GV57MG V2(Plus) @Track Air Interface Protocol

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

TRACGV57MG V2AN001

V5.02



Driving Smarter IoT

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History

Version	Date	Author	Description of Change
1.00	March 29, 2023	Mint Fang	Initial.
2.00	June 25,2023	Randall Zhang	1. Added type 3 and 4 for < *Beacon ID Model* >, < *Accessory Append Mask* >, < *Low Voltage Threshold* > and <*Organization Unique Identifier*> to **AT+GTBID**; 2. Added **+RESP:GTBID** and **+RESP:GTBIE**. 3.Added <*Index*> to **AT+GTBID**. 4.Added <*Ghost Bluetooth Name*> to **AT+GTSVR**.
3.00	Oct 13,2023	Kinnon Hu	1.Added <*Push Button Event*> to **AT+GTBID**. 2.Added **AT+GTIDA**. 3.Added **AT+GTPEO**. 4.Added <*Battery Level*> to all EVT message in HEX. 5. Added Bit11 Battery Level for < *+EVT Mask* > to **AT+GTHRM**. 6. Added <*DNS Lookup Interval*> to **AT+GTSRI** and **AT+GTQSS**.
3.01	Oct 26,2023	Kinnon Hu	1.Added **RTO-5**.
3.02	Nov 14,2023	Kinnon Hu	1. Change the maximum value of the <*MPN/MPF Validity Time*> parameter.
4.00	Feb 27,2024	Batty Zhang	1. Integrated the GV57MG V2 and GV57MGPlus protocols. 2. Removed the BLE accessories limitation in **AT+GTBAS**
5.00	Mar 29, 2024	Kinnon Hu	1. Added mode 4 for <*Keyfob Detection Mode*> to **AT+GTBID**. 2. Added Bit30, Bit31 for <*Input ID Mask*> to

			AT+GTUDF. 3. Changed feature of <*WID3X0 Detection Mode*> mode 3 in **AT+GTBID**. 4. Changed value range of <*WID3X0 IGN Scan/Report Interval*> and <*WID3X0 IGF Scan/Report Interval*> in **AT+GTBID** from 0|10 - 86400(s) to 0|30 - 86400(s).
5.01	Jul 5,2024	Kinnon Hu	1. Added CAN100 BLE accessory to **AT+GTBAS**. 2. Added **AT+GTCAN** command and **+RESP: GTCAN** message. 3. Added **AT+GTCLT** command and **+RESP: GTCLT** message. 4. Added <+*CAN Mask*> to **AT+GTHRM**. 5. Added <*CAN Module Operation Mode*> and <*CAN Module Car Model ID*> in the **AT+GTRTO** command. 6. Added **+RESP: GTCML** message. 7. Added Bit6 for <*INF Expansion Mask*> to **AT+GTHRM**. 8. Added Bit 42 and Bit 43 for <*Input ID Mask*> to **AT+GTUDF**. 9. Added mode 4 and mode 5 for <*Command Type*> to **AT+GTDAT**. 10. Added <*Long Operation1*> to **AT+GTOUT**.
5.02	August 1, 2024	Along.Lv	Changed the range of <*GNSS*

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			Accuracy> in event message.

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1. Overview

1.1. Scope of This Document

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

This document describes how to build the connection between the backend server and the terminal.

1.2. Terms and Abbreviations

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

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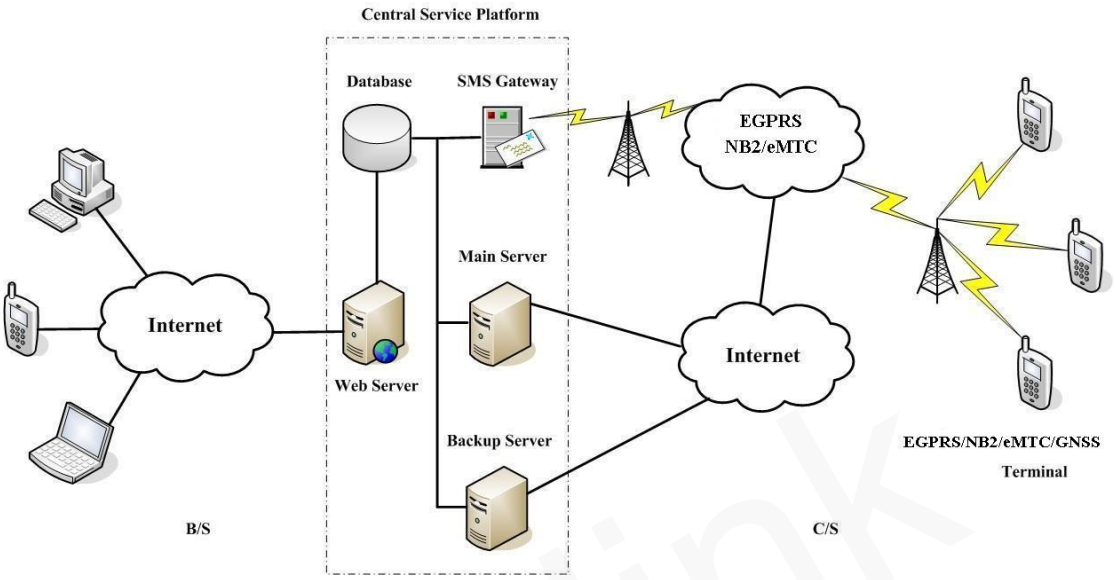
2. System Architecture



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

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

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3. Message Description

3.1. Message Format

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

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

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

To learn more, refer to Chapter 3.2 Command and Acknowledgement and Chapter 3.3 Report.

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

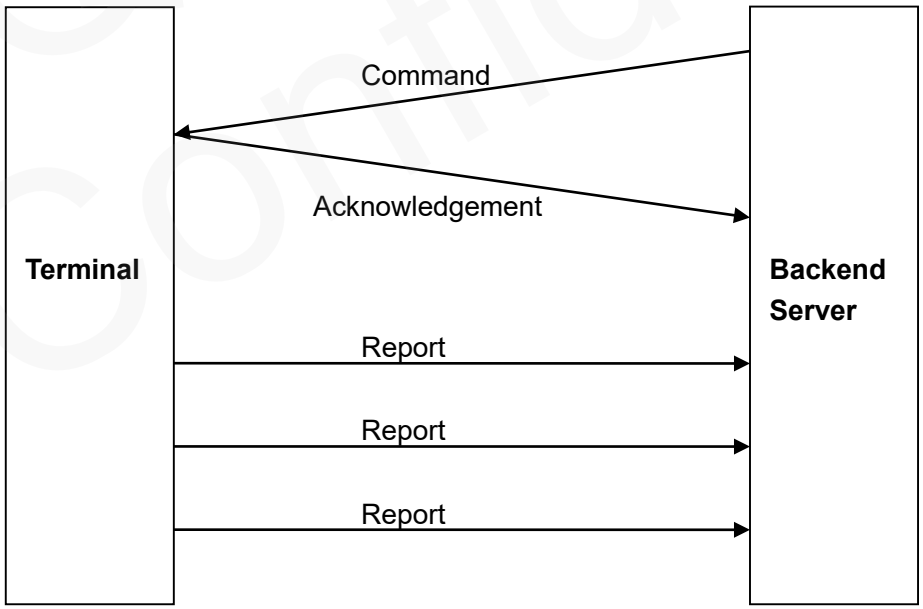

Figure 1: @Track Protocol Message Flow

3.2. Command and Acknowledgement

3.2.1.Server Connection

3.2.1.1.Bearer Setting Information

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

➢ **AT+GTBSI=**

Example: **AT+GTBSI=gv57,cmnet,,,,,,,,0000$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
APN	<=40	(ASCII)	
APN User Name	<=30	(ASCII)	
APN Password	<=30	(ASCII)	
Backup APN	<=40	(ASCII)	
Backup APN User Name	<=30	(ASCII)	
Backup APN Password	<=30	(ASCII)	
APN Authentication Methods / Network Mode	2	00 - 33	00
LTE Mode	1	0 - 5	0
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Password*>: The valid characters for the password include '0'– '9', 'a' – 'z', and 'A' – 'Z'. The default value is "gv57".

✧ <*APN*>: Access point name (APN).

✧ <*APN User Name*>: The APN user name. If the parameter field is empty, the current value for this parameter will be cleared.

✧ <*APN Password*>: The APN password. If the parameter field is empty, the current value for this parameter will be cleared.

✧ <*Backup APN*>: Backup access point name (APN). If <*APN*> does not work, <*Backup APN*> will be used.

✧ <*Backup APN User Name*>: The backup APN user name. If the parameter field is empty, the current value for this parameter will be cleared.

✧ *<Backup APN Password>*: The backup APN password. If the parameter field is empty, the current value for this parameter will be cleared.

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

✧ *< APN Authentication Methods / Network Mode >*: This field is in hex format. 4 high bits indicate APN authentication method and 4 low bits indicate network mode.

Mobile network mode of the device:

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

Mobile APN Authentication method of the device:

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

✧ *<LTE Mode>*: The LTE network mode.

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

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

The network search sequence list is shown as below:

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

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		2	Cat-M1	M1	N/A	N/A
		3	Cat-NB2	NB2	N/A	N/A
3	EGPRS First	0	Cat-M1&Cat-NB2(Cat-M1 First)	2G	M1	NB2
		1	Cat-M1&Cat-NB2(Cat-NB2 First)	2G	NB2	M1
		2	Cat-M1	2G	M1	N/A
		3	Cat-NB2	2G	NB2	N/A

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

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

- **+ACK:GTBSI,**

Example: **+ACK:GTBSI,840501,135790246811220,,0000,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

- <*Protocol Version*>: The protocol version that the terminal conforms to. The first two characters indicate the device type. As shown in the example, "**84**" means GV57MG V2, "**89**" means GV57MGPlus. The middle two characters represent the major version number of the protocol and the last two characters represent the minor version number of the protocol. Both version numbers are hex digits. For example, "**0100**" means version 1.00.
- <*Unique ID*>: The IMEI of the terminal.
- <*Device Name*>: The specified name of the device.
- <*Serial Number*>: A serial number which is the same as the <*Serial Number*> in the corresponding command. It distinguishes which command the ACK message is for.
- <*Send Time*>: The local time when receiving the right **AT+GTBSI** command.
- <*Count Number*>: A self-incrementing number in each acknowledgment message and report message. It begins from 0000 and increases by 1 for each message. It recycles back after "FFFF".
- <*Tail Character*>: A character which indicates the end of the command. It must be '$'.

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

3.2.1.2.Backend Server Registration Information

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

- **AT+GTSRI=**

Example: **AT+GTSRI=gv57,3,,1,116.226.44.17,7011,116.226.45.229,7012,+8613812341234,15,1,,,,,,,0001$** **AT+GTSRI=gv57,3,,1,some.host.name,7011,116.226.45.229,7012,+8613812341234,15,1,,,,,,,0001$** **AT+GTSRI=gv57,8,,1,116.226.44.17:7010,,116.226.45.229:7012,,+8613812341234,15,1,,,,,,,0001$** **AT+GTSRI=gv57,8,,1,some.host.name:7011,,,,+8613812341234,15,1,,,,,,,0001$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Report Mode	1	0 - 8	0
Reserved	0		
Buffer Mode	1	0 - 2	1
Main Server IP / Domain Name	<=60	(ASCII)	
Main Server Port	<=5	0 - 65535	0
Backup Server IP / Domain Name	<=60	(ASCII)	
Backup Server Port	<=5	0 - 65535	0
SMS Gateway	<=20	(Call Number)	
Heartbeat Interval	<=3	0|2 - 360(min)	0
SACK Enable	1	0 - 2	0
Protocol Format	1	0|1	0
SMS ACK Enable	1	0|1	0

Reserved	0		
Special SACK Enable	1	0|1	0
Encryption Mode	1	0 - 2	0
DNS Lookup Interval	4	0-1440 min	0
Serial Number	4	(HEX)	
Tail Character	1	$	$

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

- 0: Stop mode.
- 1: TCP short-connection preferred mode. The connection is based on TCP protocol. The terminal connects to the backend server every time it needs to send data and will shut down the connection when the terminal finishes sending data. If the terminal fails to establish TCP connection to the backend server (both Main Server and Backup Server), it will try to send data via SMS to the SMS gateway.
- 2: TCP short-connection forced mode. The connection is based on TCP protocol. The terminal connects to the backend server every time it needs to send data and will shut down the connection when the terminal finishes sending data. If the terminal fails to establish TCP connection to the backend server (both Main Server and Backup Server), it will store the data in the memory buffer if the buffer report function is enabled. Otherwise the data is dropped.
- 3: TCP long-connection mode. The connection is based on TCP protocol. The terminal connects to the backend server and maintains the connection using the heartbeat data. The backend server should respond to the heartbeat data from the terminal.
- 4: UDP mode. The terminal will send data to the backend server by UDP protocol. Receiving protocol commands via UDP is supported if the EGPRS/LTE network allows it. It is recommended to enable heartbeat sending and the **+RESP:GTPDP** report in the case of receiving commands via UDP.
- 5: Forced SMS mode. Only SMS is used for data transmission.
  Note: The messages **+RESP:GTALM**, **+RESP:GTCRD** are sent via TCP short connection when the report mode is forced to be SMS mode.
- 6: UDP with fixed local port. Like the UDP mode, the terminal will send data using UDP protocol. The difference is the terminal will use a fixed local port rather than a random port to communicate with the server in this mode. Thus the backend server could use the identical port to communicate with all terminals if the backend server and the terminals are all in the same VPN network. The port number the device uses is the same as the port number of the primary server.
- 7: Backup-server-connection supported TCP long-connection mode. The connection is based on TCP protocol. The terminal connects to the backend

server and maintains the connection using the heartbeat data. The backend server should respond to the heartbeat data from the terminal. If the main server connection is lost, the terminal will try to connect to the backup server. If the backup server connection is also lost, the terminal will try to connect to the main server again.

- 8: HTTP GET Mode. The terminal will send messages using HTTP GET method. The message to be sent is included in the URL of the HTTP GET Method. Only ASCII format message is sent in this mode. <*SACK Enable*> will be ignored, and the first character '+' will be replaced by the path defined in the URL.

