*>: The protocol version that the terminal conforms to. The first two characters point out the device type. As in the example, "**10**" means GV55LITE. The middle two characters point out the major version number of protocol and the last two characters point out the minor version number of protocol. And both version numbers are hex digital. 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 equal to the <*Serial Number*> in the corresponding command to distinguish which command the ACK message is for.
- <*Send Time*>: The local time to send the ACK message.
- <*Count Number*>: A self-increasing count number in each acknowledgment message and report message. It begins from 0000 and increases by 1 for each message. And it rolls back after "FFFF".
- <*Tail Character*>: a character to indicate the end of the command. Must be "$".

Note:

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

3.2.2. Backend Server Register Information

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

➢ **AT+GTSRI=**

Example: **AT+GTSRI=gv55L,3,,1,116.226.44.17,7011,116.226.45.229,7012,+8613812341234,15,1,0,,0,,0001$** **AT+GTSRI=gv55L,3,,1,some.host.name,7011,116.226.45.229,7012,+8613812341234,15,1,0,,1,,0001$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
Report Mode	1	0 – 6	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|5 – 360min	0
SACK Enable	1	0|1	0
Protocol Format	1	0|1	0
Reserved	0		
Connection Retry Pattern	1	0 – 4	0
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

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

- 0: Stop reporting.
- 1: TCP short-connection preferred mode. The connection is based on TCP protocol. The terminal connects to the backend server every time it needs to send data and will shut down the connection when the terminal finishes sending data. And if it fails to establish TCP connection to the backend server (both Main Server and Backup Server), it will try to send data via SMS to the SMS gateway.
- 2: TCP short-connection forced mode. The connection is based on TCP protocol. The terminal connects to the backend server every time it needs to send data and will shut down the connection when the terminal finishes sending data. And if it fails to establish TCP connection to the backend server (both Main Server and Backup Server), it will store the data in the memory buffer if 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 heart beat data. The backend server should respond to the heart beat data from the terminals.
- 4. UDP mode. The terminal will send data to the backend server by UDP protocol. Receiving protocol commands via UDP is supported if the GPRS network allows it. It is recommended to enable heartbeat sending and **+RESP:GTPDP** report when UDP receiving is the case.
- 5: Force on SMS. Only use the SMS for transmitting.
- 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 fixed local port rather than random port to communicate with the server in this mode. Thus the backend server could use 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.

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

- 0: Disable the buffer report function.
- 1: Low priority. Enable the buffer report function. Under this working mode, the device will send the buffered messages after sending the normal messages.
- 2: High priority. Enable the buffer report function. Under this working mode, the device will send all the buffered messages before sending any normal message except for the SOS message (**+RESP:GTSOS**).

✧ <*Main Server IP / Domain Name*>: The IP address or the domain name of the primary server.

✧ <*Main Server Port*>: The port of the primary server.

✧ <*Backup Server IP*>: 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 SMS messages sending. Short code (for example: 10086) is also supported.

✧ <*Heartbeat Interval*>: the interval of sending heartbeat package message (**+ACK:GTHBD**)

when report mode is TCP long-connection mode or UDP mode. If set to 0, no heartbeat package message sending.

✧ <*SACK Enable*>: This defines whether the backend server should respond to the terminal with SACK message when receiving messages from the terminal.

- 0: the backend server does not reply SACK message after receiving message from the terminal.
- 1: the backend server replies SACK message when receiving any message from the terminal.

✧ <*Protocol Format*>: This defines the format of the report message sent from the device to the backend server. 0 means using the ASCII format, 1 means the HEX format.

✧ <*Connection Retry Pattern*>: This defines the method of terminal retrying to establish TCP connection with backend server when there is no valid connection at present. The 'Pattern' number is a mode included 3 Retry-Periods (unit is *'minute'*) each. 'Periods' are the time to wait to start next retry to make connection with backend server, which start from Period1. And if there is still not any chance to establish binding although after finishing 5 times of the former *'Period'*, terminal will trigger the later '*Period*', and then keep running with the last one, '*Period3*'. Also '*Period1'* will be triggered again and 5 times counting will restart as long as there is one chance of TCP binding accomplished or 'Pattern' changing or system reboot. These patterns are no effect for mode of UDP (Ref. <*Report Mode*>).

Retry Pattern: Period1 Period2 Period3

- 0: *3* *3* *3*
- 1: *1/3* *1* *3*
- 2: *1* *3* *10*
- 3: *3* *10* *20*
- 4: *3* *30* *60*

5 times Period1 -> Period2

5 times Period2 -> Period3

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

➢ **+ACK:GTSRI,**

Example: **+ACK:GTSRI,100101,135790246811220,,0001,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	

Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

3.2.3. Quick Start Setting

The command **AT+GTQSS** is used to configure the GPRS parameter and backend server information in one command if all these settings are within 160 bytes, otherwise use **AT+GTBSI** and **AT+GTSRI** in two steps.

- **AT+GTQSS=**

Example: **AT+GTQSS=gv55L,cmnet,,,3,,1,116.226.44.17,7011,116.226.45.229,7012,+8613812341234,15,1,0,,0,0002$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
APN	<=40		
APN User Name	<=30		
APN Password	<=30		
Report Mode	1	0 – 6	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|5 – 360min	0
SACK Enable	1	0|1	0
Protocol Format	1	0|1	0
Reserved	0		
Connection Retry Pattern	1	0 – 4	0
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

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

- **+ACK:GTQSS,**

Example: **+ACK:GTQSS,100101,135790246811220,,0002,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.4. Global Configuration

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

➢ **AT+GTCFG=**

Example: **AT+GTCFG=gv55L,123456,gv55lite,,,,,,,,,,,,,,,,,0,0003$** **AT+GTCFG=gv55L,,,1,123.4,0,,0,1,,2FF,,1,1,300,0,1,,,,0,0003$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
New Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	gv55lite
ODO Enable	1	0|1	0
ODO Initial Mileage	<=9	0.0 – 4294967.0Km	0.0
Reserved	0		
Reserved	0		
Report Composition Mask	<=4	0000 – FFFF	003F
Power Saving Mode	1	0 – 2	1
Reserved	0		
Event Mask	<=4	0000 – FFFF	3FFF
Reserved	0		
LED On	1	0|1	0
Info Report Enable	1	0|1	0
Info Report Interval	<=5	30 – 86400sec	300
Location By Call	1	0|1|2	0
Feature Switch Mask	2	00~FF	00
Reserved	0		
AGPS Mode	1	0|1	0
GSM Report	4	0000 – FFFF	000F
GPS Lost Time	2	0 – 30min	0
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*New Password*>: Set to change the current password.
- <*Device Name*>: An ASCII string to represent 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 report mask to configure the composition of report message, especially the GPS information composition.
  - Bit 0 for <*Speed*>
  - Bit 1 for <*Heading*>
  - Bit 2 for <*Altitude*>
  - Bit 3 for GSM tower data, including <*MCC*>, <*MNC*>, <*LAC*>, <*Cell ID*> and the <*reserved*> parameter "00"
  - Bit 4 for <*Mileage*>
  - Bit 5 for <*Send Time*>
  - Bit 6 for <*Device Name*>

  For each bit, set it to 1 to enable corresponding component in the report, 0 to disable. This mask is effective to all report messages.
- <*Power Saving Mode*>: Set mode of power saving function. If mode of power saving function is set to 1, the fixed report, geo-fence and speed alarm report functions are suspended when the engine is off. If mode of power saving function 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 power saving function
  - 1: Mode 1 of power saving function
  - 2: Mode 2 of power saving function
- <*Event Mask*>: Bitwise mask to configure which event report should be sent to the backend server.
  - Bit 0 for **+RESP:GTPNA**
  - Bit 1 for **+RESP:GTPFA**
  - Bit 2 is reserved
  - Bit 3 is reserved
  - Bit 4 is reserved
  - Bit 5 is reserved
  - Bit 6 is reserved
  - Bit 7 is reserved
  - Bit 8 is reserved
  - Bit 9 is reserved.
  - Bit 10 for **+RESP:GTPDP**
  - Bit 11 for the power on **+RESP:GTRTL**
  - Bit 12 for the ignition report **+RESP:GTIGN** and **+RESP:GTIGF**
  - Bit 13 for the ignition on location report **+RESP:GTIGL**

  For each bit, set it to 1 to enable corresponding event report, 0 to disable.
- <*LED On*>: Configure the working mode of power LED and GPS LED.

- 0: Each time the device powers on, both LED's will work for 30 minutes and then are turned off deadly.
- 1: turn on Power LED and GPS LED if necessary.

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

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

✧ <*Info Report Interval*>: The interval of reporting the device information.

✧ <*Location By Call*>: Configure how to handle the incoming call.

- 0: Just hang up the call.
- 1: Hang up the call and report the current position (**+RESP:GTLBC**).
- 2: Hang up the call and report the current position with Google Map link through SMS to the phone number of the incoming call.

✧ <*Feature Switch Mask*>: Defind some work feature switch by bit mask. '0' is disable, '1' is enable.

- Bit 0: Working start upon device boot on, not waiting for GSM available.

✧ <*AGPS Mode*>: A numeric to indicate whether to enable AGPS. AGPS is helpful to improve the ratio to get GPS position successfully and reduce the time to get GPS position.

- 0: Disable the AGPS function.
- 1: Enable the AGPS function.

✧ <*GSM Report*>: Control how or when to report cells' information.

Bit 14 – 15, the 2 high bits mean GSM report mode

- 0: Not allow the cells' information report.
- 1: Allow the cells' information report after failed to get GPS position if cell's information available.
- 2: Report the message **+RESP: GTGSM** after getting GPS position successfully every time if cell's information available.
- 3: Report the message **+RESP:GTGSM** no matter what result of getting GPS position every time if cell's information available.

Bitwise mask to configure which event report should be sent to the backend server.

- Bit 0 for **+RESP:GTRTL**
- Bit 1 for **+RESP:GTLBC**
- Bit 2 for **+RESP:GTFRI**
- Bit 3 for **+RESP:GTSOS**
- Bit 4 – 13 are reserved

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

✧ <*GPS Lost Time*>: A time parameter to monitor the GPS signal. If the device stays <*GPS Lost Time*> consecutively without GPS signal or without successful GPS fix, it will send the event report **+RESP:GTGSS** to indicate the GPS signal lost. When the GPS signal is recovered or a successful fix obtained again, the device will send the event report **+RESP:GTGSS** to

indicate the recovery. 0 means disable this function.

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

- **+ACK:GTCFG,**

Example: **+ACK:GTCFG,100101,135790246811220,,0003,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.5. Digital Output

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

The digital output 1 is a latched output. The final status of the output will be latched during power off. It supports only wave shape 1.

Wave shape 1:

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

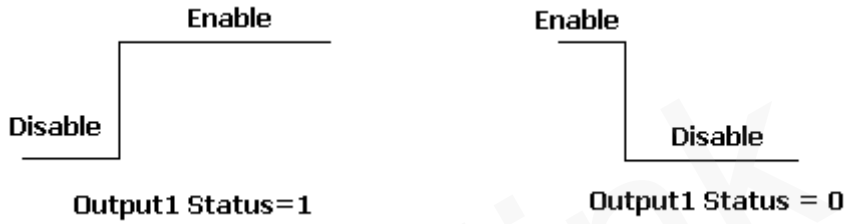


Figure **2**: Wave Shape 1

Wave shape 2:

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

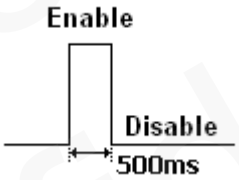


Figure **3**: Wave Shape 2

Wave shape 3:

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

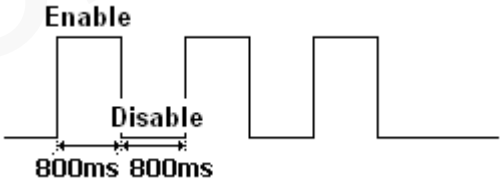


Figure **4**: Wave Shape 3

➢ **AT+GTOUT=**

Example: **AT+GTOUT=gv55L,1,,,0,0,0,,,,1,,,,,,,0004$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**

Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
Output1 Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Output2 Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Reserved	0		
Reserved	0		
Reserved	0		
DOS Report	1	0-3	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Output1 – 2 Status*>: Used only for the wave shape 1 as shown in **Figure** 2 to set the final status of the output port.
  - 0: Disable status.
  - 1: Enable status.
- <*Duration*>: Please refer to **Figure** 2, **Figure** 3 and **Figure** 4. Unit is 100ms.
- <*Toggle Times*>: Please refer to **Figure** 2, **Figure** 3 and **Figure** 4.
- <*DOS Report*>: A bitwise value to control how 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 represented output is changed with wave shape 1.
  - Bit 0: output 1.
  - Bit 1: output 2.

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

- **+ACK:GTOUT,**

Example: **+ACK:GTOUT,100101,135790246811220,,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	$	$

3.2.6. Digital Input Port Setting

The command **AT+GTDIS** is used to configure the parameters of 2 digital input ports. Input <*Ignition Detection*> is dedicated for ignition detection. The rest one inputs are customizable. If the logical status is changed on the digital input port, the device will report message **+RESP:GTDIS** to the backend server.