Examples of messages in this mode:

Example 1:

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

Message:

GET /report/ACK:GTQSS,840501,00000000000000,GV57,FFFF,20230501170607,004A$ HTTP/1.1<CR><LF>
Host:220.178.67.210<CR><LF>
Accept: */*<CR><LF>
Accept-Language: en-us,en-gb,zh-cn<CR><LF>
User-Agent: Queclink_GV57<CR><LF>
Connection: Keep-Alive<CR><LF><CR><LF>

Example 2:

URL: www.queclink.com:8080/report

Message:

GET /reportACK:GTQSS,840501,00000000000000,GV57,FFFF,20230501170607,004B$ HTTP/1.1<CR><LF>
Host:220.178.67.210<CR><LF>
Accept: */*<CR><LF>
Accept-Language: en-us,en-gb,zh-cn<CR><LF>
User-Agent: Queclink_GV57<CR><LF>
Connection: Keep-Alive<CR><LF><CR><LF>

Example 3:

URL: www.queclink.com:8080

Message:

GET /RESP:GTINF,840501,00000000000000,GV57,41,,31,0,1,,,4.11,0,1,0,,,20230501065034,96,,37.9,,,20230501145038,04F2$ HTTP/1.1<CR><LF>
Host:220.178.67.210<CR><LF>
Accept: */*<CR><LF>
Accept-Language: en-us,en-gb,zh-cn<CR><LF>
User-Agent: Queclink_GV57<CR><LF>
Connection: Keep-Alive<CR><LF><CR><LF>

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- <*Buffer Mode*>: The working mode of the buffer report function. If the buffer report function is enabled, the device will store all report messages locally when in areas without EGPRS/LTE network coverage. If the device goes back to areas with EGPRS/LTE network coverage, it will then send all the buffered reports through EGPRS/LTE. The device will delete all buffered reports after upgrading Modem/BB/MCU firmware locally or OTA.
  - 0: Disable the buffer report function.
  - 1: Low priority - Enable the buffer report function. In this mode, the device will send the buffered messages after real-time messages.
  - 2: High priority - Enable the buffer report function. In this mode, the device will send all the buffered messages before sending real-time messages, except messages **+RESP:GTSOS, +RESP:GTPFA, +RESP:GTPDP** and **+RESP:GTUPD**.
- <*Main Server IP / Domain Name*>: The IP address or the domain name of the primary server. For the HTTP GET mode, this represents the URL including server address and port number. For example, in “www.queclink.com:8080/report”, “www.queclink.com” is domain name of the HTTP server, “8080” is the port of the HTTP server, and “report” is the URL header before message body data in the following HTTP GET packet. If there is no “/report” in the URL, then there is no such header before message body data.
- <*Main Server Port*>: The port of the primary server. For the HTTP GET mode, this parameter is invalid.
- <*Backup Server IP / Domain Name* >: The IP address of the backup server.
- <*Backup Server Port*>: The port of the backup server.
- <*SMS Gateway*>: Maximum 20 characters including the optional national code starting with “+” for sending SMS messages. Short code (for example, 10086) is also supported.
- <*Heartbeat Interval*>: The time interval for sending the heartbeat message (**+ACK:GTHBD**) when the report mode is TCP long-connection mode or UDP mode. If it is set to 0, no heartbeat message will be sent.
- <*SACK Enable*>: This parameter defines whether the backend server will respond to the terminal with SACK messages when receiving messages from the terminal. If the parameter <*SACK Enable*> is set to 1 or 2, <*Special SACK Enable*> will be disabled.
  - 0: The backend server will not reply with a SACK message after receiving a message from the terminal.
  - 1: The backend server will reply with a SACK message when receiving a message from the terminal.
  - 2: The backend server replies with a SACK message when receiving a message from the device, but the device does not check the serial number of the SACK message. **Note:** If the device receives **+SACK:GTHBD** from the backend server, the device must check the serial number of the SACK message **+SACK:GTHBD** no matter what <*Enable SACK*> is.
- <*Protocol Format*>: This parameter defines the format of the report messages sent from the device to the backend server. 0 means “ASCII format”, 1 means “HEX format”.

- <*SMS ACK Enable*>: A numeral to indicate whether to send the acknowledgement message to the original number when the command is sent via SMS.
  - 0: The device will send the acknowledgement message to the backend server according to the mode configured by <*Report Mode*>.
  - 1: The device will send the acknowledgement message to the original number via SMS if the command is received via SMS.
- <*Special SACK Enable*>: This parameter defines whether the backend server will respond to the terminal with specified SACK messages when receiving the specified messages (i.e. **+RESP:GTCID**) from the terminal. It is valid when the parameter <*SACK Enable*> is disabled.
  - 0: The backend server will not reply with a specified SACK message when receiving a specified message from the terminal.
  - 1: The backend server will reply with a specified SACK message when receiving a specified message from the terminal.
- < *Encryption Mode*>: The parameter that specifies the mode of message encryption. This parameter is invalid for SMS messages that will not be encrypted.
  - 0: Disable encryption.
  - 1: Enable AES-256 encryption. The device encrypts the message content excluding “+RESP”/“+BUFF” and “$”.
  - 2: Enable AES-256 encryption. The device encrypts the message content after Unique ID and before “$”, and uses “+ARSP”/“+ABUF” as the header for an encrypted message.
- <*DNS Lookup Interval*>: The interval to resolve the backend server IP address via DNS lookup and rebuild TCP long or UDP connection. The rang is 0-1440min. 0 means to disable this feature. This will work when the type of <*Report Mode*> is TCP/UDP.

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

- **+ACK:GTSRI,**

Example: **+ACK:GTSRI,840501,135790246811220,,0001,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

3.2.1.3.Quick Start Setting

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

- **AT+GTQSS=**

Example: **AT+GTQSS=gv57,cmnet,,,3,,2,177.64.116.137,7011,,0,+8613812341234,3,1,0,,1,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
APN	<=40	(ASCII)	
APN User Name	<=30	(ASCII)	
APN Password	<=30	(ASCII)	
Report Mode	1	0 - 8	0
Reserved	0		
Buffer Mode	1	0 - 2	1
Main Server IP / Domain Name	<=60	(ASCII)	
Main Server Port	<=5	0 - 65535	0
Backup Server IP / Domain Name	<=60	(ASCII)	
Backup Server Port	<=5	0 - 65535	0
SMS Gateway	<=20	(Call Number)	
Heartbeat Interval	<=3	0|2 - 360(min)	0
SACK Enable	1	0 - 2	0
Protocol Format	1	0|1	0
Reserved	0		
DNS Lookup Interval	4	0-1440 min	0

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Serial Number	4	(HEX)	
Tail Character	1	$	$

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

- **+ACK:GTQSS,**

Example: **+ACK:GTQSS,840501,135790246811220,,0002,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.2.Device Configuration

3.2.2.1.Global Configuration

The command **AT+GTCFG** is used to configure the global parameters. All parameters ending in GV57MGPlus indicate that this parameter only works on GV57MGPlus.

- **AT+GTCFG=**

Example: **AT+GTCFG=gv57,123456,gv57,,,,,,,,,,,,,,,,0,0003$** **AT+GTCFG=gv57,,,1,123.4,,,003F,2,,023DFF,,1,1,300,00,1,0,0,,0,0,24,15,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
New Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	GV57MGV2
ODO Enable	1	0|1	0
ODO Initial Mileage	<=9	0.0 - 4294967.0(km)	0.0
Reserved	0		

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Reserved	0		
Report Composition Mask	<=4	(HEX)	003F
Power Saving Mode	1	0 - 3|4	1
Reserved	0		
Event Mask	<=6	(HEX)	23DFF
Reserved	0		
LED On	1	1|2	2
Info Report Enable	1	0|1	0
Info Report Interval	<=5	30 - 86400(sec)	300
Location Request Mask	2	00|10|20	00
Backup Battery On	1	0|1	1
Backup Battery Charge Mode	1	0 - 2	0
AGPS Mode	1	0|1	0
Reserved	0		
GNSS Lost Time	<=2	0 - 30(min)	0
Invert Output State	1	0|1	0
Wakeup Hour Interval(GV57MG Plus)	<=3	1-720(hour)	24
Work Time per Wakeup(GV57MG Plus)	<=2	5-60(min)	15
Serial Number	4	(HEX)	
Tail Character	1	$	$

- <*New Password*>: It is configured to change the current password.
- <*Device Name*>: An ASCII string which represents the name of the device.
- <*ODO Enable*>: Enable/disable the odograph function to calculate the total mileage. The current mileage is included in every position report message.
- <*ODO Initial Mileage*>: The initial value for calculating the total mileage.
- <*Report Composition Mask*>: Bitwise mask to configure the composition of a report message, especially the composition of GNSS information.
  - Bit 0 for <*Speed*>
  - Bit 1 for <*Azimuth*>
  - Bit 2 for <*Altitude*>

- Bit 3 for network data, including <*MCC*>, <*MNC*>, <*LAC*>, <*Cell ID*> and the <*Reserved*> parameter value “00”
- Bit 4 for <*Mileage*>
- Bit 5 for <*Send Time*>, the time when the report message is generated.
- Bit 6 for <*Device Name*>

For each bit, set it to 1 to enable the corresponding component in the report, and 0 to disable the corresponding component. This mask is valid for all report messages.

✧ <*Power Saving Mode*>: The parameter that configures the mode of the power saving function.

- 0: Disable the power saving function.
- 1: GNSS deep saving mode. If the parameter is set to 1, the fixed report, geo-fence and speed alarm report functions are suspended when the device is at rest or the engine is turned off (Auto parking fence and manual parking fence will not be suspended in this case).
- 2: GNSS low saving mode. The difference between Mode 1 and Mode 2 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.
- 3: GNSS and RF deep saving mode. The device can enter and exit sleep mode. **+RESP:GTFRI** will be reported when device isn’t in sleep mode. When the engine is on, the send interval of **+RESP:GTFRI** will be set to <S*end Interval*> in **AT+GTFRI**. When the engine is off, the send interval of **+RESP:GTFRI** is set to <*IGF Report Interval*> in **AT+GTFRI**, and if device is not moving for 2 minutes, it will enter sleep mode (close RF and GNSS). Device will be woke up when an accelerometer event occurs or it has been in sleep mode for 6 hours. When the engine is on, **+RESP:GTSTT** will not be reported.
- 4: Very deep saving mode (only supported on GV57MG Plus). In this mode, the device will enter very deep saving mode by turning off main processor including GNSS and wake up according to the parameters <*Wakeup Hour Interval*>, <*Work Time per Wakeup*> when ignition off. The device will wake up every <*Wakeup Hour Interval*> and keep working for <*Work Time per Wakeup*> before entering very deep saving mode again in ignition off state. The device will wake up and work normally in ignition on state. This mode is only valid when **AT+GTVMS** mode is set to zero and <*Backup Battery On*> is set to 1.

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

- Bit 0 for **+RESP:GTPNA**
- Bit 1 for **+RESP:GTPFA**
- Bit 2 for **+RESP:GTMPN**
- Bit 3 for **+RESP:GTMPF**
- Bit 4 for **+RESP:GTCID**
- Bit 5 for **+RESP:GTBPL**
- Bit 6 for **+RESP:GTBTC**
- Bit 7 for **+RESP:GTSTC**
- Bit 8 for **+RESP:GTSTT**

- Bit 9 Reserved
- Bit 10 for **+RESP:GTPDP**
- Bit 11 for the power on **+RESP:GTRTL**
- Bit 12 for the ignition report **+RESP:GTIGN / +RESP:GTVGN** and **+RESP:GTIGF / +RESP:GTVGF**
- Bit 13 for the ignition on/off location report **+RESP:GTIGL / +RESP:GTVGL**
- Bit 14 Reserved
- Bit 15 Reserved
- Bit 16 Reserved
- Bit 17 for **+RESP:GTDRM**

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

✧ <*LED On*>: It configures the working mode of LEDs.
- 1: Turn on Cell LED and GNSS LED as configured.
- 2: All LEDs (Cell LED and GNSS LED) work 10 minutes after power on and then will be turned off.

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

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

✧ <*Location Request Mask*>: Bitwise mask for SMS position request. 4 high bits are for SMS request and 4 low bits are reserved. Each bit of bit 4 to bit 5, represents one type of report. Set to 1 to enable and 0 to disable corresponding report.
- Bit 4: Report the current position (**+RESP:GTLBC**) when the device receives SMS position request message via SMS.
- Bit 5: Report the current position with Google Maps link through SMS to the original number when the device receives SMS Position Request message via SMS.

✧ <*Backup Battery On*>: It configures whether to enable backup battery. Set it to 1 to enable backup battery, and 0 to disable backup battery. If this parameter is set to 1, the backup battery will be used when <*Backup Battery Charge Mode*> is set to 1 or 2 and the ignition is off.

✧ <*Backup Battery Charge Mode*>: It controls the charge mode of the backup battery.
- 0: When the main power supply is connected, the backup battery is charged as needed.
- 1: When the main power supply is connected, the backup battery will be charged only when ignition on is detected. The charge process will begin 3 minutes after the ignition is turned on. The charge process is stopped when the ignition is off. When the ignition is off, the internal backup battery will supply power to the device.

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- 2: The external power supply will charge the internal backup battery when ignition on is detected, or when the internal backup battery capacity is less than 30 percent and the ignition is off. The external power supply will power the device during the charging process, while the internal backup battery will supply power to the device when the ignition is off. The charging process lasts until the internal backup battery is fully charged.

✧ <*AGPS Mode*>: A numeral which indicates whether to enable AGPS. AGPS helps increase the chances of getting GNSS position successfully and reduces the time needed to get GNSS position.
- 0: Disable the AGPS function.
- 1: Enable the AGPS function.

✧ <*GNSS Lost Time*>: A time parameter for monitoring GNSS signals. If there is no GNSS signal or successful GNSS fix for <*GNSS Lost Time*> consecutively, the device will send the event report **+RESP:GTGSS** to indicate "GNSS signal lost". When the GNSS signal is recovered or a successful fix is obtained again, the device will send the event report **+RESP:GTGSS** to indicate the recovery. 0 means "Disable this parameter".

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

✧ <*Invert Output State*>: It controls whether to invert the output state of OUTPUT1.
- 0: Disable this parameter.
- 1: Enable this parameter.

✧ <Wakeup Hour Interval>: A numeral to specify the interval to wake up the terminal. The value 24 means the terminal wakes up once per 24 hours. Only supported on GV57MG Plus.

✧ <Work Time per Wakeup>: Set work time per Wakeup, the value range 5-60 minutes and the default value is 15 minutes. Only supported on GV57MG Plus.

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

➢ **+ACK:GTCFG,**

Example: **+ACK:GTCFG,840501,135790246811220,,0003,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	

Tail Character	1	$	$

3.2.2.2.Auto-Unlock PIN

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

➢ **AT+GTPIN=**

Example: **AT+GTPIN=gv57,1,0000,,,,,,0014$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Enable Auto-unlock PIN	1	0|1	0
PIN	4 - 8	'0' - '9'	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ *<Auto-Unlock PIN>*: The parameter that indicates whether to unlock the SIM-PIN for the device.

- 0: Do not unlock SIM-PIN automatically.
- 1: Each time the device is powered on, it will detect whether the SIM card is locked with a PIN. If it is locked, the device will unlock the PIN automatically.

✧ *<PIN>*: The PIN code which is used to unlock the SIM automatically. If it is empty, the PIN code saved in the device will be cleared.

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

➢ **+ACK:GTPIN,**

Example: **+ACK:GTPIN,840501,135790246811220,,0004,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**

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

3.2.2.3.Time Adjustment

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

- **AT+GTTMA=**

Example: **AT+GTTMA= gv57,-,3,30,0,20230917203500,,,,,0011$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Sign	1	+|-	+
Hour Offset	<=2	0 - 12	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	(HEX)	
Tail Character	1	$	$

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

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

➢ **+ACK:GTTMA,**

Example: **+ACK:GTTMA,840501,135790246811220,,0005,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.2.4.Outside Working Hours

To protect the privacy of the driver when he is off duty, the device can be configured to report empty location information outside working hours. The command **AT+GTOWH** is used to define the working hours and the working mode to protect the privacy. If this function is enabled and it is outside of working hours, in all ASCII format reports except **+RESP:GTSOS,+RESP:GTJDR** and **+RESP:GTJDS**, the fields Latitude, Longitude, MCC, MNC, LAC, Cell ID and the reserved field after Cell ID will be empty. Meanwhile, in HEX format reports where location should be hidden, the fields Latitude and Longitude will be filled with 0x054C5638, and the fields MCC, MNC, LAC Cell ID and the reserved field after Cell ID will be filled with 0.

➢ **AT+GTOWH=**

Example: **AT+GTOWH=gv57,1,1F,0900,1200,1300,1730,,,,0,1,0,0,,,,,0012$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**

Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0|1	0
Day of Work	<=2	0 - 7F	1F
Working Hours Start1	4	HHMM	0900
Working Hours End1	4	HHMM	1200
Working Hours Start2	4	HHMM	1300
Working Hours End2	4	HHMM	1800
Reserved	0		
Reserved	0		
Reserved	0		
Digital Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of this function.
- 0: Disable this function.
- 1: Enable this function. In this mode, the device will automatically check the current time against the working hours range. If it is outside working hours, the device will hide the location information. Otherwise, the location information will be reported normally.

✧ <*Day of Work*>: The parameter that specifies the working days in a week in a bitwise manner.
- Bit 0 for Monday
- Bit 1 for Tuesday
- Bit 2 for Wednesday
- Bit 3 for Thursday
- Bit 4 for Friday
- Bit 5 for Saturday

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- Bit 6 for Sunday

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

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

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

✧ <*Output ID*>, <*Output Status*>, <*Duration*> and <*Toggle Times*>: If this function is enabled and it is currently off duty time, a specified wave will be output at the specified output.

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

➢ **+ACK:GTOWH,**

Example: **+ACK:GTOWH,840501,135790246811220,,0006,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.2.5.Protocol Watchdog

The command **AT+GTDOG** is used to reboot the device in a time based manner or upon ignition. This helps the device avoid working in an abnormal status for a long time. Besides these two automatic reboot methods, the device also supports the use of the digital input to trigger the reboot manually.

➢ **AT+GTDOG=**

Example: **AT+GTDOG=gv57,1,,1,0130,,1,,,60,60,,0013$** **AT+GTDOG=gv57,2,30,,,,1,,,60,60,,0013$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0 - 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|6	0
Reserved	0		
No Network Interval	<=4	0|5 - 1440(min)	60
No Activation Interval	<=4	0|5 - 1440(min)	60
Send Failure Timeout	<=4	0|5 - 1440(min)	60
Serial Number	4	(HEX)	
Tail Character	1	$	$

- <*Mode*>: The working mode of the watchdog function.
  - 0: Disable this function
  - 1: Reboot periodically according to the <*Interval*> and <*Time*> settings.
  - 2: Reboot upon ignition on.
- <*Ignition Frequency*>: If the time interval between the current ignition-on and last ignition-on reboot is greater than the value specified by this parameter when the working mode is 2, the device will automatically reboot upon ignition on. The device will reboot automatically upon the second ignition on for the first time use whatever the time interval from the first ignition-on.
- <*Interval*>: The interval for rebooting the device. It is measured in days. Rebooting the device for the first time will ignore this interval.
- <*Time*>: The time at which the reboot operation is performed when <*Interval*> is reached.
- <*Report Before Reboot*>: Whether to report the **+RESP:GTDOG** message before reboot. 0 means “Do not report the message before reboot”, and 1 means “Report the message before reboot”. If this parameter is enabled, the device will initiate a real-time location fix before sending the message with the current location information.
- <*Input ID*>: The ID of the digital input port which is used to trigger manual reboot. 0 means “Disable manual reboot”.

  Note: Before using input1/input6 to trigger reboot, Bit 6 (for state of digital input) of <*Mask*> in **AT+GTPDS** must be set to 1; otherwise, the device will reboot repeatedly.
- <*No Network Interval*>: The interval for rebooting the device when there is no network signal. 0 means “Do not reboot the device”.
- *<No Activation Interval>:* The interval for rebooting the device when the device is unable to be registered to the EGPRS/LTE network. 0 means “Do not reboot the device.”

✧ *<Send Failure Timeout>:* The length of time (in minutes) before rebooting the device when the device fails to send a message. 0 means “Do not reboot the device”.

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

➢ **+ACK:GTDOG,**

Example: **+ACK:GTDOG,840501,135790246811220,,0007,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.2.6.Settings for Preserving Device’s Specified Logic States

The command **AT+GTPDS** is used to preserve specified logic states of the device. The specified logic states selected according to the value of <*Mask*> will be preserved or reset according to the working mode.

➢ **AT+GTPDS=**

Example: **AT+GTPDS=gv57,1,1F,,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0 - 2	0
Mask	4	(HEX)	0
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			

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

✧ <*Mode*>: The working mode of this function.
- 0: Disable this function.
- 1: Preserve specified logic states according to the value of <*Mask*>.
- 2: Reset all the specified logic states listed in <*Mask*> after receiving the command, and then preserve specified logic states according to the value of <*Mask*>.

✧ <*Mask*>: Bitwise mask to configure which device states will be preserved. Each bit represents a state.
- Bit 0: State of GEO
- Bit 1: Reserved
- Bit 2: Reserved
- Bit 3: Information of last known position
- Bit 4: State of ignition
- Bit 5: State of wave shape 1 and final state of gradual progressive wave shape
- Bit 6: State of digital input
- Bit 7: State of SPD
- Bit 8: State of SSR
- Bit 9: State of main power

Note: The ignition input can be configured as digital input6, so please do not set Bit 4 and Bit 6 to 1 at the same time. Otherwise, the **AT+GTPDS** function may not work properly.

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

➢ **+ACK:GTPDS,**

Example: +ACK:GTPDS,840501,135790246811220,,0008,20230214093254,FFFF$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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3.2.2.7.Over-the-air Configuration Update

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

➢ **AT+GTUPC=**

Example: **AT+GTUPC=gv57,0,30,0,1,0,http://www.queclink.com/configure.ini,1,,1,0000001F,,3,0001$**			
Parameter	**Length (Byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	Gv57
Max. Download Retry	1	0 - 3	0
Download Timeout	<=2	5 - 30(min)	10
Download Protocol	1	0	0
Enable Report	1	0|1	0
Update Interval	<=4	0 - 8760(h)	0
Download URL	<=100	(URL)	
Mode	1	0|1	0
Reserved	0		
Extended Status Report	1	0|1	0
Identifier Number	<=8	(HEX)	0
Reserved	0		
Update Status Mask	1	(HEX)	3
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Max Download Retry*>: The parameter that specifies the maximum number of retries to download the configuration file upon download failure.

✧ <*Download Timeout*>: The parameter that specifies the expiration timeout of a single download. If the download expires, it is considered to be failure.

✧ <*Download Protocol*>: The protocol used to download the file. Only HTTP is supported now. It is set to 0.

✧ <*Enable Report*>: The parameter that indicates whether to report the message **+RESP:GTUPC** or **+RESP:GTEUC** when the configuration is updated over the air.

- 0: Do not report the message **+RESP:GTUPC** or **+RESP:GTEUC**.
- 1: Report the message **+RESP:GTUPC** or **+RESP:GTEUC**.

✧ <*Update Interval*>: The time interval measured in hours for updating the configuration over the air.

✧ <*Download URL*>: The parameter that specifies the URL to download the configuration file. If the <*Download URL*> ends with "/", it means the URL is just a path without a file name, the device will add <imei>.ini as the file name to complete the URL. If it is greater than 100 bytes in length, an error will be returned. The URL is a complete path and must contain an http header, such as http://.

✧ <*Mode*>: The parameter that indicates the working mode of downloading configuration over the air.

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

✧ <*Extended Status Report*>: The parameter that indicate the message to be reported for the configuration update status when <*Report Enable*> is set to 1. In HEX format, this parameter will be ignored and only **+RESP:GTUPC** message will be sent to the backend server.

- 0: Report the message **+RESP:GTUPC.**
- 1: Report the message **+RESP:GTEUC** to include more information.

✧ <*Identifier Number*>: The parameter that identifies the update configuration request. This number will be included in the message **+RESP:GTEUC** to indicate the request it is related to.

✧ <*Update Status Mask*>: Bitwise mask to configure the status in which the device can update the configuration.

- Bit 0 for ignition off
- Bit 1 for ignition on

Note:

1. The maximum sizes of the configuration file is 100KB, the device will fail to download the configuration file when the sizes of the file is more than 100KB.
2. Make sure there is only one command per line in the configuration file and there is a "\r\n" between two commands. Only the first command will be executed when there is more than one command in a line.
3. There should be no space before each command.
4. The configuration file should be a plain text file.
5. **+RESP:GTEUC** in hex format has the same message format as **+RESP:GTUPC**.

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

➢ **+ACK:GTUPC,**

Example: **+ACK:GTUPC,840501,135790246811220,,0009,20100310172830,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	

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

3.2.2.8.Configuration File Version

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

➢ **AT+GTFVR=**

Example: **AT+GTFVR=gv57,1,0000,,,,,,,,,,0010$**			
Parameter	**Length (Byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	Gv57
Configuration Name	<=40	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Configuration Version	4	0000 - 9999	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Digital Signature	32	'0'-'9', 'a'-'z', 'A'-'Z'	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Generation Time	14	YYYYMMDDHHMMSS	
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Configuration Name*>: The name of the configuration file.

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

✧ <*Digital Signature*>: The parameter is used to confirm the validity of subsequent commands.

✧ <*Generation Time*>: The time when the configuration file is generated.

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

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

- **+ACK:GTFVR,**

Example: **+ACK:GTFVR,840501,135790246811220,,000A,20180214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.3.Position Related Report

3.2.3.1.Fixed Report Information

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

- **AT+GTFRI=**

Example: **AT+GTFRI=gv57,0,,,,,,,,,,,,,,,,0009$** **AT+GTFRI=gv57,1,1,,1,1000,2300,,30,,,,,600,,,,,0009$** **AT+GTFRI=gv57,2,1,,1,1000,2300,,,500,,,,,,,,,0009$** **AT+GTFRI=gv57,3,1,,1,1000,2300,,,,1000,,,,,,,,0009$** **AT+GTFRI=gv57,4,1,,1,1000,2300,,60,,300,,,,,,,,0009$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0 - 5	0
Discard No Fix	1	0|1	1
Reserved	0		
Period Enable	1	0|1	1
Begin Time	4	HHMM	0000
End Time	4	HHMM	0000
Reserved	0		

Send Interval	<=5	5 - 86400(sec)	30
Distance	<=5	50 - 65535(m)	1000
Mileage	<=5	50 - 65535(m)	1000
Reserved	0		
Corner Report	<=3	0 - 180	0
IGF Report Interval	<=5	0|5 - 86400(sec)	600
ERI Mask	<=8	(HEX)	0
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

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

- 0: Disable this function.
- 1: Fixed Time Report. The position report message is sent to the backend server periodically according to the parameter <*Send Interval*>.
- 2: Fixed Distance Report. The position report message is sent to the backend server when the straight-line distance between the current GNSS position and the last sent GNSS position is greater than or equal to the distance specified by the parameter <*Distance*>. It is necessary to connect the ignition signal to the device or enable virtual ignition detection for this mode.
- 3: Fixed Mileage Report. The position report message is sent to the backend server when the path length between the current GNSS position and the last sent GNSS position is greater than or equal to the mileage specified by the parameter <*Mileage*>. It is necessary to connect the ignition signal to the device or enable virtual ignition detection for this mode.
- 4: Optimum Report. The device simultaneously observes both time interval and path length between two adjacent position reports. It will report device position if the calculated time interval between the current time and time of last report is greater than <*Send Interval*>, and the length of path between the current position and the last position is greater than <*Mileage*>. It is necessary to connect the ignition signal to the device or enable virtual ignition detection for this mode.
- 5: Fixed Time or Mileage Report. The device checks either time interval or path length between two adjacent position reports. It will report device position if the calculated time interval between the current time and time of last report is greater than <*Send Interval*>, or the length of path between the current position and the last position is greater than <*Mileage*>. It is necessary to connect the

ignition signal to the device or enable virtual ignition detection for this mode.

- <*Discard No Fix*>: Disable/enable report when there is no GNSS fix.
  - 0: Enable report.
  - 1: Disable report.
- <*Period Enable*>: Disable/enable the time range specified by <*Start Time*> and <*End Time*>. If the time range is enabled, the position report will be limited within the time range.
- <*Start Time*>: The start time of the scheduled report. The valid format is “HHMM”. The value range of “HH” is “00”–“23”. The value range of “MM” is “00”–“59”.
- <*End Time*>: The end time of the scheduled report. The valid format and range are the same as those of <*Start Time*>.
- <*Send Interval*>: The time interval for sending position information. The value range is 5 – 86400 and the unit is second. If <*Report Mode*> in **AT+GTSRI** is set to forced SMS mode, this parameter should not be less than 15 seconds, otherwise position information will be sent via TCP short connection.
- <*Distance*>: The specified distance for sending the position information when <*Mode*> is 2. Unit: meter.
- <*Mileage*>: The specified length for sending the position information when <*Mode*> is 3/4 and 5. Unit: meter.
- <*Corner Report*>: The threshold to determine whether the device is turning around a corner. 0 means “Disable the corner report”. For other values, the device will compare the current azimuth with that of the last known corner. If the difference is greater than or equal to this value, the corner report will be sent with **+RESP:GTFRI**.
- <*IGF Report Interval*>: The time interval for fixing and sending the position information when <*Power Saving Mode*> in **AT+GTCFG** is set to 0|2 and the engine is off. If <*IGF Report Interval*> is less than 60 seconds, the GNSS will be always on. Its value range is 0|5 – 86400 and the unit is second.

  Note: If the current <*Mode*> is not 0 and the <*Power Saving Mode*> in **AT+GTCFG** is set to 0 or 2, the message **+RESP:GTFRI** will be sent to the backend server periodically according to the parameter <*IGF Report Interval*> when the engine is off.
- <*ERI Mask*>: Bitwise mask to determine whether specified parameter fields are included in the **+RESP:GTERI** report message. For each bit, set it to 1 to enable the corresponding parameter field in the report. If this parameter value is not 0, **+RESP:GTERI** will be sent instead of **+RESP:GTFRI**.
  - Bit 0 – Bit 7: Reserved.
  - Bit 8: for the <*Bluetooth Accessory Data*> field in the message **+RESP:GTERI**.
  - Bit 9 – Bit 14: Reserved.
  - Bit 15 for the <*RAT and Band Data*> field in the **+RESP:GTERI** report. RAT means Radio Access Technology.

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

- **+ACK:GTFRI,**

Example:
+ACK:GTFRI,840501,135790246811220,,000B,20230214093254,11F0$

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

3.2.3.2.Frequency Change of Fixed Report Information

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

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

- **AT+GTFFC=**

Example: **AT+GTFFC=gv57,0,1,0,,,,,,,30,500,500,300,,0,,,,,0000$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Priority	1	0 - 4	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 - 86400(sec)	30

FRI Report Distance	<=5	50 - 65535(m)	500
FRI Report Mileage	<=5	50 - 65535(m)	500
FRI IGF Report Interval	<=5	0|5 - 86400(sec)	300
Reserved	0		
Corner Report	<=3	0 - 180	0
Reserved			
Reserved			
Reserved			
Reserved			
Serial Number	4	(HEX)	
Tail Character	1	$	$

- <*Priority*>: Priority of the event which triggers the parameter change for fixed report. 0 indicates the highest priority.
- <*Mode*>: The parameter that specifies the trigger event for the change of fixed report parameters.
  - 0: Disable the parameters of the specified priority.
  - 1: Change the fixed report parameters when the device enters into any of the defined Geo-Fence.
  - 2: Change the fixed report parameters when the device enters into known network roaming state. (Please refer to the command **AT+GTRMD** for details)
  - 3: Change the fixed report parameters when the device enters into unknown GSM roaming state.
- <*FRI Mode*>: When the specified event occurs, the working mode of the fixed report will be changed according to this parameter.
  - 0: Do not change the working mode.
  - 1: Change the working mode to “Fixed Time Report”.
  - 2: Change the working mode to “Fixed Distance Report”.
  - 3: Change the working mode to “Fixed Mileage Report”.
  - 4: Change the working mode to “Optimum Report”.
  - 5: Change the working mode to “Fixed Time or Mileage Report”.
- <*FRI IGN Report Interval*>: The time interval for sending the position information when ignition is on. The value range is 5 – 86400 and the unit is second.
- <*FRI Report Distance*>: The specified distance for sending the position information when the report mode is fixed distance report. Unit: meter.
- <*FRI Report Mileage*>: The specified path length for sending the position information when the report mode is fixed mileage report or optimum report. Unit: meter.
- <*FRI IGF Report Interval*>: The time interval for fixing and sending the position information when the ignition is off if <*Power Saving Mode*> in **AT+GTCFG** is set to

0|2. The value range is 0|5 – 86400 and the unit is second.