➢ **AT+GTDIS=**

Example: **AT+GTDIS=gv55L,0,2,,,1,1,4,,,,,,,,,,,,0005$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
Ignition Detection	1	0	0
Sample Period	<=2	0|1 – 12(×2s)	1
Reserved	0		
Reserved	0		
Input ID 1	1	1	1
Enable	1	0|1	0
Debounce Time	<=2	0 – 20(×10ms)	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	

Tail Character	1	$	$

- ✧ <*Ignition Detection*>: ID of the ignition detection port.
- ✧ <*Input ID 1*>: the digital input port ID.
- ✧ <*Sample Period*>: the sampling period of the non-interruptible input port.
- ✧ <*Enable*>: Enable or disable the interrupt input.
  - 0: Disable
  - 1: Enable
- ✧ <*Debounce Time*>: The time for interruptible input port debouncing.

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

- ➢ **+ACK:GTDIS,**

Example: **+ACK:GTDIS,100101,135790246811220,,0005,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.7. Input/Output Port Binding

This command is used to configure the user defined output-port action triggered by input ports. If the IO combination is set and the corresponding condition appears, the device will output specified wave shape on the specified output port. Otherwise, the device will restore the initial status of the specified output port. And the device will report message **+RESP:GTIOB** to the backend server when the logical status of bound input ports changes.

➢ **AT+GTIOB=**

Example: **AT+GTIOB=gv55L,1,F,A,3,1,0,8,3,,,,,0006$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
IOB ID	1	0 – 3	
Input Mask	1	0 – 3	0
Trigger Mask	1	0 – 3	0
Input Sample Period	<=2	0|1 – 12(×2s)	0
Output ID	1	0 – 2	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*IOB ID*>: ID of the user defined IO binding.

✧ <*Input Mask*>: Bitwise mask for input ports composition. Each bit, from bit 0 to bit 1, represents one digital input port. Set to 1 to enable and 0 to disable corresponding input port.

- bit0: ignition detection
- bit1: digital input 1

✧ <Trigger Mask>: bitwise mask for trigger condition composition of the corresponding input ports. Each bit, from bit 0 to bit 1, represents the logical status of the corresponding input port to trigger the IOB event. Set to 1 to use enable status as the trigger condition and 0 to use

disable status. Only when the logical status of all the input ports in one IO binding meets the trigger condition is the IOB event triggered.

- bit0: ignition detection
- bit1: digital input 1

✧ <*Input Sample Period*>: The period to check the status of all the digital input ports in one IO binding. **AT+GTIOB** and **AT+GTDIS** use independent sample period to check the input port status even for the same input port.

✧ <*Output ID*>: ID of the output port to output specified wave when the trigger condition meets. 0 means no wave will be output.

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

➢ **+ACK:GTIOB,**

Example: **+ACK:GTIOB,100101,135790246811220,,1,0006,20090214093254,11F0$**			
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' '-' '_'	
IOB ID	1	0 – 2	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.8. External Power Supply Monitoring

The command **AT+GTEPS** is used to configure the parameters of 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 an alarm message **+RESP:GTEPS** to the backend server to notify the status of the external power supply.

➢ **AT+GTEPS=**

Example: **AT+GTEPS=gv55L,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'	gv55L
Mode	1	0|1|2	0
Min Threshold	<=5	250 – 32000 mV	0
Max Threshold	<=5	250 – 32000 mV	0
Sample Period	<=2	0|1 – 12(×2s)	0
Debounce Time	1	0 – 5 (×1s)	0
Output ID	1	0 – 2	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Sync with FRI	1	0|1	0
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: Working mode of the external power supply monitoring.

- 0: Disable the external power supply monitoring.
- 1: Enable the external power supply monitoring. 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. 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 to measure the external power supply.
- <*Debounce Time*>: The time for debouncing to avoid exceptional voltage drop of the external power supply.
- <*Output ID*>: Specify the ID of the output port (1 to 2) to output specified wave shape when the **+RESP:GTEPS** alarm is triggered. If set to 0, no output wave.
- <*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 with fixed report message.
  - 1: Report external power supply voltage with fixed report message.

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

➢ **+ACK:GTEPS,**

Example: **+ACK:GTEPS,100101,135790246811220,,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	$	$

3.2.9. Fixed Report Information

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

➢ **AT+GTFRI=**

Example:
AT+GTFRI=gv55L,0,,,,,,,,,,,,,,,0009$
AT+GTFRI=gv55L,1,1,,1,1000,2300,,30,,,,,600,,,,,0009$
AT+GTFRI=gv55L,2,1,,1,1000,2300,,,500,,,,,,,,0009$
AT+GTFRI=gv55L,3,1,,1,1000,2300,,,,1000,,,,,,,0009$
AT+GTFRI=gv55L,4,1,,1,1000,2300,,60,,300,,,,,,,0009$
AT+GTFRI=gv55L,5,1,,1,1000,2300,,60,,300,,,,,,,0009$

Parameter	Length(byte)	Range/Format	Default
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
Mode	1	0 – 5	0
Discard No Fix	<=2	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	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.

- 0: Disable this function.
- 1: Fixed Timing Report. The positional report message is sent to the backend server periodically according to the parameter <*Send Interval*>.
- 2: Fixed Distance Report. The positional report message is sent to the backend server when the straight-line distance between the current GPS position and the last sent GPS position is greater than or equal to the distance specified by parameter <*Distance*>. This function need connect the vehicle ignition signal to the specified digital input port of the device.
- 3: Fixed Mileage Report. The positional report message is sent to the backend server when the path length between the current GPS position and the last sent GPS position is greater than or equal to the mileage specified by parameter <*Mileage*>. This function need connect the vehicle ignition signal to the specified digital input port of the device.
- 4: Optimum Report. Simultaneously observe both time interval and path length between two adjacent reports. Report device position if the calculated time interval per current time against the last report time is greater than the <*Send Interval*>, and the length of path between the current position and the last position is greater than the <*Mileage*> setting. This function need connect the vehicle ignition signal to the specified digital input port of the device.
- 5: Fixed Time or Mileage Report. Simultaneously observe both time interval and path length between two adjacent reports. Report device position if the calculated time interval per current time against the last report time is greater than the <*Send Interval*>, or the length of path between the current position and the last position is greater than the <*Mileage*> setting. This function need connect the vehicle ignition signal to the specified digital input port of the device.

Note: If the engine is off, the positional report message is sent to the backend server periodically according to the parameter <*IGF Report Interval*>.

✧ <*Discard No Fix*>: Disable/enable reporting when there is no GPS fixing

- 0: Enable reporting
- 1: Disable reporting

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

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

✧ <*Send Interval*>: Period to send the position information. The value range is 5 – 86400 and the unit is second. If <*report mode*> in **AT+GTSRI** is set to force on SMS, this should be greater than 15 seconds.

✧ <*Distance*>: the specified distance to send the position information when <*Mode*> is 2. Unit: meter.

✧ <*Mileage*>: the specified length to send 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 to disable the corner report. For other values, the device will compare the current heading with the last known corner, if the difference is greater than or equal to this value, send the corner report with **+RESP:GTFRI**.

✧ <*IGF Report Interval*>*:* Period to fix and send the position information when <*Power Saving Mode*> in **AT+GTCFG** is set to 2 and the engine is off and if <*Mode*> is set to 1 (Fixed Timing Report). Its value range is 5 – 86400 and the unit is second.

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

➢ **+ACK:GTFRI,**

Example: **+ACK:GTFRI,100101,135790246811220,,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	$	$

3.2.10. Geo-Fence Information

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

➢ **AT+GTGEO=**

Example: **AT+GTGEO=gv55L,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'	gv55L
GEO ID	1	0 – 4	
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	1	0 – 2	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*GEO ID*>: ID of the Geo-Fence. Total five zones, 0 to 4, 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.

✧ <*Longitude*>: The longitude of a point which is defined as the center of the Geo-Fence circular 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 minus " - " and east longitude is defined as positive without "+".

✧ <*Latitude*>: The latitude of a point which is defined as the centre of the Geo-Fence circular 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 minus " - " and north Latitude is defined as positive without "+".

✧ <*Radius*>: The radius of the Geo-Fence circular region. The value range is (50 – 6000000) and the unit is meter.

✧ <*Check Interval*>: The interval of GPS checking for the Geo-Fence alarm.

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

➢ **+ACK:GTGEO,**

Example: **+ACK:GTGEO,100101,135790246811220,,0,000A,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
GEO ID	1	0 – 4	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.11. Speed Alarm

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

➢ **AT+GTSPD=**

Example: **AT+GTSPD=gv55L,1,80,120,60,300,1,1,0,0,,,,,,,,,,,,000C$** **AT+GTSPD=gv55L,2,80,120,60,300,1,1,0,0,,,,,,,,,,,,000C$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
Mode	1	0|1|2|3	0
Min Speed	<=3	0 – 400km/h	0
Max Speed	<=3	0 – 400km/h	0
Validity	<=4	15 – 3600sec	60
Send Interval	<=4	30 – 3600sec	300
Output ID	1	0 – 2	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=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		
Reserved	0		
Serial Number	4	0000 – FFFF	

Tail Character	1	$	$

✧ <*Mode*>: The working mode of the speed alarm.
- 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 or outside the speed range defined by <*Min Speed*> and <*Max Speed*>. In this mode, <*Send Interval*> will be ignored.

✧ <*Min Speed*>: The lower limit speed.

✧ <*Max Speed*>: The upper limit speed.

✧ <*Validity*>: If the speed meets the alarm condition and maintains a period of time defined by <*Validity*>, the speed alarm will be triggered.

✧ <*Send Interval*>: The interval time of sending speed alarm message.

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

➢ **+ACK:GTSPD,**

Example: **+ACK:GTSPD,100101,135790246811220,,000C,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.12. SOS Function

This command is used to configure the specified input port for emergency. When an emergency occurs, the end user can use this input port to trigger the emergency call and report position message **+RESP:GTSOS** to the backend server. A specified wave shape can be configured to output on specified output port.

➢ **AT+GTSOS=**

Example: **AT+GTSOS=gv55L,1,1,+8613812341234,1,1,0,0,,,,,000D$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
Mode	1	0 – 2	0
Digital Input ID	1	0|1	0
SOS Number	<=20		
Output ID	1	0– 2	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=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 SOS function.
- 0: Disable SOS function.
- 1: Send the current position to the backend server via GPRS only.
- 2: Send the current position to the SOS Number via SMS only.

✧ <*Digital Input ID*>: ID of the digital input port which triggers the SOS function. 0 means the SOS function is disabled. The corresponding digital input port should be configured by the command **AT+GTDIS** first. If configured to trigger the SOS function, there is no **+RESP:GTDIS** report message for the specified digital input port.

✧ <*SOS number*>: the emergency phone number.

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

➢ **+ACK:GTSOS,**

Example: **+ACK:GTSOS,100101,135790246811220,,000D,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	$	$

3.2.13. Harsh Behavior Monitoring

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

➢ **AT+GTHBM=**

Example: **AT+GTHBM=gv55L,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'	gv55L
Enable	1	0|1	0
Reserved	0		
Reserved	0		
High Speed	<=3	100 – 400km/h	100
ΔVhb	<=3	0 – 100km/h	0
ΔVha	<=3	0 – 100km/h	0
Reserved	0		
Medium Speed	<=3	60 – 100km/h	60
ΔVmb	<=3	0 – 100km/h	0
ΔVma	<=3	0 – 100/km/h	0
Reserved	0		
Reserved	0		
ΔVlb	<=3	0 – 100/km/h	0
ΔVla	<=3	0 – 100/km/h	0
Reserved	0		
Output ID	1	0 – 2	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0

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

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

- < *Mode*>: Working mode.
  - 0: Disable this function
  - 1: Enable this function.
- <*High Speed*>, <*Medium Speed*>: If the last known speed of the device read from GPS is greater or equal to <*High Speed*>, the vehicle that the device is attached to is considered to be high speed. If the last known speed is less than <*High Speed*> while greater or equal to <*Medium Speed*>, the vehicle is considered to be medium speed. If the last known speed is less than <*Medium Speed*>, the vehicle is considered to be low speed.
- <Δ*Vhb*>: The threshold for harsh braking in high speed level. If within 5 seconds, the current speed is less than the last known speed and the change of the speed is greater than or equal to this value, a harsh braking is detected in high speed level. If set to 0, do not monitor harsh braking behavior in high speed level.
- <Δ*Vha*>: The threshold for harsh acceleration in high speed level. If within 5 seconds, the current speed is greater than the last known speed and the change of the speed is greater than or equal to this value, a harsh acceleration is detected in high speed level. If set to 0, do not monitor harsh acceleration behavior in high speed level.
- <Corner>: The threshold for corner.
- <Δ*Vmb*>: The threshold for harsh braking in medium speed level. If within 5 seconds, the current speed is less than the last known speed and the change of the speed is greater than or equal to this value, a harsh braking is detected in medium speed level. If set to 0, do not monitor harsh braking behavior in medium speed level.
- <Δ*Vma*>: The threshold for harsh acceleration in medium speed level. If within 5 seconds, the current speed is greater than the last known speed and the change of the speed is greater than or equal to this value, a harsh acceleration is detected in medium speed level. If set to 0, do not monitor harsh acceleration behavior in medium speed level.
- <Δ*Vlb*>: The threshold for harsh braking in low speed level. If within 5 seconds, the current speed is less than the last known speed and the change of the speed is greater than or equal to this value, a harsh braking is detected in low speed level. If set to 0, do not monitor harsh braking behavior in low speed level.