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

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

➢ **+ACK:GTFFC,**

Example: **+ACK:GTFFC,840501,135790246811220,,000C,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.4.Alarm Settings

3.2.4.1.Tow Alarm Configuration

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

➢ **AT+GTTOW=**

Example: **AT+GTTOW=gv57,1,5,0,120,1,0,5,10,4,10,4,,,,,,,,,000B$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Tow Enable	1	0|1	0
Engine off to Tow	<=2	5 - 15(min)	10
Fake Tow Delay	<=2	0 - 10(min)	1
Tow Interval	<=5	30 - 86400(sec)	300
Tow Output ID	1	0|1	0

Tow Output Status	1	0 - 3	0
Tow Output Duration	<=5	0 - 65535 (*100ms)	0
Tow Output Toggle Times	<=3	0 - 255	0
Rest Duration	<=3	1 - 255(*15sec)	2
Motion Duration	<=2	1 - 10(*100ms)	3
Motion Threshold	1	1 - 9	2
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

- <*Tow Enable*>: Enable/disable the tow alarm report (**+RESP:GTTOW**).
  - 0: Disable the tow alarm report.
  - 1: Enable the tow alarm report.
- <*Engine Off to Tow*>: A time parameter to measure whether the device is considered to be towed after the engine is turned off. If the motion sensor does not detect rest within the specified time after the engine is turned off, the device is being towed.
- <*Fake Tow Delay*>: If the motion sensor detects movement after detecting engine off and stillness, the device turns into a state called fake tow. If the device stays in fake tow for a period of time specified by the parameter <*Fake Tow Delay*>, it is considered to be towed.
- <*Tow Interval*>: The time interval for sending the tow alarm message.
- <*Tow Output ID*>: The ID of the output port to output the specified wave shape when a tow event is detected.
- <*Tow Output Status*>: Please refer to the parameter <*Output1 Status*> in Chapter 3.2.5.1.
- <*Tow Output Duration*>: Please refer to the parameter <*Duration*> in Chapter 3.2.5.1.
- <*Tow Output Toggle Times*>: Please refer to the parameter <*Toggle Times*> in Chapter 3.2.5.1.
- <*Rest Duration*>: A time parameter to measure whether the device enters into rest

state. The status of the device will be changed to rest if the motion sensor detects rest which is maintained for the period of time specified by the parameter <*Rest Duration*>.

- ✧ <*Motion Duration*>: A time parameter to measure whether the device enters into motion state. The status of the device will be changed to motion if the motion sensor detects motion which is maintained for the period of time specified by the parameter <*Motion Duration*>.
- ✧ <*Motion Threshold*>: The threshold for the motion sensor to measure whether the device is moving.

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

➢ **+ACK:GTTOW,**

Example: **+ACK:GTTOW,840501,135790246811220,,000D,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.4.2.Geo-Fence Information

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

➢ **AT+GTGEO=**

Example: **AT+GTGEO=gv57,0,3,121.412248,31.187891,1000,600,1,1,0,0,,,,,000A$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
GEO ID	<=2	0 - 19	
Mode	1	0 - 3	0

Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	50
Check Interval	<=5	0|5 - 86400(sec)	0
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

- <*GEO ID*>: The ID of the Geo-Fence. A total of 20 zones (0 to 19) are supported.
- <*Mode*>: The working mode of the Geo-Fence to report the message **+RESP:GTGIN** or **+RESP:GTGOT** to the backend server.
  - 0: Disable the zone's Geo-Fence function.
  - 1: Entering the zone. The report will be generated only when the terminal enters the Geo-Fence.
  - 2: Exiting the zone. The report will be generated only when the terminal exits from the Geo-Fence.
  - 3: Both entering and exiting the zone.
- <*Longitude*>: The longitude of a point which is defined as the center of the circular Geo-Fence region. The unit is degree, and accuracy is 6 decimal places. West longitude is defined as negative starting with the minus sign "–" and east longitude is defined as positive without "+".
- <*Latitude*>: The latitude of a point which is defined as the center of the circular Geo-Fence region. The unit is degree, and accuracy is 6 decimal places. South latitude is defined as negative starting with the minus sign "–" and north latitude is defined as positive without "+".
- <*Radius*>: The radius of the circular Geo-Fence region. The value range is 50 – 6000000 and the unit is meter.
- <*Check Interval*>: The interval of GNSS checking for the Geo-Fence alarm.
- <*Trigger Mode*>: The parameter that indicates the working mode of the geofencing function.
  - 0: Disable auto trigger mode.

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- 21: Automatically set up a Geo Fence after the ignition is turned off. In this mode, the device will automatically set up a Geo-Fence with the current location as the center point of the Geo-Fence when the ignition is off. It will only send the alarm report when exiting the Geo-Fence zone. The Geo-Fence will be cancelled after the device exits the zone.
- 22: Manually enable Geo-Fence after the ignition is turned off. In this mode, the device will automatically set up a Geo-Fence with the current location as the center point of the Geo-Fence when the ignition is off. It will only send the alarm report when exiting the Geo-Fence zone. When the device exits this Geo-Fence, it will cancel this Geo-Fence and disable the trigger mode at the same time. If the driver wants to use this trigger mode again, he has to manually set the trigger mode again.

✧ <*Trigger Report*>: Whether to report the **+RESP:GTGES** message when a specified trigger mode is triggered and when the Geo-Fence is cancelled.

- 0: Disable the **+RESP:GTGES** report.
- 1: Enable the **+RESP:GTGES** report.

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

➢ **+ACK:GTGEO,**

Example: **+ACK:GTGEO,840501,135790246811220,,0,000E,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
GEO ID	1	0 - 19	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.4.3.Polygon Geo-Fence Information

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

➢ **AT+GTPEO=**

Example: **AT+GTPEO=gv57,0,0,1,3,121.412240,31.187801,121.412248,31.187891,121.412258,31.187991,60,1,1,8,3,,,,,000C$**			
Parameter	**Length (Byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
PEO ID	1|2	0 - 19	0
Mode	1	0 - 3	0
Start Point	1	1 - 8	1
End Point	<=2	3 - 10	3
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
Check Interval	<=5	0|5 - 86400(sec)	0
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=3	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

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

✧ <*Mode*>: The working mode of the device reporting polygon Geo-Fence messages **+RESP:GTGIN** or **+RESP:GTGOT** to the backend server.

- 0: Disable the Geo-Fence function.
- 1: Entering the zone. The **+RESP:GTGIN** report will be generated only when the device enters the Geo-Fence.
- 2: Exiting the zone. The **+RESP:GTGOT** report will be generated only when the device exits from the Geo-Fence.
- 3: Both entering and exiting the zone.

✧ <*Start Point*>: The start point of the polygon GEO-Fence formed by a set of points.

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- ✧ <*End Point*>: The end point of the polygon GEO-Fence formed by a set of points.
- ✧ <*Longitude*>: The longitude of a point which is defined as the endpoint of the polygon Geo-Fence region. The unit is degree and accuracy is 6 decimal places. West longitude is defined as negative starting with "–" and east longitude is defined as positive without "+".
- ✧ <*Latitude*>: The latitude of a point which is defined as the endpoint of the polygon Geo-Fence region. The unit is degree and accuracy is 6 decimal places. South latitude is defined as negative starting with "–" and north latitude is defined as positive without "+".
- ✧ <*Check Interval*>: The interval of GNSS checking position information against the polygon Geo-Fence alarm.

Note: If more sets of <*Longitude*> and <*Latitude*> are needed, please adjust <*Start Point*> and <*End Point*> for appropriate setup. If some sets of <*Longitude*> and <*Latitude*> are empty, then the corresponding vertices will be deleted. For example, to delete the 4th, 5th and 6th vertices of a polygon Geo-Fence, please set <*Start Point*> to 4 and set <*End Point*> to 6 and keep those three sets of <*Longitude*> and <*Latitude*> empty.

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

- ➢ **+ACK:GTPEO,**

Example: **+ACK:GTPEO,840501,868446036658678,GV53MG,0,000C,20190918061350,4430$**			
Parameter	**Length (Byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
GEO ID	1	0 - 19	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.4.4.Roaming Detection Configuration

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

- ➢ **AT+GTRMD=**

Example: **AT+GTRMD=gv57,0,,,,,1,2,023DFF,023DFF,,,1,1,,,,2,2,,,,1F,,,1F,,,,,0,0,0,0,,,0001$** **AT+GTRMD=gv57,1,,,,,1,3,23000,23002,46003,,,2,2,46007,,,1,1,46001,,,3fff,,,2ff,,,,,0,0,0,0,,,0002$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0|1	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Home Operator Start	<=2	1-10	1
Home Operator End	<=2	1-10	1
Home Operator List	<=6*10	(ASCII)	
Reserved	0		
Reserved	0		
Roaming Operator Start	<=3	1-100	1
Roaming Operator End	<=3	1-100	1
Roaming Operator List	<=6*100	(ASCII)	
Reserved	0		
Reserved	0		
Blocked Operator Start	<=2	1-20	1
Blocked Operator End	<=2	1- 20	1
Blocked Operator List	<=6*20	(ASCII)	
Reserved	0		
Reserved	0		
Known Roaming Event Mask	<=6	(HEX)	23DFF
Reserved	0		

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Reserved	0		
Unknown Roaming Event Mask	<=6	(HEX)	23DFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Output ID	1	0 - 1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

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

difference is that the operators in this list will be considered in “Known Roaming” state.

✧ <*Blocked Operator List*>: It is mostly like the <*Home Operator List*>, and the difference is that the operators in this list will be considered as in “Blocking Report” state. In this state the device works normally but all report messages will be buffered instead of being sent.

Note: If more operators are needed, please adjust corresponding <*Operator Start*> and <*Operator End*> for appropriate settings. If some operators in <*Operator List* > are empty, then the corresponding operators will be deleted. For example, to delete the 4th, 5th and 6th operators of the <*Operator List*>, please set <*Operator Start*> to 4 and <*Operator End*> to 6 and keep the operators of <*Operator List*> empty.

Operators that are not in <*Home Operator List*>, <*Roaming Operator List*> or <*Blocked Operator List*> will be considered in “Unknown Roaming” state.

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

- Bit 0 for **+RESP:GTPNA**
- Bit 1 for **+RESP:GTPFA**
- Bit 2 for **+RESP:GTMPN**
- Bit 3 for **+RESP:GTMPF**
- Bit 4 for **+RESP:GTCID**
- Bit 5 for **+RESP:GTBPL**
- Bit 6 for **+RESP:GTBTC**
- Bit 7 for **+RESP:GTSTC**
- Bit 8 for **+RESP:GTSTT**
- Bit 9 Reserved
- Bit 10 for **+RESP:GTPDP**
- Bit 11 for the power on **+RESP:GTRTL**
- Bit 12 for the ignition report **+RESP:GTIGN / +RESP:GTVGN** and **+RESP:GTIGF / +RESP:GTVGF**
- Bit 13 for the location report **+RESP:GTIGL / +RESP:GTVGL** when the ignition is on or off
- Bit 14 Reserved
- Bit 15 Reserved
- Bit 16 Reserved
- Bit 17 for **+RESP:GTDRM**

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

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

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

Note: If more operators are needed, please adjust <*Operator Start*> and <*Operator End*>

for appropriate setup. If some operators in <*Operator List* > are empty, then the corresponding operators will be deleted. For example, to delete the 4th, 5th and 6th operators of the <*Operator List*>, please set <*Operator Start*> to 4 and <*Operator End* > to 6 and keep those three operators of <*Operator List*> empty.
In view of the <*Operator List*> field that may contain many items, make sure this AT command string does not include more than 100 fields.

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

- **+ACK:GTRMD,**

Example: **+ACK:GTRMD,840501,135790246811220,,000F,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.4.5.Speed Alarm

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

- **AT+GTSPD=**

Example: **AT+GTSPD=gv57,1,80,120,60,300,1,1,0,0,,,,,,,,,,,,000C$** **AT+GTSPD=gv57,2,80,120,60,300,1,1,0,0,,,,,,,,,,,,000C$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0 - 3	0
Min Speed	<=3	0 - 400(km/h)	0
Max Speed	<=3	0 - 400(km/h)	0

Validity	<=4	0 - 3600(sec)	60
Send Interval	<=4	30 - 3600(sec)	300
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*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		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

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

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

➢ **+ACK:GTSPD,**

Example: **+ACK:GTSPD,840501,135790246811220,,0010,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.4.6.SOS Function

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

➢ **AT+GTSOS=**

Example: **AT+GTSOS=gv57,1,1,+8613812341234,1,1,0,0,,,,,000D$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0 - 2	0
Digital Input ID	1	0|1|6	0
SOS Number	<=20	(Call Number)	
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Reserved	0		
Reserved	0		

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

- <*Mode*>:The working mode of the SOS function.
  - 0: Disable SOS function.
  - 1: Send the current position via **+RESP:GTSOS** to the backend server.
  - 2: Send the current position via **+RESP:GTSOS** to the SOS Number.
- <*Digital Input ID*>: The ID of the digital input port which triggers the SOS function. 0 means “The SOS function is disabled”. The digital input port should be configured by the command **AT+GTDIS** firstly for the SOS function. The digital input port6 should be configured by the command **AT+GTIGM** first for the SOS function. If a digital input port is 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 the **AT+GTSOS** command:

- **+ACK:GTSOS,**

Example: +ACK:GTSOS,840501,135790246811220,,0011,20230214093254,11F0$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.4.7.Excessive Idling Detection

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

message **+RESP:GTIDF** to the backend server.

➢ **AT+GTIDL=**

Example: **AT+GTIDL=gv57,1,2,1,0,,,,1,1,0,0,,,,,000F$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0|1	0
Time to Idling	<=2	1 - 30(min)	2
Time to Movement	1	1 - 5(min)	1
Debounce Distance	<=4	0|100 - 9999(m)	0
Reserved	0		
Reserved	0		
Reserved	0		
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of the excessive idling detection function.
- 0: Disable this function.
- 1: Enable this function.

✧ <*Time to Idling*>: If it is detected that the vehicle is stationary with ignition on for the length of time specified by this parameter, it is considered to be in idling status.

✧ <*Time to Movement*>: If the vehicle moves again or ignition off is detected after it enters into idling status and the status lasts for the length of time specified by this parameter, the vehicle is considered to leave idling status.

✧ <*Debounce Distance*>: If the vehicle moves a longer distance than <*Debounce Distance*> after it enters into idling status, the vehicle will be considered to leave idling

status.

✧ <*Output ID*>: It specifies the ID of the output port to output specified wave shape when the vehicle enters into idling status. If it is set to 0, there will be no wave output.

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

➢ **+ACK:GTIDL,**

Example: **+ACK:GTIDL,840501,135790246811220,,0012,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.4.8.Start/Stop Report

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

➢ **AT+GTSSR=**

Example: **AT+GTSSR=gv57,1,2,1,5,,,,,000F$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0|1	0
Time to Stop	<=2	0 - 30(min)	2
Time to Start	1	0 - 5(min)	1
Start Speed	<=2	1 - 10(km/h)	5
Long Stop	<=5	0 - 43200(min)	0
Reserved	0		

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

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

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

- **+ACK:GTSSR,**

Example: **+ACK:GTSSR,840501,135790246811220,,0013,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	

Tail Character	1	$	$

3.2.4.9.Harsh Behavior Monitoring

The command **AT+GTHBM** is used to monitor the harsh driving behavior based on GNSS or motion sensor.

➢ **AT+GTHBM=**

Example: **AT+GTHBM=gv57,1,,,100,21,6,,60,21,6,,,21,15,,1,1,8,3,,,,,0010$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0 - 4	0
Reserved	0		
Discard Unknown Event	1	0|1	0
High Speed	3	100 - 400(km/h)	100
ΔVhb	<=3	0 - 100(km/h)	0
ΔVha	<=3	0 - 100(km/h)	0
Reserved	0		
Medium Speed	<=3	60 - 100(km/h)	60
ΔVmb	<=3	0 - 100(km/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|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Cornering and Braking Threshold	2	15 - 70	30

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Cornering and Braking Duration	<=3	40 - 100(*8ms)	50
Acceleration Threshold	2	15 - 50	20
Acceleration Duration	<=3	50 - 250(*8ms)	65
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of the harsh behavior monitoring function.
- 0: Disable this function.
- 1: Enable this function: Detection by GNSS only. In this mode, two harsh behaviors are monitored, i.e. harsh braking and harsh acceleration. According to the speed read from GNSS, 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 harsh braking and harsh acceleration. If the change of speed within 5 seconds is greater than the corresponding threshold, the device will report the **+RESP:GTHBM** message to the backend server to indicate the harsh behavior. The same harsh behavior within 30 seconds will only be reported once if only GNSS is used to judge harsh driving behavior.
- 2: Enable this function: Detection by motion sensor only. In this mode, three types of harsh behavior can be detected, i.e. harsh braking, harsh acceleration and harsh cornering. The device needs GNSS information to get the harsh behavior direction, so it is necessary to keep GNSS on all the time to collect all the information needed.
- 3: Enable this function: Detection by motion sensor or GNSS. This mode works when Mode 1 or Mode 2 is enabled.
- 4: Enable this function: Detection by motion sensor and GNSS. In this mode, a harsh behavior can be triggered only if it is detected by both GNSS and motion sensor.

✧ <*Discard Unknown Event*>: The parameter that configures whether to discard the unknown harsh behavior message.
- 0: Do not discard unknown harsh behavior message.
- 1: Discard unknown harsh behavior message.

✧ <*High Speed*>, <*Medium Speed*>: If the last known speed of the device read from GNSS is greater than or equal to <*High Speed*>, the vehicle that the device is attached to is considered to be at high speed. If the last known speed is less than <*High Speed*> but greater than or equal to <*Medium Speed*>, the vehicle is considered to be at medium speed. If the last known speed is less <*Mode*>: The working mode of the harsh behavior monitoring function.

✧ <∆*Vhb*>: The threshold for harsh braking at high speed level. If the current speed is less than the last known speed and the change of speed is greater than or equal to this parameter value within 5 seconds, harsh braking is detected at high speed level.

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

- <∆*Vha*>: The threshold for harsh acceleration at high speed level. If the current speed is greater than the last known speed and the change of speed is greater than or equal to this value within 5 seconds, harsh acceleration is detected at high speed level. If it is set to 0, it means “Do not monitor harsh acceleration behavior at high speed level”.
- <∆*Vmb*>: The threshold for harsh braking at medium speed level. If the current speed is less than the last known speed and the change of speed is greater than or equal to this parameter value within 5 seconds, harsh braking is detected at medium speed level. If it is set to 0, it means “Do not monitor harsh braking behavior at medium speed level”.
- <∆*Vma*>: The threshold for harsh acceleration at medium speed level. If the current speed is greater than the last known speed and the change of speed is greater than or equal to this parameter value within 5 seconds, harsh acceleration is detected at medium speed level. If it is set to 0, it means “Do not monitor harsh acceleration behavior at medium speed level”.
- <∆*Vlb*>: The threshold for harsh braking at low speed level. If the current speed is less than the last known speed and the change of speed is greater than or equal to this value within 5 seconds, harsh braking is detected at low speed level. If it is set to 0, it means “Do not monitor harsh braking behavior at low speed level”.
- <∆*Vla*>: The threshold for harsh acceleration at low speed level. If the current speed is greater than the last known speed and the change of speed is greater than or equal to this value within 5 seconds, harsh acceleration is detected at low speed level. If it is set to 0, it means “Do not monitor harsh acceleration behavior at low speed level”.
- <*Output ID*>: It specifies the ID of the output port to output specified wave shape when harsh behavior is detected. If it is set to 0, there will be no wave output.
- <*Cornering and Braking Threshold*>: The threshold for the motion sensor to measure whether the device is in harsh cornering or harsh braking status.
- <*Cornering and Braking Duration*>: A time parameter to measure whether the device enters harsh cornering or harsh braking status. If the driving behaviors are maintained for a period of time longer than the time defined by <*Cornering and Braking Duration*>, harsh cornering or harsh braking event will be triggered.
- <*Acceleration Threshold*>: The threshold for the motion sensor to measure whether the device is in harsh acceleration status.
- <*Acceleration Duration*>: A time parameter to measure whether the device enters harsh acceleration status. If the driving behavior is maintained for a period of time longer than the time defined by <*Acceleration Duration*>, harsh acceleration event will be triggered.

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

- **+ACK:GTHBM,**

Example: **+ACK:GTHBM,840501,135790246811220,,0014,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**

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

3.2.4.10.Jamming Detection

The command **AT+GTJDC** is used to configure the parameters for jamming detection. When the detection condition is matched, the device will report the **+RESP:GTJDR** or **+RESP:GTJDS** event message to the backend server according to the <*Mode*> setting.

➢ **AT+GTJDC=**

Example: **AT+GTJDC=gv57,2,8,99,,60,2,10,1,1,0,0,10,001A$**			
Parameter	**Length (Byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0 - 2	0
LTE Threshold 1	<=2	0 - 20	15
LTE Threshold 2	<=3	0 - 130	70
Reserved	0		
2G Threshold1	<=2	0 - 99	70
2G Threshold2	1	0 - 6	2
Enter Jamming Timer Threshold	<=4	0 - 3600(sec)	60
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Quit Jamming Timer	<=4	0 - 3600(sec)	10

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

- ✧ <*Mode*>: The working mode of the jamming detection function.
  - 0: Disable jamming detection function.
  - 1: Enable jamming detection function. If jamming is detected, the device will report the **+RESP:GTJDR** message upon entering into jamming state.
  - 2: Enable jamming detection function. If jamming is detected, the device will report the **+RESP:GTJDS** message upon entering into jamming state or quitting jamming state.
- ✧ <*LTE Threshold 1*>, <*LTE Threshold 2*>: The built-in LTE jamming detection algorithm uses these two parameters to measure whether the device is currently being jammed. The smaller the setting of <LTE Threshold 1>, the larger the setting of <LTE Threshold 2>, the more sensitive the detection will be.
- ✧ <*2G Threshold1*>, <*2G Threshold2*>: The built-in 2G jamming detection algorithm uses these two parameters to measure whether the device is currently being jammed. The smaller the parameter value, the more sensitive the detection will be.
- ✧ <*Enter Jamming Timer Threshold*>: When the device detects jamming, the device will trigger the “enter jamming” event based on the <*Enter Jamming Timer Threshold*> parameter.
- ✧ <*Quit Jamming Timer Threshold*>: When the device quits jamming, the device will trigger the “quit jamming” event based on the <*Quit Jamming Timer Threshold*> parameter.

Note：The device starts to judge jamming state only after it drops from network.

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

- ➢ **+ACK:GTJDC,**

Example: +ACK:GTJDC,840501,135790246811220,GV57,0015,20230214093254,11F0$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.4.11.Jamming Behavior Setting

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

➢ **AT+GTJBS=**

Example: **AT+GTJBS=gv57,0,,10,10,60,60,1800,1,30,120,0,0,,0000$**			
Parameter	**Length (byte)**	**Range / Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0|1	0
Reserved	0		
Siren On Timer (T1)	<=5	1 - 65535(*100ms)	10
Siren Off Timer (T2)	<=5	1 - 65535(*100ms)	10
Siren Alarm Duration (T3)	<=5	1 - 65535(sec)	60
Preparing Alarm Timer (T4)	<=5	1 - 65535(sec)	30
Cut Fuel Timer (T5)	<=5	1 - 65535(sec)	3600
Motion Sensor	1	0|1	1
Speed Limit	<=3	0 - 999(km/h)	30
GNSS Fix Failure Timer (T6)	<=5	30 - 65535(sec)	120
Output 1 Init State	1	0|1	0
Output Mode	1	0|1	0
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of jamming behavior setting function.
- 0: Disable this function.
- 1: Enable this function.

✧ <*Siren On Timer (T1)*>: It specifies the length of time when the siren is on.

✧ <*Siren Off Timer (T2)*>: It specifies the length of time when the siren is off.

- <*Siren Alarm Duration (T3)*>: It indicates the length of time the siren alarm sounds.
- <*Preparing Alarm Timer (T4)*>: It indicates the length of time for preparing for alarm.
- <*Cut Fuel Timer (T5)*>: It indicates the fuel cut-off length of time.
- <*Speed Limit*>: The speed limit of cutting fuel.
- <*Motion Sensor*>: Whether the motion sensor needs to measure the motion status to cut off fuel when the GNSS fix failure timeout expires. If <*Motion Sensor*> is set to 0, the state machine will always measure the GNSS fix state.
  - 0: Disable motion sensor.
  - 1: Enable motion sensor.
- <*GNSS Fix Failure Timer (T6)*>: The length of time GNSS fix is considered valid. If GNSS fix takes longer than the time specified by this parameter, it will be considered as GNSS fix failure.
- <*Output 1 Init State*>: It is used to set the initial state of output 1.
- <*Output Mode*>: A numeral to indicate the output port's function.
  - 0: The output1 is used for "cut off fuel".
  - 1: The output1 is used for "siren" alarm.

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

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

- **+ACK:GTJBS,**

Example: **+ACK:GTJBS,840501,135790246811220,GV57,0016,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.4.12.Crash Detection

The command **AT+GTCRA** is used to configure the parameters for crash detection. If the crash detection function is enabled and the current acceleration in a direction is beyond the configured threshold, the device will report the **+RESP:GTCRA** event message and **+RESP:GTCRD** data packets to the backend server. If it is configured to report

accelerations to the backend server, the device will report the **+RESP:GTACC** message with 75 groups of tri-axial acceleration data to the backend server.

➢ **AT+GTCRA=**

Example: **AT+GTCRA=gv57,1,50,50,50,1,500,500,0,0,0,0,,0,20,100,10,60,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv57
Mode	1	0 – 3	0
Threshold_X	<=2	0 – 80(*0.1g)	50
Threshold_Y	<=2	0 – 80(*0.1g)	50
Threshold_Z	<=2	0 – 80(*0.1g)	50
Sampling Start	1	0|1	1
Samples Before Crash	<=4	1 - 1500	500
Samples After Crash	<=4	1 - 1500	500
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Reserved	0		
Report ACC	1	0|1	0
Speed Confirmation	<=2	0|10 – 80(km/h)	20
ODO Confirmation	<=3	0|50 – 200(m)	100
Confirmation Time	<=2	3 – 15(seconds)	10
Fall Degrees	2	20 – 80	60
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of the crash detection function.

- 0: Disable this function.
- 1: Enable this function.
- 2: In this mode, the acceleration sensor data will be converted in accordance with three axis self-calibration. In the new coordinate system, the positive X-

axis points in the direction in which the vehicle travels, the positive Y-axis, which is perpendicular to X axis, points in such a way that the positive X-axis is right handed, and positive Z-axis represents the opposite direction of gravity.

- 3: This mode works mostly like Mode 2, and the difference is that in this mode <*Fall Degrees*> on the Z-axis is checked additionally.

Note: In Mode 2 and Mode 3, the device will still use the original three axes based on sensor to detect crash event until it has already detected the first **+RESP:GTASC** event.

- <*Threshold_X*>: The acceleration threshold for crash in X direction. The smaller the parameter value, the easier it is to detect crash event. If <*Threshold_X*> is 0, the device will not monitor crash event in X axis. The unit is 0.1g.
- <*Threshold_Y*>: The acceleration threshold for crash in Y direction. The smaller the parameter value, the easier it is to detect crash event. If <*Threshold_Y*> is 0, the device will not monitor crash event in Y axis. The unit is 0.1g.
- <*Threshold_Z*>: The acceleration threshold for crash in Z direction. The smaller the parameter value, the easier it is to detect crash event. If <*Threshold_Z*> is 0, the device will not monitor crash event in Z axis. The unit is 0.1g.
- <*Sampling Start*>: The parameter that indicates the time when acceleration sampling starts.
  - 0: Start acceleration sampling after power on. The device will always collect acceleration information as long as the device is powered on.
  - 1: Start acceleration sampling after ignition on. The device will collect acceleration information only in ignition on state.
- <*Samples Before Crash*>: The number of recorded XYZ-axis acceleration samples before crash.
- <*Samples After Crash*>: The number of recorded XYZ-axis acceleration samples after crash.
- <*Report ACC*>: The parameter that indicates whether to report the acceleration data to the backend server.
  - 0: Disable reporting.
  - 1: Enable reporting. The device will report 75 groups of tri-axial acceleration data to the backend server via the message **+RESP:GTACC**.
- <*Speed Confirmation*>: The vehicle speed used to measure whether a crash event will be reported. If a crash is detected and the vehicle speed is less than the value of <*Speed Confirmation*> for the time period specified by <*Confirmation Time*>, the crash event will be reported. If <*Speed Confirmation*> parameter is set to 0, the vehicle speed will not be checked when a crash is detected.
- <*ODO Confirmation*>: The ODO mileage of the vehicle used to measure whether a crash event will be reported. If the ODO mileage accumulated during <*Confirmation Time*> is less than the value of <*ODO Confirmation*>, the crash event will be reported. If the <*ODO Confirmation*> parameter is set to 0, the ODO mileage will not be checked when a crash is detected.

  Note: If both <*Speed Confirmation*> and <*ODO Confirmation*> are set to a non-zero value, the crash event will be reported when the condition defined by either of these two parameters is satisfied. <*ODO Confirmation*> may cause deviation due to

positioning accuracy.

- ✧ <*Confirmation Time*>: The time parameter which is used in combination with <*Speed Confirmation*> or <*ODO Confirmation*> to determine whether to report the crash event.
- ✧ <*Fall Degrees*>: This parameter is valid only when <*Mode*> is set to 3. In Mode 3, if the condition defined by either <*Speed Confirmation*> or <*ODO Confirmation*> is met, and the degree change on the Z-axis is greater than the value of <*Fall Degrees*> within 3 seconds before or after a crash is detected, then the crash event will be reported.

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

- ➢ **+ACK:GTCRA,**

Example: **+ACK:GTCRA,840501,135790246811220,,0017,20230214093254,11F0$**			
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	$	$

3.2.4.13.Three-Axis Self-Calibration

The command **AT+GTASC** is used to define the condition for the calibration of the accelerometer directions. When the condition is matched and the accelerometer is calibrated successfully, the device will report the event message **+RESP:GTASC** which includes the calibration result to the backend server. The pre-condition for the calibration is that the device is in moving state while the ignition is on and the parameter <*Mode*> in the command **AT+GTCRA** is set to 2.

- ➢ **AT+GTASC=**

Example: **AT+GTASC=gv57,50,10,5,,,,,,,,,0019$**				
SN	**Parameter**	**Length (byte)**	**Range/Format**	**Default**
1	Password	4 – 20	'0' - '9', 'a' - 'z', 'A' -' Z'	gv500

2	Brake Speed Threshold	<=3	30 - 400(km/h)	50
3	Delta Speed Threshold	<=2	5 - 72(km/h)	10
4	Delta Heading Threshold	1	0 - 5	2
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		
9	Output ID	1	0|1	0
10	Output Status	1	0 - 3	0
11	Duration	<=5	0 - 65535(*100ms)	0
12	Toggle Times	<=3	0 - 255	0
13	Reserved	0		
	Serial Number	4	(HEX)	
	Tail Character	1	$	$

- *<Brake Speed Threshold>*: The lower threshold of the speed before braking. If the speed is beyond the threshold before braking, the braking event can trigger the accelerometer calibration.
- *<Delta Speed Threshold>*: The lower threshold of the delta speed in one second during braking. If the delta speed is beyond the threshold, the braking event can trigger the accelerometer calibration.
- *<Delta Heading Threshold>*: The upper threshold of the delta heading during braking. If the delta heading is smaller than the threshold, the braking event can trigger the accelerometer calibration.

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

- **+ACK:GTASC,**

Example: **+ACK:GTASC,840501,135790246811220,,0018,20180214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	

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

3.2.5.IO Application

3.2.5.1.Digital Output

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

Wave Shape 1:

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



Figure 2: Wave Shape 1

Wave Shape 2:

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

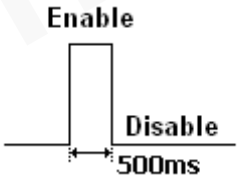


Figure 3: Wave Shape 2

Wave Shape 3:

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

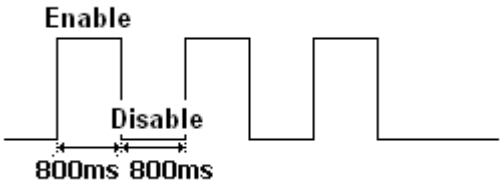


Figure 4: Wave Shape 3

➢ **AT+GTOUT=**

Example: **AT+GTOUT=gv57,1,0,0,,,,1,,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Output1 Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Reserved	0		
Reserved	0		
Reserved	0		
DOS Report	1	0|1	0
Long Operation1	<=3	0 - 120(min)	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Output1 Status*>: Valid only for the wave shape 1 as shown in **Figure 2**, it configures the final status of the output port.