- ✧ <Δ*Vla*>: The threshold for harsh acceleration in low speed level. If within 5 seconds, the current speed is greater than the last known speed and the change of the speed is greater than or equal to this value, a harsh acceleration is detected in low speed level. If set to 0, do not monitor harsh acceleration behavior in low speed level.
- ✧ <*Output ID*>: Specify the ID of the output port (1 to 2) to output specified wave shape when the harsh behavior is detected. If set to 0, no output wave.

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

- ➢ **+ACK:GTHBM,**

Example: **+ACK:GTHBM,100101,135790246811220,,0010,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.14. Time Adjustment

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

➢ **AT+GTTMA=**

Example: **AT+GTTMA=gv55L,-,3,30,0,20090917203500,,,,,0011$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
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*>: Indicate the positive or negative of the local time offset to UTC
✧ <*Hour Offset*>: UTC offset in hours
✧ <*Minute Offset*>: UTC offset in minutes
✧ <*Daylight Saving*>: Enable/disable daylight saving time.
- 0: Disable daylight saving
- 1: Enable daylight saving

✧ <*UTC time*>: UTC time to adjust the local time.

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

➢ **+ACK:GTTMA,**

Example:

+ACK:GTTMA,100101,135790246811220,,0011,20090214093254,11F0$			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{‘A’ – ‘Z’,’0’ – ‘9’}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.15. Outside Working Hours

To protect the privacy of the driver when they are off duty, the device could be configured to report empty location information during the outside working hours. The command **AT+GTOWH** is used to define the working hours and the working mode to protect the privacy. When this function is enabled, the device will report empty latitude, empty longitude, (or fill with fake '054C5638' in hex report) empty gsm cell information in all the report messages except for **+RESP:GTSOS**.

➢ **AT+GTOWH=**

Example: **AT+GTOWH=gv55L,1,1F,0900,1200,1300,1730,,,1,1,1,0,0,,,,,0012$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
Mode	1	0|1|2|3	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		
Digital Input ID	1	0 – 1	0
Output ID	1	0 – 2	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: Working mode.

- 0: Disable this function.
- 1: Manual mode. By using the equipment connected to the specified digital input, the driver manually enable the time checking. If the device finds it is outside the working hours, it will hide the location information in the report messages. Otherwise report normally.
- 2: Full manual mode. By using the equipment connected to the specified digital input, the driver has full control to the privacy protection. The device will not check the time against the working hours arrange. It just hides the location information when the input is enabled and reports normally when the input is disabled.
- 3: Automatic mode. Under this mode, the device will ignore the status of the digital input. It will automatically check the current time against the working hours arrange. If outside the working hours, hide the location information. Otherwise report normally.

✧ <*Day of Work*>: Specify 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, 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.

✧ <*Digital Input ID*>: The input ID used to trigger this function when mode is 1. The working parameter of the specified input must be set by **AT+GTDIS** first. If using interruptible digital input, please connect slide button instead of tact button to that input for this function.

✧ <*Output ID*>, <*Output Status*>, <*Duration*> and <*Toggle Times*>: When this function is enabled and current is off duty time, the specified wave will be output to the specified output.

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

➢ **+ACK:GTOWH,**

Example: **+ACK:GTOWH,100101,135790246811220,,0012,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{‘A’ – ‘Z’,’0’ – ‘9’}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	

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

3.2.16. 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 exceptional status for a long time. Besides these two automatically reboot method, the device also supports to use the digital input to trigger the reboot manually.

➢ **AT+GTDOG=**

Example: **AT+GTDOG=gv55L,1,,1,0130,,1,1,,60,60,,0013$** **AT+GTDOG=gv55L,2,30,,,,1,1,,,,,0013$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
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
Input ID	1	0|1	0
Reserved	0		
GSM interval	4	0|5-1440	60
PDP interval	4	0|5-1440	60
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: Working mode.
- 0: Disable this function
- 1: Reboot periodically according to the <*Interval*> and <*Time*> setting.
- 2: Reboot when ignition on.

✧ <*Ignition Frequency*>: When the working mode is 2, if the time interval between two adjacent ignitions is greater than the specified value, the device will automatically reboot upon ignition on.

✧ <*Interval*>: The interval to reboot the device in day.

✧ <*Time*>: At what time to perform the reboot operation when <*Interval*> is met.

✧ <*Report Before Reboot*>: Whether to report the **+RESP:GTDOG** message before reboot. 0

means no report, 1 to report. If this is enabled, the device will make a real-time location before sending the message in order to send it with the current location information.

- ✧ <*Input ID*>: ID of the digital input port which is used to trigger the manually reboot. 0 means do not use manual reboot. Only digital input port 1 is supported.
- ✧ <*GSM Interval*>: The time before rebooting the device if there is no GSM coverage. 0 means do not reboot the device.
- ✧ <*PDP Interval*>: The time before rebooting the device if it is failed to activate GPRS. 0 means do not reboot the device.

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

- ➢ **+ACK:GTDOG,**

Example: **+ACK:GTDOG,100101,135790246811220,,0013,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.17. 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, use this command to let the device auto-unlock the SIM PIN with the pre-set PIN code.

➢ **AT+GTPIN=**

Example: **AT+GTPIN=gv55L,1,0000,,,,,,0014$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
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*>: 1 to enable the auto-unlock PIN function, 0 to disable.

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

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

➢ **+ACK:GTPIN,**

Example: **+ACK:GTPIN,100101,135790246811220,,0014,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	

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

3.2.18. Real Time Operation

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

➢ **AT+GTRTO=**

Example: **AT+GTRTO=gv55L,A,,,,,,0015$** **AT+GTRTO=gv55L,2,CFG,,,,,0015$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
Sub Command	1	0 – C	
Sub AT Command	3		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Sub Command*>: Valid value is 0–9, A, B，C.

- 0: ***GPS***. Get the GPS related information via message **+RESP:GTGPS**.
- 1: ***RTL***. Request the terminal to report its current position immediately via message **+RESP:GTRTL**.
- 2: ***READ***. Get the current configuration of the terminal via message **+RESP:GTALL**.
- 3: ***REBOOT***. Reboot the terminal.
- 4: ***RESET***. Reset all parameters to factory setting, and clear all buffer messages. Parameters configured by **AT+GTBSI** and **AT+GTSRI, AT+GTCFG and AT+GTTMA, 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 message **+RESP:GTCID**.
- 7: ***CSQ***. Get the current GSM signal level of the terminal via message **+RESP:GTCSQ**.
- 8: ***VER***. Get the version information of the device via message **+RESP:GTVER**.
- 9: ***BAT***. Get the external adapter status of the terminal via message **+RESP:GTBAT**.
- A: ***IOS***. Get status of all the IO ports via message **+RESP:GTIOS**.
- B: ***TMZ***. Get the time zone settings via message **+RESP:GTTMZ**.

- C: ***GIR***. Get cell information via message **+RESP:GTGSM**.

✧ <Sub AT Command>: Including all the AT commands we defined which save configuration parameters in the device. For example, if you want to get configuration of **AT+GTFRI**, please set **AT+GTRTO=gv55L,2,FRI,,,,,0015$,** and then get it from **+RESP:GTALS**.

✧ *Exception: To get local time information, please use "TMZ".*

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

➢ **+ACK:GTRTO,**

Example: **+ACK:GTRTO,100101,135790246811220,,IOS,0015,20090214093254,11F1$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Sub Command	<=6	Sub Command String	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

3.2.19. Hour Meter Counter

The command **AT+GTHMC** is used to measure the accumulated time of use with each actuation of the ignition on. To use this command, the ignition signal must be connected to the device. When the device sends **+RESP:GTFRI, +RESP:GTIGN** or **+RESP:GTIGF** message, <*hour meter counter*> will be involved into these reports.

➢ **AT+GTHMC=**

Example: **AT+GTHMC=gv55L,1,12345:12:34,,,,,,,,0018$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
Hour Meter Enable	1	0|1	0
Initial Hour Meter Count	11	00000:00:00-99999:00:00	00000:00:00
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Hour Meter Enable*>: Enable or disable hour meter counter function. If hour meter counter function is enabled, hour meter count will be increased when the device is in ignition.
- 0: Disable hour meter counter function
- 1: Enable hour meter counter function

✧ <*Initial Hour Meter Count*>: Initial hours meter count. It is formatted with 5 hour digits and 2 minute digits and 2 second digits and ranges from 00000:00:00– 99999:00:00. When ignition is on at 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 **AT+GTHMC** command:

➢ **+ACK:GTHMC,**

Example: **+ACK:GTHMC,100101,135790246811220,,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	$	$

3.2.20. Jamming Detection

The command **AT+GTJDC** is used to configure the parameter for jamming detection. When the detection condition is matched, the device will report **+RESP:GTJDR** event message to the backend server.

➢ **AT+GTJDC=**

Example: **AT+GTJDC=gv55L,1,10,40,,,,,1,1,15,5,,0019$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
Mode	1	0|1	0
Signal Threshold	<=3	0 – 255	10
C1 Threshold	<=3	0 – 255	40
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Output ID	1	0 – 2	0
Output Status	1	0|1	0
Duration	<=3	0～255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: Working mode.
- 0: Disable this function.
- 1: Enable this function.

✧ <*Signal Threshold*>, <*C1 Threshold*>: The built-in jamming detection algorithm uses these two parameters to judge whether the device is currently being jammed. The smaller the parameter, the more sensitive.

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

➢ **+ACK:GTJDC,**

Example: **+ACK:GTJDC,100101,135790246811220,,0019,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.21. 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 or voice monitoring functions.

➢ **AT+GTWLT=**

Example: **AT+GTWLT=gv55L,1,1,2,13813888888,13913999999,,,,,0018$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
Call Filter	1	0|1	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*>: The working mode of this function.
- 0: Disable this function. Allow any phone number to use the location by call.
- 1: White list for location by call. Only phone numbers saved in the white list could use the location by call function.

✧ <*Start Index*>, <*End Index*>: The index range of the white list to which the phone numbers are to be updated. For example, the <*Start Index*> is set to 1 and the 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*> defines the total amount of phone numbers that will be updated. If either one is empty, there should be no <*Phone Number List*> parameter followed.

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

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

➢ **+ACK:GTWLT,**

Example: **+ACK:GTWLT, 100101,135790246811220,,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*:**

It is necessary to make sure the total size of the command is not greater than 160 if it is sent via SMS.

3.2.22. Preserve special device logical state Setting

The command AT+GTPDS is used to preserve special device logical state for the terminal.
The special logical states chosen by the value of component mask will be preserved or reset according to the mode.

➢ **AT+GTPDS=**

Example: AT+GTPDS=gv55L,1,1F,,,,,,,FFFF$			
Parameter	Length(byte)	Range/Format	Default
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
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* >:

- 0: Disable this function
- 1: Preserve special device logical state according to the value of the MASK
- 2: Reset all the special device logical states list in the <Mask> after receiving the command, and then preserve special device logical state according to the value of the <Mask>

✧ < *Mask* >: Bitwise mask to configure which device states will be preserved.
Each bit represents a state.

- Bit 0: States of GEO
- Bit 1: Reserved bit
- Bit 2: Reserved bit
- Bit 3: Information of last known position
- Bit 4: State of ignition
- Bit 5: State of wave shape 1

The acknowledgment message of AT+GTPDS command:

➢ +ACK:GTPDS,

Example: +ACK:GTPDS, **0F0101**,135790246811220,,000D,20090214093254,FFFF$			
Parameter	Length(byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X∈{ A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.23. Roaming Detection Configuration

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

➢ **AT+GTRMD=**

Example: **AT+GTRMD=gv55L,0,,,,,1,2,46000F,46002F,,,1,1,,,,2,2,,,,1f,,,1f,,,,,0,0,0,0,,,0001$** **AT+GTRMD=gv55L,1,,,,,1,3,46000,46002,46003,,,2,2,46007,,,1,1,46001,,,3fff,,,2ff,,,,,0,0,0,0,,,0002$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
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		
Black Operator Start	<=2	1-20	
Black Operator End	<=2	1-20	
Black Operator List	<=6*20		
Reserved	0		
Reserved	0		
Known Roaming Event Mask	<=6	000000 – FFFFFF	3FFF
Reserved	0		

Reserved	0		
Unknown Roaming Event Mask	<=6	000000 – FFFFFF	3FFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Output ID	1	0 – 2	0
Output Status	1	0|1	
Duration	<=3	0～255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Mode*>: Working mode.
  - 0: Disable this function.
  - 1: Enable this function.
- <*Operator Start*>: A numeric to indicate the first index of the white operator number to input. For example, if it is **1**, it will update the white operator list from the **1**st one. If it is empty, it should not include white number list later.
- <*Operator End*>: A numeric to indicate the last index of the white operator number to input. For example, if it is **2**, it will update the white operator list until the **2**nd one. If it is empty, it should not include white number list later.
- <*Home Operator List*>: A PLMN operator white number list. The numbers include MCC and MNC, consisting of 3-digi number each, or the last digi of MNC can be omitted (e.g. '46001F' or '46001' is the PLMN of 'CHINA UNICOM'). The operators in this list will be treated as not in 'Home' state. And two close operator numbers are separated with '**,**'. The number of the operator in the list is up to the parameter <Operator Start> and <Operator End>. For example, if <Operator Start> is **1** and is <Operator End> **2**, the operator list should include **2** operator numbers (also accept empty) and the two numbers are separated by with '**,**'. Using type of 'MCCFF' is able to cover a whole country, for example '460FF' coverd whole country mobile network in China.
- <*Roaming Operator List* >: It mostly likes the <Home Operator List>, the different is the operators in this list will be treated as the 'Known roaming' state.
- < *Black Operator List* >: It mostly likes the <Home Operator List>, the different is the operators in this list will be treated as 'Blocking report' state. In this state device works in

normal but all report will be buffered for no sending.

Operators that are not in <Home Operator List>,<Roaming Operator List> and <Black Operator List > will be treated as 'Unknown Roaming' state.

✧ <*Known Roaming Event Mask*>: Bitwise mask to configure which event report should be sent to the backend server when GSM roam state is detected. If the roaming state is a 'Known Roaming', the <Known Roaming Event Mask> will be acting; else the <Unknown Roaming Event Mask> will be acting.

- Bit 0 for **+RESP:GTPNA**
- Bit 1 for **+RESP:GTPFA**
- Bit 2 is reserved
- Bit 3 is reserved
- Bit 4 is reserved
- Bit 5 is reserved
- Bit 6 is reserved
- Bit 7 is reserved
- Bit 8 is reserved
- Bit 9 is reserved
- Bit 10 for **+RESP:GTPDP**
- Bit 11 for the power on **+RESP:GTRTL**
- Bit 12 for the ignition report **+RESP:GTIGN** and **+RESP:GTIGF**
- Bit 13 for the ignition on location report **+RESP:GTIGL**
- Reserved
- Others is Reserved

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

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

✧ <*Output ID*>, <*Output Status*>, <*Duration*> and <*Toggle Times*>: When this function is enabled and Roaming is detected, the specified wave will be output to the specified output.

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

➢ **+ACK:GTRMD,**

Example: **+ACK:GTRMD,010100,135790246811220,,0000,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=10	'0' – '9' 'a' – 'z' 'A' – 'Z'	

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

***Note*:**

It is restricted via Manage Tool (but not for sending via GPRS) that only no more than 180 bytes of an AT command string could be accepted by device.

As GTRMD contains large configuration information in PLMN code list, make good use of <Start index>, <End index> to avoid over 180 bytes. Also a color alert will occur on Command Text Box with yellow if it happened while using Manage Tool.

3.2.24. Frequency Change of Fixed Report Information

The command **AT+GTFFC** is used to change the parameters of fixed report when certain event occurs to match the request of different report interval according to the need. When the event disappears, the device will resume its previous settings.

The device supports up to 5 sets of parameter 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=gv55L,0,1,0,,,,,,,30,500,500,300,,0,,,,,0000$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
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	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 to the event which triggers the parameter change for fixed report. 0 is the highest priority.
- ✧ <*Mode*>: Specify the trigger event to change the fixed report parameters.
  - 0: Disable the parameters in the specified priority.
  - 1: Change the fixed report parameter when the device enters into any of the defined Geo-Fence.
  - 2: Change the fixed report parameter when the device enters into GSM known roaming state. （ref. GTRMD）

    3: Change the fixed report parameter when the device enters into GSM unknown 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 'Timing Report'.
  - 2: Change the working mode to 'Distance Report'.
  - 3: Change the working mode to '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*>: Period to send the position information when ignition is on. The value range is 5 – 86400 and the unit is second.
- ✧ <*FRI Report Distance*>: The specified distance to send the position information when change to fixed distance report. Unit: meter.
- ✧ <*FRI Report Mileage*>: The specified path length to send the position information when change to fixed mileage report or optimum report. Unit: meter.
- ✧ <*FRI IGF Report Interval*>: Period to fix and send the position information when ignition is off if <*Power Saving Mode*> in **AT+GTCFG** is set to0|2. The value range is 5 – 86400 and the unit is second.
- ✧ <*Corner Report*>: The threshold to determine whether the device is turning around a corner. 0 to disable the corner report. For other values, the device will compare the current heading with the last known corner, if the difference is greater than or equal to this value, send the corner report with **+RESP:GTFRI**.

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

- ➢ **+ACK:GTFFC,**

Example: **+ACK:GTFFC,060100,135790246811220,,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	$	$

3.2.25. GPS Jamming Status Report

The command **AT+GTGPJ** is used to configure the parameter for GPS jamming status detection. When GPS jamming has been detected or suspected by the receiver, the device will report **+RESP: GTGPJ** event message to the backend server.

➢ **AT+ GTGPJ=**

Example: **AT+GTGPJ=gv55L,1,15,3,,,,,1,1,15,5,,0019$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4–6	'0'–'9' 'a'–'z' 'A'–'Z'	gv55L
Mode	1	0|1	0
CW Threshold	<=2	0 - 31	15
BB Threshold	<=2	0 - 15	3
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Output ID	1	0 – 2	0
Output Status	1	0|1	0
Duration	<=3	0 – 255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Reserved	0		
Serial Number	4	0000–FFFF	
Tail Character	1	$	$

✧ <Mode>: Working mode.
- 0: Disable this function.
- 1: Enable this function.

✧ <BB Threshold>: Broadband jamming detection threshold (unit = dB)

✧ <CW Threshold>: Continuous wave(narrowband) jamming detection threshold (unit = dB)

NOTE: This function is only supported by UBLOX-7 device.

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

➢ **+ACK:GTGPJ**

Example: **+ACK:GTGPJ,0F0100,135790246811220,,0019,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000–XXFFFF, X∈{'A'–'Z','0'–'9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0'–'9' 'a'–'z' 'A'–'Z"-"_'	
Serial Number	4	0000–FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000–FFFF	
Tail Character	1	$	$

3.3. Report

This section defines the formats of the report messages. Due to the max length of SMS message (160 bytes), it is recommended to carefully set the <*Report Composition Mask*> in **AT+GTCFG** to limit the length of the report which contains GPS position information if you choose SMS as the transmit method. Otherwise the report will be truncated to fit the length of SMS message.

3.3.1. Position Related Report

- **+RESP:GTDIS,**

If the status of digital inputs are detected being changed, the device will send the message **+RESP:GTDIS** to the backend server.

- **+RESP:GTIOB,**

If the IO combination is set and the corresponding condition appears, the device will report the message **+RESP:GTIOB** to the backend server.

- **+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.

- **+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 is detected into the alarm range,.

- **+RESP:GTSOS,**

If the SOS function is enabled, the device will send the message **+RESP:GTSOS** to the backend server when the corresponding digital input port triggers SOS.

- **+RESP:GTRTL,**

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

- **+RESP:GTDOG,**

The protocol watchdog reboot message.

- **+RESP:GTIGL,**

The location message for ignition on.

- **+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:GTDIS,100101,135790246811220,,,20,1,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,2000.0,20090214093254,11F0$

+RESP:GTIOB,100101,135790246811220,,,10,1,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,2000.0,20090214093254,11F0$

+RESP:GTGEO,100101,135790246811220,,,00,1,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,2000.0,20090214093254,11F0$

+RESP:GTSPD,100101,135790246811220,,,00,1,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,2000.0,20090214093254,11F0$

+RESP:GTSOS,100101,135790246811220,,,00,1,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,2000.0,20090214093254,11F0$

+RESP:GTRTL,100101,135790246811220,,,00,1,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,2000.0,20090214093254,11F0$

+RESP:GTDOG,100101,135790246811220,,,01,1,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,2000.0,20090214093254,11F0$

+RESP:GTIGL,100101,135790246811220,,,00,1,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,2000.0,20090214093254,11F0$

+RESP:GTHBM,100101,135790246811220,,,10,1,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,2000.0,20090214093254,11F0$

+RESP:GTHBM,100101,135790246811220,,,11,1,1,24.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,2000.0,20090214093254,11F0$

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' '-' '_'	
Reserved			
Report ID/Report Type	2	X(0-4)X(0-3)	
Number	1	0 – 1	
GPS Accuracy	<=2	0|1 – 50	
Speed	<=5	0.0 – 999.9 km /h	

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

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

Report ID has different meanings in different messages as below.

- The ID of digital input port which triggers the report message **+RESP:GTDIS** and **+RESP:GTSOS**. The range is 1 .
- The ID of the bound IO which triggers the report message **+RESP:GTIOB**. The range is 0 – 3.
- The ID of Geo-Fence in the report message **+RESP:GTGEO**. The range is 0 – 4.
- The ID of the digital input port which triggers the reboot message **+RESP:GTDOG**. The valid value is 1 .
- The speed level of which the harsh behavior is detected in message **+RESP:GTHBM**. 3 is high speed, 2 is medium speed and 1 is low speed.

For the rest of the messages, it will always be 0.

Report type has different meanings in different messages as below.

- In the **+RESP:GTDIS** report message generated by the digital input
  0: The current logical status of the input port is disable status.
  1: The current logical status of the input is enable status.
- In the **+RESP:GTIOB** report message generated by bound IO
  0: The current logical status of the bound IO does not meet the alarm condition.
  1: The current logical status of the bound IO meets the alarm condition.
- In Geo-Fence report message **+RESP:GTGEO**
  0: Exit from the Geo-Fence.

1: Enter the Geo-Fence.

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

For the rest of the messages, it will always be 0.

✧ <*Number*>: The number of the GPS position included in the report message. Generally, it equals to 1.

✧ <*GPS Accuracy*>: The HDOP defined in NMEA0183 (The National Marine Electronics Association (NMEA) is a non-profit association of manufacturers, distributors, dealers, educational institutions, and others interested in peripheral marine electronics occupations. The NMEA 0183 standard defines an electrical interface and data protocol for communications between marine instrumentation.). The range of value is 0 – 50. Here 0 means no GPS fix.

✧ <*Speed*>: The current speed. Unit: km/h

✧ <*Heading*>: The Heading of the GPS fixing.

✧ <*Altitude*>: The height above the sea level.

✧ <*Longitude*>: The longitude of the current position.

✧ <*Latitude*>: The latitude of the current position.

✧ <*GPS UTC Time*>: The UTC time from the GPS chip.

✧ <*MCC*>: Mobile country code. It is 3 digits in length and ranges from 000–999.

✧ <*MNC*>: Mobile network code. It is 3 digits in length and ranges from 000–999.

✧ <*LAC*>: Location area code in hex format.

✧ <*Cell ID*>: Cell ID in hex format.

✧ <*Mileage*>: The current total mileage.

➢ **+RESP:GTFRI,**

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

Example:

+RESP:GTFRI,100101,135790246811220,,,10,2,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,0,4.3,92,70.0,121.354335,31.222073,20090101000000,0460,0000,18d8,6141,00,2000.0,12345:12:34,,,,200100,,,,20090214093254,11F0$

+RESP:GTFRI,100101,135790246811220,,,10,1,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,2000.0,12345:12:34,,,,200100,,,,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' '-' '_'	
External Power Voltage	<=5	0 – 99999 mV	
Report ID/Report Type	2	X(1-5)X(0-6)	
Number	<=2	1 – 2	
GPS Accuracy	<=2	0|1 – 50	
Speed	<=5	0.0 – 999.9 km /h	
Heading	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	
Mileage	<=9	0.0 – 4294967.0 km	
Hour Meter Count	11	HHHHH:MM:SS	
Reserved	0		
Reserved	0		
Reserved	0		
Device Status	6	000000 – FFFFFF	

Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

  Report ID has four meanings as below.
  - 1: fixed timing report.
  - 2: fixed distance report.
  - 3: fixed mileage report.
  - 4: fixed timing and mileage report.
  - 5: fixed timing or mileage report.

  Report type has meanings as below.
  - 0: the normal fixed report.
  - 1: corner report which indicates that the device just turns around a corner.
  - 2: FRI report frequency change which indicates that the terminal enter into Geo-Fence or roaming status.
  - 3: corner report when FRI report frequency changed.
  - 4: mileage report when fixed report is mode 5
  - 5: reserved.
  - 6: mileage report when fixed report is mode 5 and FFC works
- <*Number*>: The number of the GPS position included in the report message. In the message **+RESP:GTFRI**, it probably includes one or several GPS position according to the setting of <*Send Interval*> and <*Check Interval*>. If multi-position in one **+RESP:GTFRI** message, the green part repeats.
- <*Hour Meter Count*>: If hour meter counter function is enabled by the command **AT+GTHMC**, total hours meter counted when engine is on will be reported in this field. It is formatted with 5 hour digits and 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.
- <*Device Status*>: The state of the device. The left two bits indicate the current ignition state of the device, the middle two bits indicate the input ports status, the right two bits indicate the output ports status.

  The current ignition state of the device.
  - 10 (**Ignition Off**): The device attached vehicle is ignition off.
  - 20 (**Ignition On**): The device attached vehicle is ignition on

  The input ports status: A bitwise hex integer to represents the logical status of the digital

input. From the lowest bit to the highest bit, each bit represents ignition detection and digital inputs 1 respectively. For each bit, 0 means disable status, 1 means enable status.

The output ports status: A bitwise hex integer to represents the logical status of the digital output. From the lowest bit to the highest bit, each bit represents one of the digital outputs 1 – 2 respectively. For each bit, 0 means disable status, 1 means enable status.

- **+RESP:GTEPS,**

If the external power 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 enters the alarm range.