- 0: Disable status.
- 1: Enable status.
- 2: Gradual-progressive-high-wave-shape Enable status. For detailed information, please refer to **AT+GTGDO**.
- 3: Gradual-progressive-low-wave-shape Enable status. For detailed information, please refer to **AT+GTGDO**.

✧ <*Duration*>: Please refer to **Figure 2**, **Figure 3** and **Figure 4**. Unit: 100ms.

✧ <*Toggle Times*>: Please refer to **Figure 2**, **Figure 3** and **Figure 4**.

✧ <*DOS Report*>: A bitwise value to control whether to report the message **+RESP:GTDOS**. Each bit represents an output. If the bit value is 1, the device will

report the message **+RESP:GTDOS** when the status of the wave shape 1 output changes.

- Bit 0: Output 1

Note: This parameter is also valid for the gradual-progressive-wave-shape related functions.

✧ *<Long Operation1>*: The long operation time for output1. After the long operation time, the output waveform will be reset to the initial status at the specified output port. This parameter is valid only when the output waveform is 1.

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

➢ **+ACK:GTOUT,**

Example: **+ACK:GTOUT,840501,135790246811220,,0019,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.5.2.Digital Input Port Setting

The command **AT+GTDIS** is used to configure the parameters for the ignition input port. The *<Ignition Detection>* input is dedicated to ignition signal detection. The other one is customizable. If the logic status of the customizable digital input changes, the device will report the message **+RESP:GTDIS** to the backend server.

➢ **AT+GTDIS=**

Example: **AT+GTDIS=gv57,0,3,,,1,1,0,0,,,,,,,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Ignition Detection	1	0	0
Sample Period	<=2	0 - 12(*2sec)	1
Reserved	0		

Reserved	0		
Input ID 1	1	1	1
Enable	1	0|1	0
Debounce Time	<=2	0 - 20(*10ms)	0
Validity Time	<=2	0 - 12(*2sec)	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	(HEX)	
Tail Character	1	$	$

- <*Ignition Detection*>: The ID of the ignition detection port.
- <*Sample Period*>: The sampling period of the non-interruptible input port.
- <*Input ID 1*>: The digital input port ID.
- <*Enable*>: Enable/disable the interrupt input.
  - 0: Disable the interrupt input.
  - 1: Enable the interrupt input.
- <*Debounce Time*>: The time for interruptible input port debouncing.
- <*Validity Time*>: The validity time of the input port. 0 means “Do not check the validity time”. Only when a new input state is maintained for at least the period of time specified by the parameter <*Validity Time*> will the new state of the device be considered valid.

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

- **+ACK:GTDIS,**

Example:
+ACK:GTDIS,840501,135790246811220,,001A,20230214093254,11F0$

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

3.2.5.3.Ignition Multiplexing Setting

The command **AT+GTIGM** is used to configure the hard-wired ignition input to work as a normal digital input. If the logic status of this digital input port changes, the device will report the message **+RESP:GTDIS** to the backend server. That <*Virtual Ignition Mode*> is set to 0 (hard-wired ignition detection) by the **AT+GTVMS** command will be ignored when this function is enabled, and we recommend to set <*Virtual Ignition Mode*> in **AT+GTVMS** as a non-zero value to enable virtual ignition detection.

- **AT+GTIGM=**

Example: **AT+GTIGM=gv57,6,0,0,0,0,,,,,, 0005$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Input ID	1	6	6
Enable	1	0|1	0
Report Mode	1	0 - 3	0
Debounce Time	<=2	0 - 20(*10ms)	0
Validity Time	<=2	0 - 12(*2sec)	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	

Tail Character	1	$	$

- ✧ <*Input ID*>: The ID of the digital input that the ignition input is configured as.
- ✧ <*Enable*>: Enable/disable the interrupt input.
  - 0: Disable the interrupt input.
  - 1: Enable the interrupt input.
- ✧ <*Report Mode*>: It defines the event(s) to trigger the **+RESP:GTDIS** report to the backend server.
  - 0: Disable the **+RESP:GTDIS** report.
  - 1: Activate the digital input.
  - 2: Deactivate the digital input.
  - 3: Both upon activating and deactivating the digital input.
- ✧ <*Debounce Time*>: The debounce time for interruptible input port.
- ✧ <*Validity Time*>: The validity time of the input port. 0 means “Do not check the validity time”.

Note: The device needs to be restarted for the change of the <*Enable*> setting in the **AT+GTIGM** command to take effect.

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

- ➢ **+ACK:GTIGM,**

Example: **+ACK:GTIGM,840501,135790246811220,,001B,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.5.4. Input/Output Port Binding

The command **AT+GTIOB** is used to configure the user defined output-port actions triggered by input ports. If the I/O binding is configured and the corresponding condition is met, the device will output specified wave shape at the specified output port. Otherwise, the device will restore the initial status of the specified output port. And the device will report the message **+RESP:GTIOB** to the backend server when the logic status of bound input

ports changes.

➢ **AT+GTIOB=**

Example: **AT+GTIOB=gv57,1,0000,0000,0,0,0,0,0,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
IOB ID	1	0 - 3	
Input Mask	<=4	0000 - 0042	0
Trigger Mask	<=4	0000 - 0042	0
Input Sample Period	<=2	0 - 12(*2sec)	0
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

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

✧ <*Input Mask*>: Bitwise mask for input ports composition. Each bit, from Bit 0 to Bit 6, represents one input port. Set it to 1 to enable the corresponding input port and 0 to disable the corresponding input port.

- Bit 0: Ignition detection
- Bit 1: Input1
- Bit 2 - Bit 5: Reserved
- Bit 6: Input6

Note: Ignition detection input can be configured as digital input6, so please do not set Bit 0 and Bit 6 to 1 at the same time. Otherwise, this function will not work properly.

✧ <*Trigger Mask*>: Bitwise mask for trigger condition composition of the corresponding input ports. Each bit, from Bit 0 to Bit 6, represents the logic status of the corresponding input port to trigger the IOB event. Set it to 1 to use “Enable status” as the trigger condition and 0 to use “Disable status” as the trigger condition. Only when the logic status of all the input ports in one IO binding meets the trigger condition will the IOB

event be triggered.

- Bit 0: Ignition detection
- Bit 1: Input1
- Bit 2 - Bit 5: Reserved
- Bit 6: input 6

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

✧ <*Output ID*>: The ID of the output port to output specified wave when the trigger condition is met. 0 means “No wave will be output”.

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

➢ **+ACK:GTIOB,**

Example: **+ACK:GTIOB,840501,135790246811220,,1,001C,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.5.5.External Power Supply Monitoring

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

➢ **AT+GTEPS=**

Example: **AT+GTEPS=gv57,2,250,12000,3,2,1,1,0,0,1,,,,0007$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0 - 2	0

Min Threshold	<=5	7000 - 28000(mV)	7000
Max Threshold	<=5	7000 - 28000(mV)	7000
Sample Period	<=2	0 - 12(*2sec)	0
Debounce Time	1	0 - 5(sec)	0
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Sync with FRI	1	0|1	0
Voltage Margin Error	<=3	0 - 100(*10mV)	0
Debounce Voltage Threshold	<=3	0 - 100(*100mV)	0
MPN/MPF Validity Time	<=3	0 - 255(sec)	0
Serial Number	4	(HEX)	
Tail Character	1	$	$

- <*Mode*>:The working mode of the external power supply monitoring function.
  - 0: Disable the external power supply monitoring function.
  - 1: Enable the external power supply monitoring function. If the current voltage is within the range of (<*Min. Threshold*>, <*Max. Threshold*>), **+RESP:GTEPS** alarm will be triggered.
  - 2: Enable the external power supply monitoring function. If the current voltage is outside the range of (<*Min. Threshold*>, <*Max. Threshold*>), **+RESP:GTEPS** alarm will be triggered.
- <*Min. Threshold*>: The lower limit to the voltage of the external power supply to trigger the alarm.
- <*Max. Threshold*>: The upper limit to the voltage of the external power supply to trigger the alarm.
- <*Sample Period*>: The sampling period for measuring the external power supply.
- <*Debounce Time*>: The time for debouncing external power voltage to avoid excessive voltage drop in the external power supply.
- <*Output ID*>: It specifies the ID of the output port to output specified wave shape when the **+RESP:GTEPS** alarm is triggered. If it is set to 0, there will be no wave output.
- <*Sync with FRI*>: Besides the **+RESP:GTEPS** alarm report, the device can also send the voltage of external power supply periodically along with the fixed report message.
  - 0: Do not report external power supply voltage along with the fixed report message.
  - 1: Report external power supply voltage along with the fixed report message.

- <*Voltage Margin Error*>: This parameter is used together with <*Min. Threshold*> and <*Max. Threshold*> parameters. It indicates the voltage margin error of <*Min. Threshold*> and <*Max. Threshold*>. If the current voltage detected falls within the range of the <*Voltage Margin Error*> of <*Min. Threshold*> or the <*Voltage Margin Error*> of <*Max. Threshold*>, it will not trigger the **+RESP:GTEPS** alarm report. For example, if the <*Min. Threshold*> is set to 7000mv, the <*Max. Threshold*> is set to 12000mv, and the <*Voltage Margin Error*> is set to ±100mv, the current voltage will not trigger the **+RESP:GTEPS** alarm report when the current voltage meets the condition (6900mv < current voltage < 7100mv) or (11900mv < current voltage < 12100mv). The parameter improves the performance of the **+RESP:GTEPS** alarm report.
- <*Debounce Voltage Threshold*>: This parameter is used together with <*Debounce Time*>. If the voltage drops or bursts dramatically more than <*Debounce Voltage Threshold*>, the device will start to debounce voltage for the period of time specified by <*Debounce Time*>.
- <*MPN / MPF Validity Time*>: The validity time for detecting the device connecting or disconnecting main power supply. 0 means “Do not check the validity time”. If <*MPN / MPF Validity Time*> is not 0, and the device remains connected or disconnected with main power supply for the period of time specified by this parameter, the device will report **+RESP:GTMPN** or **+RESP:GTMPF** to the backend server. If it is detected that the device connects or disconnects the main power supply when <*MPN / MPF Validity Time*> is 0, the device will report **+RESP:GTMPN** or **+RESP:GTMPF** immediately to the backend server.

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

- **+ACK:GTEPS,**

Example: **+ACK:GTEPS,840501,135790246811220,,001D,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.5.6.Gradual Digital Output Configuration

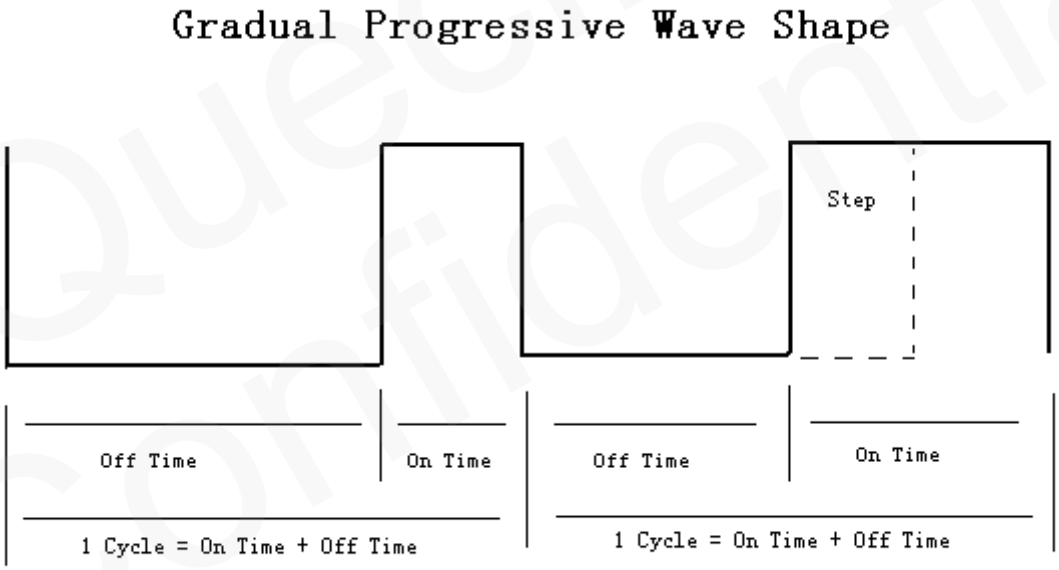
The command **AT+GTGDO** is used to configure specified gradual progressive wave shape from the digital output port.

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

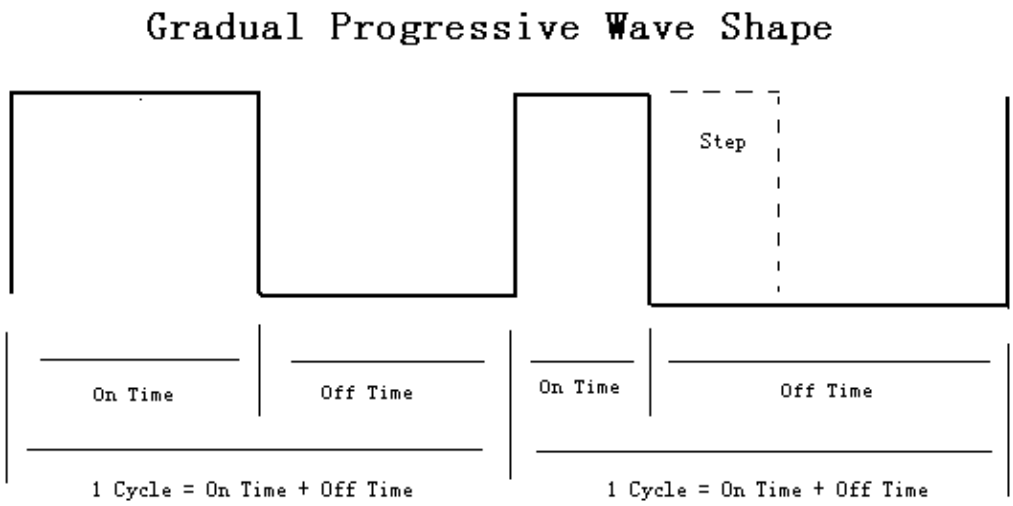
Next time progressive output is activated, the cycle described above starts over again regardless of the former progressive state.

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

- The time for one complete cycle is equal to OFF phase time plus ON phase time which is prior to OFF time.
- For constant output, the ON Time and the Cycle Time should be the same.
- For progressive output, when the <*Output1 Status*> is set to 2, an incremental step will be added to the ON time at the end of a cycle before the start of the next.



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



➢ **AT+GTGDO=**

Example: **AT+GTGDO=gv57,0,30,1,,,,,,0004$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Time of First Active Phase (ON Time) / Time of First Inactive Phase (OFF Time)	<=3	0 - 100(*100ms)	0
Cycle Time (Total Time)	<=3	0 - 100(*100ms)	30
Incremental Step	<=3	0 - 100(*100ms)	1
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Time of First Active Phase*>: Time (in units of 100ms) that the output will be in active state during the first cycle when <*Output1 Status*> is set to 2.

✧ <*Time of First Inactive Phase*>: Time (in units of 100ms) that the output will be in inactive state during the first cycle when <*Output1 Status*> is set to 3.

- ✧ <*Cycle Time*>: Time (in units of 100ms) that forms a complete cycle (ON phase time + OFF phase time).
- ✧ <*Incremental Step*>: Time (in units of 100ms) that shall be added to the ON/OFF phase time before starting the next cycle. If this parameter value is 0, the cycles are equal.