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

Example:
+RESP:GTEPS,100101,135790246811220,,13500,00,1,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,2000.0,20090214093254,11F0$

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

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

- <*External Power Voltage*>: The value of the external power voltage. When the voltage of the external input meets the alarm condition as set by command **AT+GTEPS**, the device will send the current external input voltage with **+RESP:GTEPS** to the backend server
- <*Report ID/Report Type*>: The report ID and the type of the report type in hex format. 4 high bits mean report ID and 4 low bits means report type.
  Report ID has different meanings in these two messages.
  - The ID of analog input port which triggers report message +RESP:GTEPS. The value is 0.

  Report type has two meanings as below.
  - 0: Outside of the predefined range.
  - 1: Inside of the predefined range.
- <*Number*>: The number of the GPS position included in the report message. Generally, it equals to 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 by the message **+RESP:GTLBC** when there is an incoming call.

Example: **+RESP:GTLBC,100101,135790246811220,,+8613800000000,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Call Number	<=20	phone number	
GPS Accuracy	<=2	0|1 – 50	

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

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

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 by the message **+RESP:GTINF** to the backend server periodically.

- **+RESP:GTINF,**

Example: **+RESP:GTINF,100101,135790246811220,,10,898600810906F8048812,16,0,,12000,,,,,0,,2009 0214013254, , , ,00,00,+0800,0,20090214093254,11F0$**			
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' '-' '_'	
State	2	10|20	
ICCID	20		
CSQ RSSI	<=2	0 – 31|99	
CSQ BER	<=2	0 – 7|99	
Reserved	0		
External Power Voltage	<=5	0 – 99999mV	
Reserved	0		
Reserved	0		
Reserved	0		
LED On	1	0|1	
Reserved	0		
Reserved	0		
Last Fix UTC Time	14	YYYYMMDDHHMMSS	
Reserved	0		
Reserved	0		
Reserved	0		
Digital Input	2	00 – 01	
Digital Output	2	00 – 02	
Time Zone Offset	5	±HHMM	

Daylight Saving	1	0|1	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*State*>: The current ignition state of the device.
  -
  - 10 (**Ignition Off**): The device attached vehicle is ignition off.
  - 20 (**Ignition On**): The device attached vehicle is ignition on
- <*ICCID*>: The ICCID of the SIM card.
- <*CSQ RSSI*>: The signal strength level.

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

- <*CSQ BER*>: The quality of the GSM signal. The range is 0-7, 99 for unknown.
- <*External Power Voltage*>: The voltage of the external power.
- <*Last Fix UTC Time*>: The UTC time of the latest successful GPS fixing.
- <*Digital Input*>: A bitwise hex integer to represents the logical status of the digital input. From the lowest bit to the highest bit, each bit represents ignition detection and one of the digital inputs 1 respectively. For each bit, 0 means disable status, 1 means enable status.
- <*Digital Output*>: A bitwise hex integer to represents the logical status of the digital output. From the lowest bit to the highest bit, each bit represents one of the digital outputs 1 – 2 respectively. For each bit, 0 means disable status, 1 means enable status
- <*Time Zone Offset*>: The time offset of the local time zone to 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 of Real Time Querying

3.3.3.1. +RESP:GTGPS

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

➢ **+RESP:GTGPS,**

Example: **+RESP:GTGPS,100101,135790246811220,,,,,0000,,,20090214013254,20090214093254,11F0$**			
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' '-' '_'	
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*>: Refer to <*Report Composition Mask*> of **AT+GTCFG** command

3.3.3.2. +RESP:GTALL

After the device receives the command **AT+GTRTO** to read all the configurations, it will send all configurations to the backend server by the message **+RESP:GTALL**. This message only sends via GPRS even if the report mode is force on SMS. The **+RESP:GTALL** is not support the HEX report.

➢ **+RESP:GTALL,**

Example:

**+RESP:GTALL,100104,868034001346782,gv55lite,BSI,cmnet,,,,,,,SRI,3,,1,220.178.67.210,1
0026,0.0.0.0,0,15705602728,5,1,0,,0,,CFG,gv55L,gv55lite,1,602.3,,,007F,2,,3FFF,,1,1,60,0,,,1,0
000,1,EPS,0,0,0,0,0,0,0,0,0,0,,,,DIS,0,1,,,1,0,0,,,,,,,,,,,,,IOB,0,0,0,0,0,0,0,0,,,,,1,0,0,0,0,0,0,0,,,,,2
,0,0,0,0,0,0,0,,,,,3,0,0,0,0,0,0,0,,,,,TMZ,+0800,0,,,,,FRI,0,1,,1,0000,0000,,30,1000,1000,,0,600,,,,
,GEO,0,0,,,50,0,0,0,0,0,,,,,1,0,,,50,0,0,0,0,0,,,,,2,0,,,50,0,0,0,0,0,,,,,3,0,,,50,0,0,0,0,0,,,,,4,0,,,50,0,
0,0,0,0,,,,,SPD,0,0,0,60,300,0,0,0,0,,,,,,,,,,,SOS,0,0,,0,0,0,0,,,,,PIN,0,,,,,,,OWH,0,1f,0900,1200,1
300,1800,,,0,0,0,0,0,,,,,DOG,0,60,30,0200,,1,0,,60,60,,HMC,0,00000:00:00,,,,,,,,,HBM,0,,,100,0
,0,,60,0,0,,,0,0,,0,0,0,0,,,,,JDC,0,10,40,,,,,0,0,0,0,,WLT,0,,,,,,,,,,,,,,HRM,,,EF,FE17BF,FE17BF,
FFFD,EF,,,,,GPJ,0,12,3,,,,,1,1,15,5,,RMD,1,,,,,46001,,,,,,,,,,,,46011,,
,,36000,36001,36002,36003,36004,36005,36006,36007,36008,3
6009,360010,360011,360012,360013,,,,,,,,,3FFF,,,3FFF,,,,,0,0,0,0,,,FFC,0,0,0,,,,,,,30,500,500,30
0,,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,,,,,PDS,0,0,,,,,,,OUT,0,,,,,,,20130702141128,0617$**

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' '-' '_'	
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	
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|5 – 360min	
SACK Enable	1	0|1	
Protocol Format	1	0|1	
Reserved	0		
Connection Retry Pattern	1	0 – 4	
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	0|1	
Info Report Enable	1	0|1	
Info Report Interval	<=5	30 – 86400sec	
Location By Call	1	0|1|2	
Feature Switch Mask	2	00~FF	0

Reserved	0		
Agps Mode	1	0|1	
GSM Report	4	0000 – FFFF	
GPS Lost Time	2	0 – 30min	0
EPS	3	EPS	EPS
Mode	1	0|1|2	
Min Threshold	<=5	250 – 32000 mV	
Max Threshold	<=5	250 – 32000 mV	
Sample Period	<=2	0|1 – 12(×2s)	
Debounce Time	1	0 – 5(×1s)	
Output ID	1	0 – 2	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Sync with FRI	1	0|1	
Reserved	0		
Reserved	0		
Reserved	0		
DIS	3	DIS	DIS
Ignition Detection	1	0	0
Sample Period	<=2	0|1 – 12(×2s)	
Reserved	0		
Reserved	0		
Input ID 1	1	1	1
Enable	1	0|1	
Debounce Time	<=2	0 – 20(×10ms)	
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		
IOB	3	IOB	IOB
IOB ID0	1	0	0
Input Mask	1	0 – 3	
Trigger Mask	1	0 – 3	
Input Sample Period	<=2	0|1 – 12(×2s)	
Output ID	1	0 – 2	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
IOB ID1	1	1	1
Input Mask	1	0 – 3	
Trigger Mask	1	0 – 3	
Input Sample Period	<=2	0|1 – 12(×2s)	
Output ID	1	0 –2	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	

Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
IOB ID2	1	2	2
Input Mask	1	0 – 3	
Trigger Mask	1	0 – 3	
Input Sample Period	<=2	0|1 – 12(×2s)	
Output ID	1	0 – 2	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved			
IOB ID3	1	3	3
Input Mask	1	0 – 3	
Trigger Mask	1	0 – 3	
Input Sample Period	<=2	0|1 – 12(×2s)	
Output ID	1	0 – 2	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
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	0|5 – 86400sec	
Distance	<=5	300 – 65535m	
Mileage	<=5	300 – 65535m	
Reserved	0		
Corner Report	<=3	0 – 180	
IGF Report Interval	<=5	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 – 2	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
Reserved	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 – 2	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
Reserved	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 – 2	
Output Status	1	0|1	

Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
Reserved	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 – 2	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
Reserved	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 – 2	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	

Reserved	0		
Reserved	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	15 – 3600sec	
Send Interval	<=4	30 – 3600sec	
Output ID	1	0 – 2	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
SOS	3	SOS	SOS
Mode	1	0 – 4	
Digital Input ID	1	0|1	
SOS Number	<=20		
Output ID	1	0 – 2	

Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
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|2|3	
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		
Digital Input ID	1	0 – 1	
Digital Output ID	1	0 – 2	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		

Reserved	0		
Reserved	0		
Reserved	0		
DOG	3	DOG	DOG
Mode	1	0|1|2	
Ignition Frequency	<=3	10 – 120min	
Interval	<=2	1 – 30	
Time	4	HHMM	
Reserved	0		
Report Before Reboot	1	0|1	
Input ID	1	0|1|2	
Reserved	0		
GSM interval	4	0|5-1440	60
PDP interval	4	0|5-1440	60
Reserved	0		
HMC	3	HMC	HMC
Hour Meter Enable	1	0|1	
Initial Hour Meter Count	11	00000:00:00-99999:00:00	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
HBM	3	HBM	HBM
HBM Enable	1	0|1	
Reserved	0		
Reserved	0		

High Speed	<=3	100 – 400km/h	
ΔVhb	<=3	0 – 100km/h	
ΔVha	<=3	0 – 100km/h	
Reserved	0		
Medium Speed	<=3	100 – 400km/h	
ΔVmb	<=3	0 – 100km/h	
ΔVma	<=3	0 – 100km/h	
Reserved	0		
Reserved	0		
ΔVlb	<=3	0 – 100km/h	
ΔVla	<=3	0 – 100km/h	
Reserved	0		
Output ID	1	0 – 2	
Output Status	1	0|1	
Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
JDC	3	JDC	JDC
Mode	1	0|1	0
Signal Threshold	<=3	0 – 255	10
C1 Threshold	<=3	0 – 255	40
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Output ID	1	0 – 2	
Output Status	1	0|1	

Duration	<=3	0 – 255(×100ms)	
Toggle Times	<=3	0 – 255	
Reserved	0		
WLT	3	WLT	WLT
Call Filter	1	0|1|2	
Phone Number List	<=20*10		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
HRM	3	HRM	HRM
Reserved	0		
Reserved	0		
ACK Mask	<=2	'0' – '9' 'a' – 'f' 'A' – 'F'	EF
Response Mask	<=6	'0' – '9' 'a' – 'f' 'A' – 'F'	FE17BF
Event Mask	<=6	'0' – '9' 'a' – 'f' 'A' – 'F'	FE17BF
Information Mask	<=4	'0' – '9' 'a' – 'f' 'A' – 'F'	FFFD
HBD Mask	<=2	'0' – '9' 'a' – 'f' 'A' – 'F'	EF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
GPJ	3	GPJ	GPJ
Mode	1	0|1	0
CW Threshold	<=2	0 - 31	15
BB Threshold	<=2	0 - 15	3
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

Output ID	1	0 – 2	0
Output Status	1	0|1	
Duration	<=3	0～255(×100ms)	0
Toggle Times	<=3	0 – 255	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 Operator list	<=6*20		
Reserved	0		
Reserved	0		
Known Roaming Event Mask	<=6	000000 – FFFFFF	3FFF
Reserved	0		
Reserved	0		
Unknown Roaming Event Mask	<=6	000000 – FFFFFF	3FFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Output ID	1	0 – 2	0

Output Status	1	0|1	
Duration	<=3	0～255(×100ms)	0
Toggle Times	<=3	0 – 255	0
Reserved	0		
Reserved	0		
FFC	3	FFC	FFC
Priority	1	0	0
Mode	1	0-3	0
FRI Mode	1	0-5	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
FRI IGN Report Interval	<=5	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		
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	0-3	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	

Tail Character	1	$	$

3.3.3.3. +RESP:GTALM

After the device receives the command **AT+GTRTO** to read all the configurations, it will send all configurations to the backend server by the message **+RESP:GTALL**. This message only sends via GPRS even if the report mode is force on SMS. If the message's length is too long, then subpackage it into several messages **+RESP:GTALM**. The **+RESP:GTALM** is not support the HEX report.

➢ **+RESP:GTALM,**

Example:

+RESP:GTALM,100104,868034001591155,gv55lite,3,1,BSI,cmnet,,,,,,SRI,2,,2,220.178.67.210,10029,220.178.67.210,10029,+8615705602728,5,1,0,,0,,CFG,gv55L,gv55lite,1,65535.0,,,007F,2,,3FFF,,1,1,300,1,,,1,000F,1,EPS,2,251,25000,1,1,1,1,1,1,1,,,,DIS,0,1,,,1,1,1,,,,,,,,,,,,IOB,0,3,3,1,1,1,0,0,,,,,1,2,2,1,2,1,1,1,,,,,2,0,0,0,0,0,0,0,,,,,3,0,0,0,0,0,0,0,,,,,TMZ,+0800,0,,,,,FRI,1,0,,1,1234,2359,,61,999,999,,39,599,,,,,20130731150423,034D$

+RESP:GTALM,100104,868034001591155,gv55lite,3,2,GEO,0,3,117.201475,31.833544,500,60,1,1,5,6,,,,,1,3,117.201239,31.833544,500,60,1,1,5,6,,,,,2,3,117.201239,31.833544,500,60,1,1,5,6,,,,,3,3,117.201239,31.833544,500,60,1,1,5,6,,,,,4,3,117.201239,31.833544,500,60,1,1,5,6,,,,,SPD,3,1,60,59,299,1,1,1,1,,,,,,,,,,,SOS,1,1,15705602728,1,1,6,6,,,,,PIN,0,,,,,,,OWH,1,7f,0801,1301,1456,2357,,,1,1,1,1,1,,,,,DOG,1,60,1,1100,,1,0,,8,8,,HMC,0,00000:00:00,,,,,,,,,HBM,1,,,101,1,1,,61,1,1,,,1,1,,1,1,1,1,1,,,,,JDC,1,11,41,,,,,1,1,1,1,,WLT,1,1234567890,1234567890-,1234567890,234567890,qw345678,qw4567,23456789,234567890,q34567890,34567890,,,,,HRM,,,EF,E17BF,FE17BF,FFFD,EF,,,,,20130731150423,034E$

+RESP:GTALM,100104,868034001591155,gv55lite,3,3,RMD,0,,,,,46001,46002,46003,46004,46005,46006,46007,46008,46009,46010,,,46011,46012,46013,46014,46015,46016,46017,46018,46019,46020,46021,46022,46023,46024,46025,46026,46027,46028,46029,46030,46031,46032,46033,46034,46035,46036,46037,46038,46039,46040,46041,46042,46043,46044,46045,46046,46047,46048,46049,46050,46051,46052,46053,46054,46055,46056,46057,46058,46059,46060,46061,46062,46063,46064,46065,46066,46067,46068,46069,46070,46071,46072,46073,46074,46075,46076,46077,46078,46079,46080,46081,46082,46083,46084,46085,46086,46087,46088,46089,46090,46091,46092,46093,46094,46095,46096,46097,46098,46099,460100,460101,460102,460103,460104,460105,460106,460107,460108,460109,460110,,,36000,36001,36002,36003,36004,36005,36006,36007,36008,36009,,,,,,,,,,,,3FFF,,,3FFF,,,,,0,0,0,0,,,FFC,0,1,1,,,,,,,29,499,500,300,,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,,,,,PDS,1,3F,,,,,,OUT,0,,,,,,,20130731150423,034F$

Parameter	Length(byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Total Packets	1	3	

Current Packet	1	1 – 3	
Configurations	< 1500		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Total Packets*>: The total number of **+RESP:GTALM**
- <*Current Packet*>: The sequence serial number of current packet.
- <*Configurations*>: The current configuration of device. The first message contain from **BSI** to **TMZ**, the second from **GEO** to **HRM**, and the third from **RMD** to the end.

  Note: The length of every message +RESP:GTALM (include header and tail) <= 1500 characters.

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 by the message **+RESP:GTALS**. Different AT Command get different configuration information.For example, get FRI configuration,**AT+GTRTO=gv55L,2,FRI,,,,,0015$**

- **+RESP:GTALS,**

Example: **+RESP:GTALS,100100,862170010822169,gv55L,FRI,1,0,,0,0000,0000,,30,1000,1000,,40,60,00000000,,,,,20121205072258,00C3$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Sub AT Command	3	'a' – 'z' 'A' – 'Z' '	
Mode	1	0 – 4	
Discard No Fix	<=2	0|1	
Reserved	0		
Period Enable	1	0|1	
Start Time	4	HHMM	
End Time	4	HHMM	
Reserved	0		
Send Interval	<=5	5 – 86400sec	
Distance	<=5	50 – 65535m	
Mileage	<=5	50 – 65535m	
Reserved	0		
Corner Report	<=3	0 – 180	
IGF Report Interval	<=5	0|5-86400sec	
Reserved	0		
Reserved	0		
Reserved	0		

Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.3.3.5. +RESP:GTCID

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

- **+RESP:GTCID,**

Example: **+RESP:GTCID,100101,135790246811220,,898600810906F8048812,20090214093254,11F0$**			
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' '-' '_'	
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 by the message **+RESP:GTCSQ**.

➢ **+RESP:GTCSQ,**

Example: **+RESP:GTCSQ,100101,135790246811220,,16,0,20090214093254,11F0$**			
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' '-' '_'	
CSQ RSSI	<=2	0 – 31|99	
CSQ BER	<=2	0 – 7|99	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

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

✧ <*CSQ BER*>: The quality of the GSM signal. The range is 0-7, 99 for unknown.

3.3.3.7. +RESP:GTVER

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

➢ **+RESP:GTVER,**

Example: **+RESP:GTVER,100101,135790246811220,,GV55LITE,0100,0101,20090214093254,11F0$**			
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' '-' '_'	
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. The first two characters represent the major version and the last two characters represent the minor version. For example: **010A** means the version **1.10**.

✧ <Hardware Version>: The hardware version. The first two characters represent the major version and the last two characters represent the minor version. For example: **010A** means the version **1.10**.

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 by the message **+RESP:GTBAT**.

- **+RESP:GTBAT,**

Example: **+RESP:GTBAT,100101,135790246811220,,,12000,,,,0,20090214093254,11F0$**			
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' '-' '_'	
Reserved	0		
External Power Voltage	<=5	0 – 99999mV	
Reserved	0		
Reserved	0		
Reserved	0		
LED On	1	0|1	
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 all the IO ports status, it will send the status to the backend server by the message **+RESP:GTIOS**.

- **+RESP:GTIOS,**

Example: **+RESP:GTIOS,100101,135790246811220,,,,,00,00,20090214093254,11F0$**			
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' '-' '_'	
Reserved	0		
Reserved	0		
Reserved	0		
Digital Input	2	00 – 01	
Digital Output	2	00 – 02	
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 settings by the message **+RESP:GTTMZ** to the backend server.

- **+RESP:GTTMZ,**

Example: **+RESP:GTTMZ,100101,135790246811220,,+0800,0,20090214093254,11F0$**			
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' '-' '_'	
Time Zone Offset	5	±HHMM	
Daylight Saving	1	0|1	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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:GTPDP: GPRS connection establishment report
+RESP:GTIGN: Ignition on report
+RESP:GTIGF: Ignition off report
+RESP:GTJDR: Jamming indication
+RESP:GTGSM: The report for the information of the service cell and the neighbor cells.
+RESP:GTGSS: GPS signal status
+RESP:GTDOS: Output status change with wave shape 1
+RESP:GTRMD: The report for entering or leaving GSM roam state.
+RESP:GTGPJ: Gps Jamming status report.

In **+RESP:GTIGN**, **+RESP:GTIGF**, **+RESP:GTJDR** , **+RESP:GTGPJ** and **+RESP:GTGSS** event reports, the last known GPS information and the current GSM network information are involved.

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

Example:
+RESP:GTPNA,100101,135790246811220,,20090214093254,11F0$
+RESP:GTPFA,100101,135790246811220,,20090214093254,11F0$
+RESP:GTPDP,100101,135790246811220,,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' '-' '_'	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- **+RESP:GTJDR,**

Example:
+RESP:GTJDR,100101,135790246811220,,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 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
GPS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km /h	
Heading	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

➢ **+RESP:GTIGN,**

Example:
+RESP:GTIGN,100101,135790246811220,,1200,0,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00, 12345:12:34,2000.0,20090214093254,11F0$

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' '-' '_'	

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

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

➢ **+RESP:GTIGF,**

Example:
+RESP:GTIGF,100101,135790246811220,,1200,0,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00, 12345:12:34,2000.0,20090214093254,11F0$

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

✧ <*Duration of Ignition On*>: Duration since last time the ignition is on. If greater than 999999 seconds, report as 999999 seconds.

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

➢ **+RESP:GTGSM**

Example: **+RESP:GTGSM,080100,135790246811220,FRI,0460,0000,1878,0871,20,,0460,0000,1878,0152,16,,,,,,,,,,,,,,,,,,,,,,,,0460,0000,1878,0873,57,00,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**

Protocol Version	6	XX0000 – XXFFFF, X∈{'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Fix Type	3	SOS|RTL|LBC|FRI|GIR	
MCC1	4	0XXX	
MNC1	4	0XXX	
LAC1	4		
Cell ID1	4		
RX Level1	2	0-63	
Reserved	2		
MCC2	4	0XXX	
MNC2	4	0XXX	
LAC2	4		
Cell ID2	4		
RX Level2	2	0-63	
Reserved	2		
MCC3	4	0XXX	
MNC3	4	0XXX	
LAC3	4		
Cell ID3	4		
RX Level3	2	0-63	
Reserved	2		
MCC4	4	0XXX	
MNC4	4	0XXX	
LAC4	4		
Cell ID4	4		
RX Level4	2	0-63	
Reserved	2		
MCC5	4	0XXX	
MNC5	4	0XXX	
LAC5	4		

Cell ID5	4		
RX Level5	2	0-63	
Reserved	2		
MCC6	4	0XXX	
MNC6	4	0XXX	
LAC6	4		
Cell ID6	4		
RX Level6	2	0-63	
Reserved	2		
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4		
Cell ID	4		
RX Level	2	0-63	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Fix Type*> : A string to indicate what kind of GPS fixing this cell information is for.
  "SOS" This cell information is for SOS requirement.
  "RTL" This cell information is for RTL requirement.
  "LBC" This cell information is for LBC requirement.
  "FRI" This cell information is for FRI requirement.
  "GIR" This cell information is for sub command "**C**" in **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 coded in 1 dB steps:
  0: -110 dBm
  1 to 62: -109 to -48 dBm
  63: -47 dBm
- <*MCC*>: MCC of the service cell.
- <*MNC*>: MNC of the service cell.

- ✧ <*LAC*>: LAC in hex format of the service cell.
- ✧ <*Cell ID*>: Cell ID in hex format of the service cell.
- ✧ <*RX Level*>: The signal strength of the service cell.

Note:

1. It probably includes only several neighbor cells' (even no neighbor cell) information. If some neighbor cell wasn't find, all the fields of the neighbor cell will be empty.
2. "ffff" in the field of <*LAC(i)*>, <*Cell ID(i)*> means the terminal doesn't know the value.
3. This message cannot be sent via SMS.

➢ **+RESP:GTGSS**

Example: **+RESP:GTGSS,100101,135790246811220,,1,9,10,,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 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
GPS Signal Status	1	0 | 1	
Satellite Number	2	0 - 24	
Device State	2	10|20	
Reserved	0		
GPS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km /h	
Heading	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00

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

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

✧ <*Satellite Number*>: The number of the in sight satellites when fix successful, if fix failed，The parameter is reserved.

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

- 10 (Ignition off Rest): The device attached vehicle is ignition off.
- 20 (Ignition On Rest): The device attached vehicle is ignition on.

➢ **+RESP:GTDOS**

Example:
+RESP:GTDOS,010103,862170010190559,,2,0.0,57.7,117.201371,31.833041,20121015085137,0460,0000,5663,5A02,,2,1,20121015085153,0149$

Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Wave1 output id	1	1-2	
Wave1 ouptut active	1	0|1	
GPS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km /h	
Heading	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	

Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ < *Wave1 output id*>: ID of the output With wave shape 1

✧ < *Wave1 output active*>: The output status with wave shape 1

If the device changes GSM roam state, the message will report current roam state.
The message will be defined to a event message.

➢ **+RESP:GTRMD,**

Example:
+RESP:GTRMD,010100,135790246811220,,0,0,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,20090214093254,11F0$

Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=10	'0' – '9' 'a' – 'z' 'A' – 'Z'	
Roaming state	1	0-3	
GPS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km /h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	

Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ < Roam state >:

- 0 Home
- 1 Known Roaming
- 2 Unknow Roaming
- 3 Blocking Report

➢ **+RESP:GTGPJ**

Example:
+RESP:GTGPJ,0F0100,135790246811220,,16,0,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,20090214093254,11F0$

Parameter	Length(byte)	Range/Format	Default
Protocol Version	6	XX0000–XXFFFF, X∈{'A'–'Z','0'–'9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z"-"_'	
CW Jamming Value	<=3	0-255	
GPS Jamming State	2	0|1|2|3	
GPS Accuracy	<=2	0	
Speed	<=5	0.0 –999.9 km /h	
Heading	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	

Tail Character	1	$	$

✧ <*CW Jamming Value*>: Current continues wave jamming value.

✧ <*GPS Jamming State*>: Current jamming state.

- 0: unknown or feature disabled.
- 1: (ok) no significant jamming.
- 2:(warning) interference visible but fix OK.
- 3: (critical) interference visible and no fix.

NOTE: +RESP:GTGPJ message will not be reported until first good fix.

3.3.5. Buffer Report

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

- ✧ GSM network is not available
- ✧ Failed to activate GPRS context for the TCP or UDP connection.
- ✧ Failed to establish the TCP connection with the backend server.

These messages will be sent to the backend server when connection to the server recovers again. The buffer reports are saved to the built-in non-volatile memory in case the device is reset. The terminal can buffer up to 3000 messages (160 bytes per message).

Detailed information about buffer report is listed below.