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

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

➢ **+ACK:GTGDO,**

Example: **+ACK:GTGDO,840501,135790246811220,,001E,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.6.Virtual Ignition Detection

3.2.6.1.Voltage Virtual Ignition Setting

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

➢ **AT+GTVVS=**

Example: **AT+GTVVS=gv57,13000,500,10,,,000B$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Ignition on Voltage	<=5	8000 - 28000(mV)	13500
Voltage offset	<=4	200 - 2000(mV)	600
Ignition on Debounce	<=3	5 - 255 (*2sec)	10

Smart Voltage Adjustment	1	0|1	1
Ignition off Debounce	<=3	5 - 255 (*2sec)	10
Serial Number	4	(HEX)	
Tail Character	1	$	$

- <*Ignition On Voltage*>: The external power voltage in ignition on state. Different vehicles have different voltage in ignition on state. This parameter should be set very close to the original external power, so that the device can detect ignition event more accurately.
- <*Voltage Offset*>: The offset from <*Ignition On Voltage*> used to determine ignition on or ignition off state. If the voltage of the external power is higher than <*Ignition On Voltage*> - <*Voltage Offset*> and is maintained for <*Debounce*> seconds, the device will consider it as virtual ignition on state. If the voltage of the external power is lower than <*Ignition On Voltage*> - <*Voltage Offset*> and is maintained for <*Ignition Off Debounce*> seconds, the device will consider it as virtual ignition off state.
  Note: <*Ignition On Voltage*> and <*Voltage Offset*> values will be adjusted automatically according to measured external power voltage data, if necessary, to make ignition judgement more precise.
- <*Debounce*>: The debounce time before updating virtual ignition on/off status according to the external power voltage. Unit: second.
- <*Smart Voltage Adjustment*>: Enable/disable smart voltage adjustment algorithm.
  - 0: Disable the smart voltage adjustment algorithm. The values of <*Ignition On Voltage*> and <*Voltage Offset*> will keep static.
  - 1: Enable the smart voltage adjustment algorithm. The values of <*Ignition On Voltage*> and <*Voltage Offset*> will dynamically change according to the actual ignition on and off voltage.
- <*Ignition Off Debounce*>: The debounce time to wait before updating the virtual ignition off state according to the external power voltage.

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

- **+ACK:GTVVS,**

Example: +ACK:GTVVS,840501,135790246811220,,001F,20230214093254,11F0$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	

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

3.2.6.2.Accelerometer (Motion Status) Virtual Ignition Setting

The command **AT+GTAVS** is used to configure parameters for detecting ignition status based on motion status. It will work when hard-wired ignition line is not connected and motion status Virtual Ignition mode is enabled by **AT+GTVMS**.

➢ **AT+GTAVS=**

Example: **AT+GTAVS=gv57,20,30,,,,000B$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Rest Validity	<=3	1 - 255(sec)	20
Movement Validity	<=3	1 - 255(sec)	60
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

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

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

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

➢ **+ACK:GTAVS,**

Example: **+ACK:GTAVS,840501,135790246811220,,0020,20230214093254,11F0$**

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

3.2.6.3.Virtual Ignition Mode Selection

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

➢ **AT+GTVMS=**

Example: **AT+GTVMS=gv57,7,02,02,1,0,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Virtual Ignition Mode	1	0 - 4|7	1
Virtual Ignition On Mask	2	(HEX)(01 - 03)	3
Virtual Ignition Off Mask	2	(HEX)(01 - 03)	3
Virtual Ignition On Logic	1	0|1	1
Voltage Idle Vehicle Event	1	0|1	0
Serial Number	4	(HEX)	
Tail Character	1	$	$

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

- 0: Hard-wired ignition detection mode. This mode is valid only when <*Enable*> in the **AT+GTIGM** command is set to 0.

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

  Note: Whenever the ignition detection mode is changed to Mode 1, restart the device for Mode 1 to take effect.
- 2: External power voltage mode (virtual ignition detection). Ignition state is related to the voltage of external power (please refer to the command **AT+GTVVS**). Please enable the function of **AT+GTEPS** in order for this mode to work.
- 3: Reserved.
- 4: Accelerometer mode (virtual ignition detection). Ignition state is related to the state of the accelerometer (please refer to the command **AT+GTAVS**).
- 7: Combined detection mode. In this mode, ignition on/off trigger conditions can be selected using <*Virtual Ignition On Mask*> and <*Virtual Ignition Off Mask*> parameters.

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

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

Bit0 (01): Voltage virtual ignition detection

Bit1 (02): Motion status virtual ignition detection

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

Bit0 (01): Voltage virtual ignition detection

Bit1 (02): Motion status virtual ignition detection

For example:

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

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

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

✧ <*Voltage Idle Vehicle Event*>: If this parameter is set to 1, the device will generate **+RESP:GTVGN** or **+RESP:GTVGF** event based on external power voltage. When the external voltage meets the trigger condition defined in **AT+GTVVS**, **+RESP:GTVGN / +RESP:GTVGF** will be reported.

Note: When this function is enabled, virtual ignition detection will be disabled and

+RESP:GTVGN / +RESP:GTVGF will only be reported as an event.

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

- **+ACK:GTVMS,**

Example: **+ACK:GTVMS,840501,135790246811220,,0021,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

Note: If the virtual ignition detection function is enabled, **+RESP:GTVGN**, **+RESP:GTVGF** and **+RESP:GTVGL** can be reported to the backend server when the corresponding bit in <*Event Mask*> of the command **AT+GTCFG** is set to 1.

3.2.7.Bluetooth Settings

3.2.7.1.Bluetooth Setting

The command **AT+GTBTS** is used to configure Bluetooth settings for the device to report certain events.

- **AT+GTBTS=**

Example: **AT+GTBTS=gv57,1,,GV57MG_BT,7,3,0,0D03,0003,,,0,,,,0,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 6	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0|1	0
Reserved	0		
Bluetooth Name	<=20	(ASCII)	GV57MG_BT
Bluetooth Service	1	7	7

Discoverable Mode	1	0 - 3	3
Discoverable Time	<=4	0 – 1440(Min)	0
Bluetooth Report Mask	<=4	(HEX)	0D03
Bluetooth Event Mask	<=4	(HEX)	0003
Reserved	0		
Reserved	0		
Advertising Type	1	0|2	0
Reserved	0		
Reserved	0		
Reserved	0		
Advertising Data Type	1	0|3	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 Bluetooth.
  - 0: Disable Bluetooth.
  - 1: Enable Bluetooth.
- <*Bluetooth Name*>: The name of the device for Bluetooth identification.
- <*Bluetooth Service*>: The services which the device provides.
  - Bit 0: Device information service including Manufacturer Name and Model Number.
  - Bit 1: Battery Service including Battery Level.
  - Bit 2: Virtual Serial Port Service. The data will be transmitted over virtual serial port connection in this service.
- <*Discoverable Mode*>: The mode to configure the Bluetooth to be non-discoverable or discoverable for the period according to <*Discoverable Time*>.
  - 0: Non-discoverable mode.
  - 1: General discoverable mode: The device will remain discoverable for <*Discoverable Time*> minutes after the ignition is turned on.
  - 2: General discoverable mode: The device will remain discoverable for

<*Discoverable Time*> minutes after the ignition is turned off.

- 3: General discoverable mode: The device will remain discoverable for <*Discoverable Time*> minutes after it is powered on.

✧ <*Discoverable Time*>: The time period for the device to remain discoverable. If it is set to 0, the device will always be discoverable when a specific condition as described in <*Discoverable Mode*> is satisfied.

✧ <*Bluetooth Report Mask*>: Bitwise mask to configure the composition of Bluetooth information in report messages.

- Bit 0 for <*Bluetooth Name*>
- Bit 1 for <*Bluetooth MAC Address*>
- Bit 2... Bit 7 - Reserved
- Bit 8 for <*Peer Role*>
- Bit 9 - Reserved
- Bit 10 for <*Peer Address Type*>
- Bit 11 for <*Peer MAC Address*>
- Bit 12 - Reserved
- Bit 13 … Bit 15 - Reserved

For each bit, set it to 1 to enable the corresponding component in the report, and 0 to disable the corresponding component in the report. This mask is valid for **+RESP:GTBCS** and **+RESP:GTBDS** report messages.

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

- Bit 0 for **+RESP:GTBCS**
- Bit 1 for **+RESP:GTBDS**

✧ <*Advertising Type*>: The type of advertising.

- 0: ADV_IND (Connectable undirected advertising)
- 1: Reserved
- 2: ADV_SCAN_IND (Scannable undirected advertising)

✧ <*Advertising Date Type*>: The type of advertising data.

- 0: Bluetooth Name.
- 1: Reserved
- 2: Reserved.
- 3. Bluetooth Mac address

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

➢ **+ACK:GTBTS,**

Example: **+ACK:GTBTS,840501,865084030960726, ,0022,20230411103140,02FF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	

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

3.2.7.2.Bluetooth Driver Identification

The command **AT+GTBDI** is used to configure a list of driver ID which is used to identify the driver. To use this command, the parameter <*Mode*> must be enabled and the parameter <*Discoverable Mode*> in the command **AT+GTBTS** should not be 0.

➢ **AT+GTBDI=**

Example: **AT+GTBDI=gv57,0,1,2,1381388,1391399,0,,,,0018$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Enable	1	0|1	0
Start Index	<=4	1 - 1200	
End Index	<=4	1 - 1200	
Driver ID List	<=8*75	00000001 - FFFFFFFF	
Report Mode	1	0 - 3	0
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Enable*>: Enable/disable the driver ID setting function. If the function is enabled, the device will verify the driver ID sent from the app side, and then return the verification result to the app.

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

Note: If <*Enable*> was set to 1, all AT commands (except **AT+GTDAT**) sent from vcom to BB must get Driver ID authentication before they can be executed.

- <*Start Index*>, <*End Index*>: The index range of the allowlist to which the Driver ID is to be updated. For example, if <*Start Index*> is set to 1 and <*End Index*> is set to 2, then the first two Driver IDs in the allowlist will be updated by the numbers provided in the parameter < Driver ID List >. The parameters <*Start Index*> and <*End Index*> determine the total number of Driver IDs that will be updated. If either one is empty, there should be no < Driver ID List >.
- <*Driver ID List*>: A list of comma-separated Driver ID. The number of the Driver ID is determined by <*Start Index*> and <*End Index*>.
- <*Report Mode*>:The mode of reporting login status in **+RESP:GTBDL**
  - Bit 0: Report when driver logs in.
  - Bit 1: Report when driver logs out.

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

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

- **+ACK:GTBDI,**

Example: **+ACK:GTBDI,600100,135790246811220,,0018,20090214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.7.3.Bluetooth Beacon ID Setting

The command **AT+GTBID** is used for the device to scan Bluetooth beacon accessories. To use this function, the parameter <*Mode*> in the command **AT+GTBTS** must be set to 1.

- **AT+GTBID=**

Example: **AT+GTBID=gv57,1,1,3,000A,2400,1,1,1,78054116A854,,3,,60,60,780541,,,,,,0,,FFFF**

$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' - '9', 'a' - 'z', 'A' - 'Z'	Gv57
Index	1	0 - 2	0
Enable	1	0|1	0
Beacon ID Model	1	0|3|4	0
Accessory Append Mask	<=4	(HEX)	000A
Low Voltage Threshold	<=4	0 - 5000(mV)	2400
Expand Organization Unique Identifier Numbers	1	0 – 4	0
Start Index	<=3	1 - 300	
End Index	<=3	1 - 300	
MAC List	<=12*75		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Organization Unique Identifier	6	(HEX)	
Organization Unique Identifier1 (Optional)	6	(HEX)	
Organization Unique Identifier2 (Optional)	6	(HEX)	
Organization Unique Identifier3 (Optional)	6	(HEX)	
Organization Unique Identifier4 (Optional)	6	(HEX)	
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535 (*100ms)	0
Toggle Times	<=3	0 - 255	0

Message Type	1	0|1	
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

- <*Index*>: The index of the beacon Bluetooth accessory.
- <*Enable*>: Enable/disable this function.
  - 0: Disable this function.
  - 1: Enable this function.
- <*Beacon ID Model*>: The model of the Bluetooth accessory. If<*Beacon ID Model*>changes, the previously set <*MAC List*> will be cleared.The following is supported now:
  - 0: WKF300. Five reserved parameters are used as follows:

Push Button Event	1	0|1	0
Keyfob Detection Mode	1	0|3|4	0
Keyfob Detection Interval	<=3	30 - 600(Sec)	30
Ignition OFF Debounce	<=3	0 | 30 - 600(Sec)	30
Reserved	0		

  - 3: WID300. Five reserved parameters are used as follows:

Reserved	0	0	0
WID300 Detection Mode	1	0|2|3	0
WID300 Detection Interval	<=3	30 - 600(s)	30
WID300 IGN Scan/Report Interval	<=5	0|30 - 86400(s)	60
WID300 IGF Scan/Report Interval	<=5	0|30 - 86400(s)	60

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

Reserved	0	0	0
WID310 Detection Mode	1	0|2|3	0
WID310 Detection Interval	<=3	30 - 600(s)	30
WID310 IGN Scan/Report Interval	<=5	0|30 - 86400(s)	60

WID310 IGF Scan/Report Interval	<=5	0|30 - 86400(s)	60

- <*Accessory Append Mask*>: Bitwise mask to configure the composition of the Bluetooth accessory information in **+RESP:GTBIE/GTBID** message.
  - Bit 0: Reserved
  - Bit 1: <*Accessory MAC*>
  - Bit 2: Reserved
  - Bit 3: <*Accessory Battery Level*>
  - Bit 4: Reserved
  - Bit 5: Reserved.
  - Bit 6: <*Accessory Signal Strength*>.
- <*Low Voltage Threshold*>: It specifies the lower voltage limit. When the voltage of Bluetooth accessory is below this value, the device will report message **+RESP:GTBAA** to the backend server. 0 means "Disable low voltage detection".
- <*Expand Organization Unique Identifier Numbers*>: The expand number of <*Organization Unique Identifier*>.
- <*Push Button Event*>: If this parameter is set to 1 and the button on WKF300 is pushed, the device will report the message **+RESP:GTBAA** to the backend server.
- <*Keyfob Detection Mode*>: The parameter that specifies the mode of detecting Keyfob.
  - 0: Disable Keyfob detection.
  - 1: Reserved.
  - 2: Reserved.
  - 3: Enable Keyfob detection: Allow the device to scan only once. After entering ignition on (only valid in hard-wired ignition on), the device will scan Keyfobs one time for the time specified by <*Keyfob Detection Interval*>. If the device detects Keyfob(s) or a change in available Keyfob(s), it will immediately stop scanning, give an unlock output and report the message **+RESP:GTBKS** to the backend server, otherwise, it will only report the message **+RESP:GTBKS** to the backend server.
  - 4: Enable Keyfob detection: Allow the device to scan continuously. The device will keep scanning Keyfob(s) continuously. If the device detects Keyfob(s) or change of available Keyfob(s) within <*Keyfob Detection Interval*> time, it will send the **+RESP: GTBID/+RESP:+GTBIE** message to report information of Keyfob(s). If more than 15/100 Keyfobs are detected, the **+RESP:GTBID/+RESP:GTBIE** message will contain information on the top 15/100 Keyfobs with the strongest signal.
- <*Keyfob Detection Interval*>: The device scans Keyfobs once for the period specified by this parameter.
- <*Ignition OFF Debounce*>: After entering ignition off (only valid in hard-wired ignition on) for the time specified by <*Ignition OFF Debounce*>, the device will give a lock output and report the message **+RESP:GTBKS** to backend server. If this parameter is set to 0, the device will give a lock output and report the message **+RESP:GTBKS** to backend server immediately after entering ignition off.
- <*Start Index*>, <*End Index*>: The index range of the MAC list to which the MAC

addresses are to be updated. For example, if <*Start Index*> is set to 1 and <*End Index*> is set to 2, then the first two MAC addresses in the MAC list will be updated by the MAC addresses provided in the parameter <*MAC List*>. <*Start Index*> and <*End Index*> determine the total number of MAC addresses that will be updated. If either one is empty, there should be no <*MAC List*> following the empty value. A maximum of 75 MAC addresses can be updated each time.