- ✧ Only **+RESP** messages are buffered except that **+RESP:GTALL** and **+RESP:GTALM** is not buffered
- ✧ In the buffer report, the original header string "**+RESP**" is replaced by "**+BUFF**" while keeps the other content untouched including the original sending time and count number.
- ✧ Buffered messages will be sent only via GPRS by TCP or UDP protocol. They cannot be sent via SMS. If the current report mode is forcing on SMS, the buffered messages will be sent via TCP short connection.
- ✧ The buffered messages will be sent after the other normal messages sending if <*Buffer Mode*> in **AT+GTSRI** is set to 1.
- ✧ The buffered messages will be sent before the other normal messages sending if <*Buffer Mode*> in **AT+GTSRI** is set to 2. The SOS message has the highest priority and is sent before the buffered messages.

Example:

The following is an example of the buffered message:

+BUFF:GTFRI,100101,135790246811220,,,10,2,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,00,0,4.3,92,70.0,121.354335,31.222073,20090101000000,0460,0000,18d8,6141,00,2000.0,12345:12:34,,,,200100,,,,20090214093254,11F0$

3.3.6. Report Google Maps Hyperlink

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

➢ **Google Maps hyperlink**

Example:
gv55lite:
<http://maps.google.com/maps?q=31.222073,121.354335
F1 D2009/01/01T00:00:00>

Parameter	Length(byte)	Range/Format	Default
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Google Maps Hyperlink Header	30	http://maps.google.com/maps?q=	http://maps.google.com/maps?q=
Latitude	<=10	(–)xx.xxxxxx	
Longitude	<=11	(–)xxx.xxxxxx	
GPS Fix	<=3	F0|F1 – F50	
GPS UTC Time	20	DYYYY/MM/DDTHH:MM:SS	

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

3.4. Heartbeat

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

➢ **+ACK:GTHBD**

Example: **+ACK:GTHBD,100101,135790246811220,,20100214093254,11F0$**			
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' '-' '_'	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

➢ **+SACK:GTHBD**

Example: **+SACK:GTHBD,100101,11F0$** **+SACK:GTHBD,,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Protocol Version*>: The device type and the protocol version that the backend server supported. 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 **AT+GTSRI** command, the backend server should reply to the device whenever it receives a message from the device.

➢ **+SACK:**

Example: **+SACK:11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

4. HEX Format Report Message

From this version, the @Tracker protocol starts to support report messages in HEX format. For all the commands, they are still using the ASCII format as described above. By default the device using ASCII format report messages. The backend server could use **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 **AT+GTHRM** command. The actual length of each HEX report message varies depending on set some mask 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

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

➢ **AT+GTHRM=**

Example: **AT+GTHRM=gv55L,,,FFFF,FFFFFFFF,FFFFFFFF,FFFF,FFFF,,,,,0018$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv55L
Reserved	0		
Reserved	0		
+ACK Mask	1	00 – FF	EF
+RSP Mask	4	00000000 – FFFFFFFF	00FE17BF
+EVT Mask	4	00000000 – FFFFFFFF	00FE17BF
+INF Mask	2	0000 – FFFF	FFFD
+HBD Mask	1	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.

Bit	**Item to Mask**
Bit 7	Reserved
Bit 6	<*Count Number*>
Bit 5	<*Send Time*>
Bit 4	<*Unique ID*>

Bit 3	*<Firmware Version>*
Bit 2	*<Protocol Version>*
Bit 1	*<Device Type>*
Bit 0	*<Length>*

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

Bit	Item to Mask
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	*< Satellites Information>*
Bit 18	*<Ignition 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	*<Unique ID>*
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.

Bit	Item to Mask
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	*<Satellites Information>*
Bit 18	*<Ignition 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	*<Unique ID>*
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 group of items is included when reporting message other than **+RESP:GTINF**.

Bit	Item to Mask
Bit 15	**+RESP:GTGIR**
Bit 14	**+RESP:GTTMZ**
Bit 13	**+RESP:GTCSQ**
Bit 12	**+RESP:GTCID**
Bit 11	**+RESP:GTBAT**
Bit 10	**+RESP:GTGPS**
Bit 9	**+RESP:GTIOS**
Bit 8	**+RESP:GTVER**
Bit 7	Reserved
Bit 6	*<Count Number>*
Bit 5	*<Send Time>*
Bit 4	*<Firmware Version>*
Bit 3	*<Protocol Version>*

Bit 2	*<Device Type>*
Bit 1	*<Unique ID>*
Bit 0	*<Length>*

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

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

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

➢ **+ACK:GTHRM,**

Example: **+ACK:GTHRM,040100,135790246811220,,0019,20090214093254,11F0$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

4.2. Acknowledgement +ACK

➢ **+ACK,**

Example: **2B 41 43 4B 19 EF 24 10 01 02 03 02 56 50 22 00 0A 02 3B 01 00 00 4E 07 DD 02 17 11 21 20 46 AD 4E 1E 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	10	10
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI	
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*>: The ID of the command that the device received.

Command	**ID**
AT+GTBSI	0
AT+GTSRI	1
AT+GTQSS	2
AT+GTCFG	4
Reserved	5
AT+GTEPS	6
AT+GTDIS	7
AT+GTOUT	8

AT+GTIOB	9
AT+GTTMA	10
AT+GTFRI	11
AT+GTGEO	12
AT+GTSPD	13
AT+GTSOS	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
Reserved	28
AT+GTHBM	29
AT+GTHMC	30
Reserved	31
Reserved	32
Reserved	33
AT+GTWLT	34
AT+GTHRM	35
Reserved	36
Reserved	37
AT+GTPDS	38

Reserved	39 - 42
AT+GTGPJ	43
AT+GTRMD	44
AT+GTFFC	45

- <*Report Mask*>: It refer to the <*+ACK Mask*> in **AT+GTHRM.**
- <*Length*>: The whole length of the acknowledgement message header to the tail characters.
- <*Unique ID*>: If the Bit 4 of <*+ACK Mask*> is 0, IMEI of the device 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**	**02**	**59**	**1**
HEX	**56**	**50**	**22**	**00**	**0A**	**02**	**3B**	**01**

- <*ID*>: Sub-command ID of **AT+GTRTO** or the ID of **AT+GTIOB** and **AT+GTGEO**, for others, set to 0.
- <*Send Time*>: The local time to send the acknowledgement message. Total 7 bytes. The first 2 bytes are for year, the rest 5 bytes 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:GTDIS**, **+RESP:GTIOB**, **+RESP:GTFRI**, **+RESP:GTGEO**, **+RESP:GTSPD**, **+RESP:GTRTL**, **+RESP:GTDOG , +RESP:GTIGL, +RESP:GTEPS** and **+RESP:GTHBM** use this format.

- **+RSP,**

Example:
2B 52 53 50 07 00 FE 07 BF 00 5C 10 01 02 03 02 56 50 22 00 0A 02 3B 01 01 01 20 07 10 01 01 00 00 00 00 E3 00 44 06 FA D2 F5 01 E7 42 CA 07 DD 02 17 07 32 1A 04 60 00 00 56 78 2D 7E 00 00 00 05 00 00 00 73 05 00 00 00 00 00 00 00 00 00 07 DD 02 17 10 36 1D 46 2B B9 CE 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	10	10
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI	
External Power Voltage	2		
Digital Input Status	1	00 – 03	
Digital Output Status	1	00 – 03	
Ignition Status	1	0x10 0x20	
Satellites in View	1		
Report ID / Report Type	1		
Number	1	1 – 15	
GPS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		

Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 – 65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
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 location report message.

Command	**ID**
Reserved	0
Reserved	1
Reserved	2
+RESP:GTLBC	3
+RESP:GTEPS	4
+RESP:GTDIS	5
+RESP:GTIOB	6
+RESP:GTFRI	7
+RESP:GTGEO	8
+RESP:GTSPD	9
+RESP:GTSOS	10
+RESP:GTRTL（PNL）	11
+RESP:GTDOG	12

Reserved	13
Reserved	14
+RESP:GTHBM	15
+RESP:GTIGL	16

- <*Report Mask*>: It refer to the <*+RSP Mask*> in **AT+GTHRM.**
- <*Unique ID*>: If the Bit 6 of <*+RSP Mask*> is 0, IMEI of the device 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**	**02**	**59**	**1**
HEX	**56**	**50**	**22**	**00**	**0A**	**02**	**3B**	**01**

- <*Digital Input Status*>: The mask of digital input1 and Ignition Detection status consist of the byte.

Input status item	**Bit**
Ignition Detection	Bit 0
Digital Input1	Bit 1
Reserved	
Reserved	

- <*Digital Output Status*>: The mask of digital output1 and digital output2 status consist of the byte.

Output status item	**Bit**
Digital Output1	Bit 0
Digital Output2	Bit 1
Reserved	
Reserved	

- < *Satellites*>: The last 2 bits of 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*>: Total 3 bytes. The first 2 two bytes are for the integer part of the speed and the last byte is for the fraction part. The fraction part only has 1 digit.
- <*Longitude*>: The longitude of the current position. Total 4 bytes. Convert the longitude to an integer with 6 implicit decimals and report this integer in HEX format. If the value of the longitude is negative, it is represented in 2's complement format.

Longitude	**117101301**

117.101301				
HEX	**06**	**FA**	**D2**	**F5**

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

Latitude 31.933130	**31933130**			
HEX	**01**	**E7**	**42**	**CA**

✧ <*GPS UTC Time*>: The UTC time from the GPS chip. Total 7 bytes. The first 2 bytes are for year, the rest 5 bytes for month, day, hour, minute and second respectively.

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

✧ <*Current Mileage*>: Total 3 bytes. The first 2 bytes are for the integer part of the current mileage and the last byte is for the fraction part. The fraction part only has 1 digit.

Current Mileage	**0**		**0**
HEX	**00**	**00**	**00**

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

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

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

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

Location report message for **+RESP:GTLBC** use below format

Example:
2B 52 53 50 03 00 FE 17 BF 00 65 10 01 02 03 03 56 50 22 00 0D 2E 06 03 2F 87 01 00 20 06 00 70 15 70 56 02 72 8F 01 01 00 00 02 00 9F 00 3A 06 FA D2 F5 01 E7 42 CA 07 DD 02 1B 07 30 13 04 60 00 00 56 78 20 79 00 00 01 07 00 00 00 73 05 00 00 00 00 00 00 00 00 00 07 DD 02 1B 10 34 13 00 DD 1E D4 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	10	10
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI	
External Power Voltage	2		
Digital Input Status	1	00 – 03	
Digital Output Status	1	00 – 03	
Ignition Status	1	0x10 0x20	
Satellites in View	1		
Report ID / Report Type	1		
Number Length / Number Type	1		
Phone Number	<=10		
Number	1	1 – 15	
GPS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	

Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
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 the number of byte used to represent the phone number including this byte. <*Number Type*> indicates if there is a '+' sign before the phone number. 1 means has the sign, 0 means no sign.

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

✧ <*Phone Number*>: Not more than 10 bytes. In each byte, use the high nibble and low nibble to represent one digit of the phone number respectively. If the last low nibble has no digit to represent, fill in 0xF.

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

Location report message for **+RESP:GTSOS** use below format

Example:
2B 52 53 50 0A 00 FE 17 BF 00 5F 10 01 02 03 03 56 50 22 00 0D 2E 06 03 2F 87 03 00 20 05 10 00 01 03 00 09 02 00 94 00 4B 06 FA D2 F5 01 E7 42 CA 07 DD 02 1B 07 25 32 04 60 00 00 56 78 5D 7B 00 00 01 06 00 00 00 73 04 00 00 00 00 00 00 00 00 00 07 DD 02 1B 10 29 32 00 CA 87 9D 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	10	10
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI	

External Power Voltage	2		
Reserved	2	0000	0000
Reserved	2	0000	0000
Digital Input Status	1	00 – 03	
Digital Output Status	1	00 – 03	
Ignition Status	1	0x10 0x20	
Satellites in View	1		
Report ID / Report Type	1		
Reserved	1	00	00
Number	1	1 – 15	
GPS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

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 below, however only **+RESP:GTINF** includes all the items while others only include related information to themselves.

- **+INF,**

Example:
(INF):
2B 49 4E 46 01 FF FD 00 AD 56 50 22 00 0D 2E 06 03 10 01 02 03 03 01 02 01 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00 00 20 00 09 01 07 DD 02 1B 09 13 1C 00 00 00 7F 00 1E 02 58 00 00 00 00 00 10 2F 87 00 00 00 89 86 02 10 12 52 85 51 73 62 1B 00 02 08 04 00 07 04 60 00 00 56 78 20 79 00 34 04 60 00 00 56 63 59 E4 00 29 04 60 00 00 56 63 5ª 01 00 25 04 60 00 00 56 78 2D 7E 00 25 04 60 00 00 56 65 20 6E 00 24 04 60 00 00 56 78 2D 7F 00 22 04 60 00 00 56 78 5D 7B 00 34 07 DD 02 1B 12 17 1E 00 6E 4D 93 0D 0A

(CID):
2B 49 4E 46 04 10 7D 00 2D 56 50 22 00 0D 2E 06 03 10 01 02 03 03 89 86 02 10 12 52 85 51 73 62 07 DD 02 1B 12 17 06 00 6D 8D D7 0D 0A

(GIR):
2B 49 4E 46 0A 80 7D 00 61 56 50 22 00 0D 2E 06 03 10 01 02 03 03 06 06 04 60 00 00 56 78 20 79 00 34 04 60 00 00 56 63 59 E4 00 2ª 04 60 00 00 56 65 20 6E 00 24 04 60 00 00 56 78 02 38 00 23 04 60 00 00 56 78 2D 7E 00 22 04 60 00 00 56 78 5D 7B 00 33 07 DD 02 1B 12 17 02 00 6B 5D B5 0D 0A

Parameter	Length(byte)	Range/Format	Default
Message Header	4	+INF	+INF
Message Type	1		
Report Mask	2	0000 – FFFF	
Length	2		
Unique ID	8	IMEI	
Device Type	1	10	**+RESP: GTVER**
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Hardware Version	2	0000 – FFFF	
MCU Version	2	0000 – FFFF	

Reserved	2	0000	
Reserved	1	00	**+RESP: GTIOS**
Reserved	2	0000	
Reserved	2	0000	
Reserved	1	00	
Reserved	2	0000	
Reserved	2	0000	
Reserved	2	0000	
Digital Input Status	1	00 – 03	
Digital Output Status	1	00 – 03	
Reserved	1	00	
Ignition Status	1	0x10 0x20	**+RESP: GTGPS**
Reserved	1	00	
Satellites in View	1		
Power Saving Enable / OWH Mode / Outside Working Hour / AGPS	1		
Last Fix UTC Time	7	YYYYMMDDHHMMSS	
Reserved	1	00	
FRI Discard No Fix	1	0|1	
ResponseReport Items Mask	2		
IGN Interval	2		
IGF Interval	2		
Reserved	4	00000000	
Reserved	1	00	
LED On	1		**+RESP: GTBAT**
External Power Voltage	2	0	
Reserved	2	0000	
Reserved	1	00	
ICCID	10	ICCID	**+RESP: GTCID**

CSQ RSSI	1	0 – 31 | 99	**+RESP: GTCSQ**
CSQ BER	1	0 – 7 | 99	
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	00	
RX Level	1		
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

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

Command	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

✧ <*Report Mask*>: It refer to the <+*INF Mask*> in **AT+GTHRM.**

✧ <*Unique ID*>: If the Bit 1 of <+*INF Mask*> is 0, IMEI of the device 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	02	59	1
HEX	56	50	22	00	0A	02	3B	01

✧ *<Power Saving Enable / OWH Mode / Outside Working Hour/ >*: The highest bit, bit 7 is reserved, bit 5 and bit 6 is for*<Power Saving Enable>*, bit 4 and bit 3 are for *<OWH Mode>*, bit 2 is for *<Outside Working Hour>*. Bit 0 is for *<AGPS>*. *<Outside Working Hour>* is used to indicate whether the device is currently outside the working hour. 1 means outside.

Bit	Item to Mask
Bit 7	*Reserved*
Bit 6	*<Power Saving Enable>*
Bit 5	
Bit 4	*<OWH Mode>*
Bit 3	
Bit 2	*<Outside Working Hour>*
Bit 1	*Reserved*
Bit 0	*<AGPS>*

✧ *<LED On>*: Bit 4 is for *<LED On>* to indicate whether the LED's are turned on.

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

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

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

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

Fix Type	**ID**
SOS	1
RTL	2
LBC	3
Reserved	4
FRI	5
GIR	6

- ✧ <*Cell Number*>: <*Cell Number*> express number of the IMSI**.** The IMSI consist of MCC, MNC, LAC, Cell ID.

4.5. Event Report +EVT

Event report messages including **+RESP:GTPNA**, **+RESP:GTPFA**, **+RESP:GTPDP** use this format.

➢ **+EVT,**

Example: **2B 45 56 54 01 00 FE 17 BF 00 5D 10 01 02 03 02 56 50 22 00 0A 02 3B 01 00 00 00 01 10 00 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 04 60 00 00 56 78 20 79 00 00 00 00 00 00 00 73 00 00 00 00 00 00 00 00 00 00 07 DD 02 17 0C 13 39 44 78 AC F2 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	10	10
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI	
External Power Voltage	2		
Digital Input Status	1	00 – 03	
Digital Output Status	1	00 – 03	
Ignition Status	1	0x10 0x20	
Satellites in View	1		
Number	1	1	
GPS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		

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

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

Command	**ID**
+RESP:GTPNA	1
+RESP:GTPFA	2
Reserved	3
Reserved	4
Reserved	5
Reserved	6
Reserved	7
Reserved	8
Reserved	9
Reserved	10
Reserved	11
+RESP:GTPDP	12
+RESP:GTIGN	13
+RESP:GTIGF	14

+RESP:GTUPD	15
Reserved	16
Reserved	17
Reserved	18
Reserved	19
+RESP:GTJDR	20
+RESP:GTGSS	21
Reserved	22
Reserved	23
Reserved	24
+RESP:GTDOS	25
Reserved	26 -30
+RESP:GTGPJ	31
+RESP:GTRMD	32

- <*Report Mask*>: It refer to the <*+EVT Mask*> in **AT+GTHRM.**
- <*Unique ID*>: If the Bit 6 of <*+EVT Mask*> is 0, IMEI of the device 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**	**02**	**59**	**1**
HEX	**56**	**50**	**22**	**00**	**0A**	**02**	**3B**	**01**

Event report message **+RESP:GTIGN** and **+RESP:GTIGF** use this format. For these two messages, the <*mileage*> field will always be present in spite of the <*Report Items Mask*> setting.

- **+EVT,**

Example:
2B 45 56 54 0D 00 FE 17 BF 00 61 10 01 02 03 03 56 50 22 00 0D 2E 06 03 00 00 01 00 20 08 00 00 00 0A 01 00 00 00 01 00 00 00 3A 06 FC 59 7F 01 E5 BC 55 07 DD 02 1B 06 19 25 04 60 00 00 56 78 5D 7B 00 00 00 00 00 00 00 7C 00 00 00 00 00 00 00 00 00 00 07 DD 02 1B 0F 1D 28 00 4D 48 9C 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	10	10
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI	
External Power Voltage	2		
Digital Input Status	1	00 – 03	
Digital Output Status	1	00 – 03	
Ignition Status	1	0x10 0x20	
Satellites in View	1		
Duration of Ignition On or Ignition Off	4	0 – 999999 sec	
Number	1	1	
GPS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	

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

Event report message **+RESP:GTUPD** uses this format. For this message, the <*Protocol Version*> and <*Firmware Version*> will always be present in spite of the <*Report Items Mask*> setting

- **+EVT,**

Example:
2B 45 56 54 0F 00 FE 17 BF 00 60 10 01 02 03 03 56 50 22 00 0D 2E 06 03 2F 87 01 00 20 06 01 2C 00 01 00 00 00 01 00 9F 00 43 06 FC 59 9D 01 E5 BC 30 07 DD 02 1B 07 38 37 04 60 00 00 56 78 5D 7B 00 00 01 08 00 00 00 73 06 00 00 00 00 00 00 00 00 00 07 DD 02 1B 11 02 16 00 E6 72 F7 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	10	10
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI	
External Power Voltage	2		
Digital Input Status	1	00 – 03	
Digital Output Status	1	00 – 03	
Ignition Status	1	0x10 0x20	
Satellites in View	1		
Code	2		
Retry	1		
Number	1	1	
GPS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	

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

Event report message **+RESP:GTGSS** uses this format.

- **+EVT,**

Example:
2B 45 56 54 15 00 FE 17 BF 00 62 10 01 02 03 03 56 50 22 00 0D 2E 06 03 2F 87 01 00 20 04 00 00 00 00 00 01 00 00 0B 00 00 94 00 60 06 FC 5C 48 01 E5 BE 7D 07 DD 02 1B 06 35 22 04 60 00 00 56 78 20 79 00 00 01 04 00 00 00 73 02 00 00 00 00 00 00 00 00 00 07 DD 02 1B 0F 3A 25 00 BA D2 30 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	10	10

Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI	
External Power Voltage	2		
Digital Input Status	1	00 – 03	
Digital Output Status	1	00 – 03	
Ignition Status	1	0x10 0x20	
Satellites in View	1		
GPS Signal Status	1	0 | 1	
Reserved	4	00000000	00000000
Number	1	1	
GPS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Reserved	4	00000000	00000000
Send Time	7	YYYYMMDDHHMMSS	

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

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

Event report message **+RESP:GTDOS** uses this format.

➢ **+EVT,**

Example:
2B 45 56 54 1B 01 FE DF FF 00 68 10 01 06 06 02 67 76 33 30 30 00 00 00 00 00 00 00 00 00 01 41 10 01 01 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 04 60 00 00 18 77 08 73 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 07 DB 01 01 00 02 1C 00 0D 80 F6 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	10	10
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI	
External Power Supply Voltage	2		
Digital Input Status	1	00 – 03	
Digital Output Status	1	00 – 03	
Ignition Status	1	0x10 0x20	
Satellites in View	1		

Wave1 output id	1	1-2	
Wave1 ouptut active	1	0|1	
Number	1	1	
GPS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

Event report message **+RESP:GTRMD** use this format..

- **+EVT,**

Example:
2B 45 56 54 20 00 FE 17 BF 00 61 10 01 02 03 03 56 50 22 00 0D 2E 06 03 00 00 01 00 20 08 00 00 00 0A 01 00 00 00 01 00 00 00 3A 06 FC 59 7F 01 E5 BC 55 07 DD 02 1B 06 19 25 04 60 00 00 56 78 5D 7B 00 00 00 00 00 00 00 7C 00 00 00 00 00 00 00 00 00 00 07 DD 02 1B 0F 1D 28 00 4D 48 9C 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	10	10
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI	
External Power Voltage	2		
Digital Input Status	1	00 – 03	
Digital Output Status	1	00 – 03	
Ignition Status	1	0x10 0x20	
Satellites in View	1		
Roaming state	1	0-3	
Number	1	1	
GPS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	

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

Event report message **+RESP:GTGPJ** uses this format.

➢ **+EVT,**

Example:
2B 45 56 54 1F 00 FE 1F BF 00 60 0F 01 05 05 02 56 50 22 00 0F 5B 2A 09 5E 00 00 00 00 16 09 03 01 01 00 00 00 00 00 00 00 5B 06 FC 59 D5 01 E5 BB 91 07 DD 07 04 05 09 2A 04 60 00 00 56 78 20 79 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 07 DD 07 04 05 09 2C 00 2C 46 69 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	0F	0F
Protocol Version	2	0000–FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI	
Battery Level	1	0~100	
External Power Voltage	2		
Digital Input Status	1	00 – 03	
Digital Output Status	1	00 – 03	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		

CW Jamming Value	1	0-255	
GPS Jamming State	1	0|1|2|3	
Number	1	1	
GPS Accuracy	1	0	0
Speed	3	0.0 –999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GPS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 –4294967.0 km	
CurrentHour 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

- <*CW Jamming Value*>: Current continues wave jamming value.
- <*GPS Jamming State*>: Current jamming state.
  - 0: unknown or feature disabled.
  - 1: (ok) no significant jamming.
  - 2:(warning) interference visible but fix OK.
  - 3: (critical) interference visible and no fix.

4.6. Heartbeat Data +HBD

➢ **+HBD,**

Example: **2B 48 42 44 EF 20 10 01 02 03 02 56 50 22 00 0A 02 3B 01 07 DD 02 17 10 35 39 46 2A A8 F8 0D 0A**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Message Header	4	+HBD	+HBD
Report Mask	1	00 – FF	
Length	1		
Device Type	1	10	10
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

✧ <*Report Mask*>: It refer to the <*+HBD Mask*> in **AT+GTHRM.**

✧ <*Unique ID*>: If the Bit 4 of <*+HBD Mask*> is 0, IMEI of the device 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**	**02**	**59**	**1**
HEX	**56**	**50**	**22**	**00**	**0A**	**02**	**3B**	**01**

If the mask of <*UID*> set as 0 in the <*+HBD Mask*> of **AT+GTHRM**, the heart beat message will not report IMEI information. If the mask of <*UID*> is set as 1, then according to the mask of < *Unique ID* >, the heart beat message will report IMEI information .

4.7. Buffer Report in HEX Format

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

Appendix: Message Index

- Command and ACK

AT+GTWLT
+ACK:GTWLT
AT+GTPDS
+ACK:GTPDS
AT+GTRMD
+ACK:GTRMD
AT+GTFFC
+ACK:GTFFC
AT+GTGPJ
+ACK:GTGPJ

✧ Position Related Report

+RESP:GTEPS
+RESP:GTDIS
+RESP:GTIOB
+RESP:GTFRI
+RESP:GTGEO
+RESP:GTSPD
+RESP:GTSOS
+RESP:GTRTL
+RESP:GTLBC
+RESP:GTDOG
+RESP:GTIGL
+RESP:GTHBM

✧ Device Information Report

+RESP:GTINF

✧ Report for Querying

+RESP:GTGPS
+RESP:GTALL
+RESP:GTCID
+RESP:GTCSQ
+RESP:GTVER
+RESP:GTBAT
+RESP:GTIOS
+RESP:GTTMZ

✧ Event Report

+RESP:GTPNA
+RESP:GTPFA
+RESP:GTPDP

+RESP:GTIGN
+RESP:GTIGF
+RESP:GTJDR
+RESP:GTGSM
+RESP:GTGSS
+RESP:GTRMD
+RESP:GTDOS
+RESP:GTGPJ

✧ Heartbeat

+ACK:GTHBD
+SACK:GTHBD

✧ Server Acknowledgement

+SACK

✧ Hex format report message

+ACK
+RSP
+EVT
+INF
+HBD