✧ <*MAC List*>*:* A list of comma-separated MAC addresses to be updated to the MAC list. The number of the MAC addresses is determined by <*Start Index*>and <*End Index*>.

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

✧ <*WID300 Detection Mode*>: The parameter which specifies the mode of detecting WID300.

- 0: Disable detection.
- 2: Enable detection: Allow the device to scan continuously. After entering ignition-on-and-moving state, the device will keep scanning WID300 continuously. If the device detects WID300 or change of available WID300, it will send the **+RESP:GTBID/GTBIE** messages to report information of WID300. If more than 15/100 WID300 are detected, the **+RESP:GTBID/GTBIE** message will contain the information on the top 15/100 WID300.
- 3: Enable detection: According to the parameter <*WID300 IGN Scan/Report Interval*>/<*WID300 IGF Scan/Report Interval*> to scan the beacons and to report the **+RESP:GTBID/+RESP:+GTBIE** message to the backend server. If more than 15/100 WID300 are detected, the **+RESP:GTBID/GTBIE** message will contain the information on the top 15/100 WID300.

✧ <*WID300 Detection Interval*>: The device scans WID300 for the time period specified by this parameter when <*WID300 Detection Mode*> is 2.

✧ <*WID300 IGN Scan/Report Interval*>: The time interval for Scanning beacons and sending **+RESP: GTBID/GTBIE** messages when the engine is on and <*WID300 Detection Mode*> is 3.

✧ <*WID300 IGF Scan/Report Interval*>: The time interval for Scanning beacons and sending **+RESP: GTBID/GTBIE** messages when the engine is off and <*WID300 Detection Mode*> is 3.

✧ <*WID310 Detection Mode*>: The parameter which specifies the mode of detecting WID310.

- 0: Disable detection.
- 2: Enable detection: Allow the device to scan continuously. After entering ignition-on-and-moving state, the device will keep scanning WID310 continuously. If the device detects WID310 or change of available WID310, it will send the **+RESP:GTBID/GTBIE** messages to report information of WID310. If more than 15/100 WID310 are detected, the **+RESP:GTBID/GTBIE** message will contain the information on the top 15/100 WID310.

- 3: Enable detection: According to the parameter <*WID310 IGN Scan/Report Interval*>/<*WID310 IGF Scan/Report Interval*> to scan the beacons and to report the **+RESP: GTBID/GTBIE** message to the backend server. If more than 15/100 WID310 are detected, the **+RESP:GTBID/GTBIE** message will contain the information on the top 15/100 WID310.

✧ <*WID310 Detection Interval*>: The device scans WID310 for the time period specified by this parameter when <*WID310 Detection Mode*> is 2.

✧ <*WID310 IGN Scan/Report Interval*>: The time interval for Scanning beacons and sending **+RESP:GTBID/GTBIE** messages when the engine is on and <*WID310 Detection Mode*> is 3.

✧ <*WID310 IGF Scan/Report Interval*>: The time interval for Scanning beacons and sending **+RESP:GTBID/GTBIE** messages when the engine is off and <*WID310 Detection Mode*> is 3.

✧ <*Organization Unique Identifier*>: It is the first three bytes of Bluetooth address, which is composed of NAP and UAP. Only one Organization Unique Identifier (OUI) is allowed for each type of Bluetooth accessory. For example, 'AC233F' represents the Bluetooth iBeacon E6. The 'AC23' is NAP, the '3F ' is UAP. If the device detects this OUI, the **+RESP:GTBID/GTBIE/GTBKS** message will be reported. If the value is empty, it means “Disable this function”.

✧ <*Message Type*>: The type of message.

- 0: Report **+RESP:GTBID** (MAX 15 device information will be reported).
- 1: Report **+RESP:GTBIE** (MAX 100 device information will be reported).

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

➢ **+ACK:GTBID,**

Example: +ACK:GTBID,840501,135790246811220,,0024,20230214093254,11F0$			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.7.4.Transparent Data Transmission

The command **AT+GTDAT** is used to transfer data to the backend server. Data is wrapped into the message **+RESP:GTDAT** and sent to the backend server.

➢ **AT+GTDAT=**

Example: **AT+GTDAT=gv57,0,,data to the backend server,0,,,,FFFF$** **AT+GTDAT=gv57,2,,data to the backend server,0,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Command Type	1	0|2|4|5	
Reserved	0		
Data	<=245	ASCII Code	
Need Ack	1	0|1	
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Command Type*>: The parameter which indicates how to send the data.

- 0: Send message to the backend server with **+RESP:GTDAT (Short Format)**.
- 2: Send message to the backend server with **+RESP:GTDAT (Long Format)**.
- 4: Send the pure data directly to the Bluetooth.
- 5: Send the pure data directly to the Bluetooth without CRLF.

Note: If you send data through Bluetooth, <*Data*> can only be 200, but the <Data> can only be 198 when the <*Command Type*> is 4. The **+RESP: GTDAT** in HEX format will be the same when the <*Command Type*> is 0 or 2.

✧ <*Data*>: Data to be transferred the backend server. When the value of <*Enable SACK*> in **AT+GTSRI** and **AT+GTQSS** is 1.

✧ <*Need ACK*>: Need to report **+ACK: GTDAT** or not.

- 0: Do not need the ACK report.
- 1: Need the ACK report.

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

➢ **+ACK:GTDAT,**

Example: **+ACK:GTDAT,840501,865084030960726,,0025,20230411110219,0336$**

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

3.2.7.5.Primary Stolen Vehicle Recovery

The command **AT+GTSVR** is used to configure the Bluetooth settings for the Primary device. If the Primary device can't connect with the Ghost device within the time defined by <*Connect Interval*> * <*Connect Fail Count*>, it will report the **+RESP:GTSVR** message to the backend server. When the Primary device connects to the Ghost device for the first time, and meanwhile the Primary device matches the Ghost device's MAC address, IMEI and UTC successfully, the Primary device will report the **+RESP:GTSVR** message to the backend server and the Cellular LED will be On (2 seconds) and Off (2 seconds) periodically which lasts 40 seconds.

➢ **AT+GTSVR=**

Example: T+GTSVR=gv57,1,C63B383FEBFA,10,1,865585040360855,10,,,GL53MG,FFFF$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv57
Mode	1	0 - 1	0
Ghost MAC Address	12	(HEX)	
Connect Interval	<=4	10|20|30|60|120|180|240|360|480|720|1440	10
Connect Fail Count	<=2	1 - 10	1
Match Connected IMEI	15	(IMEI)	
BTI Report Interval	<=4	0 - 1440	0
Reserved	0		

Reserved	0		
Ghost Bluetooth Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'(ASCII)	GL53MG
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Mode*>: The working mode of the Primary device's stolen vehicle recovery function.
  - 0: Disable this function.
  - 1: Enable this function.

  Note: If <*Mode*> in **AT+GTSVR** is set to 1, except <*Mode*> and <*Bluetooth Name*> fields in **AT+GTBTS**, all other parameters in **AT+GTBTS, AT+GTBID, AT+GTBAS** will not work.
- <*Ghost MAC Address*>: The MAC address of the Ghost device which is used to pair with the Primary device.
- <*Connect Interval*>: The maximum amount of time allowed for the Ghost device to establish a connection with the Primary device. Unit: minute.

  Note: The <*Connect Interval*> parameter for the Ghost device should be set to a value less than or equal to the <*Connect Interval*> set for the Primary device.
- <*Connect Fail Count*>: The maximum number of allowed connections between the Primary device and the Ghost device.
- <*Ghost IMEI*>: The IMEI of the Ghost device which is used to match with the Primary device.
- <*BTI Report Interval*>: The parameter that specifies the interval for reporting the **+RESP:GTBTI** message regarding the status and Bluetooth information of the Ghost device. 0 means "Disable the **+RESP:GTBTI** report". Unit: minute.

  Note: If the connection between the Primary device and the Ghost device fails, the **+RESP:GTBTI** message will not be reported.
- <*Ghost Bluetooth Name*>: The Bluetooth name of the Ghost device which is used for **+RESP:GTBTI** messages.
-

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

➢ **+ACK:GTSVR,**

Example: +ACK:GTSVR,840501,135790246811220,,0026,20230214093254,11F0$			
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	$	$

3.2.7.6.Bluetooth Accessory Setting

The command **AT+GTBAS** is used for the device to scan or connect with Bluetooth accessories in order to obtain data. To use this command, the parameter <*Mode*> in the command **AT+GTBTS** must be enabled.

➢ **AT+GTBAS=**

Example: **AT+GTBAS=gv57,1,13,0,WRL300,DA4516FA9BE3,000F,,2400,,1,123456,123456,,,,,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Index	1	0 - 9	0
Accessory Type	<=2	0|4|6|8|13	0
Accessory Model	1	0|4	0
Accessory Name	<=20	(ASCII)	
Accessory MAC	12	(HEX)	FFFFFFFFFFFF
Accessory Append Mask	<=4	(HEX)	000F
Reserved			
Low Voltage Threshold	<=4	0 – 5000mV	2400
Reserved			
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		

Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved			
Reserved			
Serial Number	4	(HEX)	
Tail Character	1	$	$

- <*Index*>: The index of the Bluetooth accessory.
- <*Accessory Type*>: The type of the Bluetooth accessory which is defined in the <*Index*>. The following is supported now:
  - 0: No Bluetooth accessory.
  - 4: CAN accessory. Nine reserved parameters are used as follows (CAN Chanel Type):

PIN Code	4|6	0000-9999|000000-999999	0000
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			

  - 6: Multi-functional beacon sensor.

Temperature Mode	1	0-3	0
Low Temperature	<=3	-40 - 80℃	0
High Temperature	<=3	-40 - 80℃	10
Temperature Validity	<=2	1 - 10	2

Temperature Send Interval	<=5	30 - 43200	300
Humidity Mode	1	0 - 3	0
Low Humidity	<=3	0 - 100rh	20
High Humidity	<=3	0 - 100rh	30
Humidity Validity	<=2	1 - 10	2
Humidity Send Interval	<=5	30 - 43200	300

- 8: External Input Output Bluetooth Accessory.

  Note: The input/output configuration of the accessory can be found in the **AT+GTIEX**, **AT+GTAEX** and **AT+GTOEX**.

- 13: Relay Bluetooth accessory

Relay Event Notification	1	0 - 1	0
Password	<=6	'0' – '9' 'a' – 'z' 'A' – 'Z'	123456
New Password	<=6	'0' – '9' 'a' – 'z' 'A' – 'Z'	123456
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			

The device will report the +RESP:GTBAA message to the backend server when the temperature and humidity reach alarm conditions.

✧ <*Temperature Mode*>: The working mode of the temperature alarm.

- 0: Disable temperature alarm.
- 1: Report temperature alarm if the current temperature is within the temperature range defined by <*Low Temperature*> and <*High Temperature*>.
- 2: Report temperature alarm if the current temperature is outside the temperature range defined by <*Low Temperature*> and <*High Temperature*>.
- 3: Report temperature alarm only once if the current temperature enters or exits the temperature range defined by <*Low Temperature*> and <*High Temperature*>. In this mode, <*Temperature Send Interval*> will be ignored.

- <*Low Temperature*>: It specifies the lower temperature limit.
- <*High Temperature*>: It specifies the upper temperature limit.
- <*Temperature Validity*>: If the sensor detects the environment temperature which meets the alarm condition, it will continuously check the temperature. If the temperature keeps meeting the alarm condition for <*Temperature Validity*> times, the temperature alarm will be triggered.
- <*Humidity Mode*>: The working mode of the humidity alarm.
  - 0: Disable humidity alarm.
  - 1: Report humidity alarm if the current humidity is within the humidity range defined by <*Low Humidity*> and <*High Humidity*>.
  - 2: Report humidity alarm if the current humidity is outside the humidity range defined by <*Low Humidity*> and <*High Humidity*>.
  - 3: Report humidity alarm only once if the current humidity enters or exits the humidity range defined by <*Low Humidity*> and <*High Humidity*>. In this mode, <*Humidity Send Interval*> will be ignored.
- <*Low Humidity*>: It specifies the lower humidity limit.
- <*High Humidity*>: It specifies the upper humidity limit.
- <*Humidity Validity*>: If the sensor detects the environment humidity which meets the alarm condition, it will continuously check the humidity. If the humidity keeps meeting the alarm condition for <Humidity Validity> times, the humidity alarm will be triggered.
- <*Relay Event Notification*>: It configures whether to enable event notification function.
  - 0: Disable relay event notification.
  - 1: Enable relay event notification. If a new event occurs on the accessory, the device will report the **+RESP:GTBAA** message.
- <*Password*>: It is the current password for the accessory device.
- <*New Password*>: It is set to change the current password.

Note: If <*New Password*> is set successfully, <*Password*> will be changed to <*New Password*>.

- <*Accessory Model*>: The model of the Bluetooth accessory which is defined in <*Accessory Type*>. The following are supported now:
  - The model of CAN accessory (<Accessory Type> is 4):
    0: BLE CAN100
  - The External Input Output Bluetooth Accessory (<*Accessory Type*> is 8):
    0: WBC300.
  - The model of Multi-functional beacon sensor (<*Accessory Type*> is 6):
    4: WMS301.
  - The model of Relay Sensor (<*Accessory Type*> is 13):
    0: WRL300.
- <*Accessory Name*>: The name of the Bluetooth accessory.
- <*Accessory MAC*>: The MAC address of the Bluetooth accessory.
- <*Accessory Append Mask*>: If the device is connected to a Bluetooth accessory, and Bit 8 (for <*Bluetooth Accessory Data*>) of <*ERI Mask*> is set to 1, the device will report Bluetooth accessory data via **+RESP:GTERI** instead of **+RESP:GTFRI**. This mask is

used to configure the accessory data fields to be reported in the **+RESP:GTERI** and **+RESP:GTBAA** messages.

- Bit 0: <Accessory Name>
- Bit 1: <Accessory MAC>
- Bit 2: <Accessory Status>
- Bit 3: <Accessory Battery Level>
- Bit 4: <Accessory Temperature>
- Bit 5: <Accessory Humidity>
- Bit 14: <Relay Config Result/Relay State>

✧ <*Low Voltage Threshold*>: It specifies the lower voltage limit. When the voltage of the Bluetooth accessary falls below this value, the device will report the message **+RESP:GTBAA** to the backend server. 0 means “Disable low voltage detection”.

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

➢ **+ACK:GTBAS,**

Example: **+ACK:GTBAS,840501,135790246811220,,0027,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.7.7.Input Expansion

The command **AT+GTIEX** is used to configure the parameters of external Bluetooth Input accessories. All these inputs are customizable. If the logic status is changed on one of Bluetooth Input accessories, the device will report the message **+RESP:GTDIS** to the backend server.

➢ **AT+GTIEX=**

Example: **AT+GTIEX=gv57,1,0,1,5,,,,,,,,FFFF$**

Parameter	Length (byte)	Range/Format	Default
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv57
Input Expansion Type	1	1	1
Bind BAS Index	1	0 - 9	0
Input Number	1	1	
Input ID	1	0|5	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Input Expansion Type*>: The parameter that indicates what kind of extended device the following parameters can be used for.

1: Bluetooth Accessory Input Setting.

Note: Limited by the detection mechanism, changing the input state in a short time may not be detected.

✧ <*Bind BAS Index*>: The parameter that is used to bind the specific configuration in **AT+GTBAS** when the <*Input Expansion Type*> is set to 1. The value is the same as the index in **AT+GTBAS**.

✧ <*Input Number*>: The parameter that indicates the number of configured Bluetooth Input Setting. It is used to define how many of the following two parameters(<*Input ID*> and Reserved) included.

✧ <*Input ID*>: The ID of Bluetooth accessory Input. 0 means “Disable this function”. 5 means that Bluetooth accessory Input 1 is enabled.

Note: If <*Input ID*> is set to 5, the parameters of <*Accessory Type*> and <*Accessory Model*> should be set in **AT+GTBAS**.

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

➢ **+ACK:GTIEX,**

Example:
+ACK:GTIEX,840501,867995030082104,,0028,20230415085637,0261$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=10	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.7.8.Analog Input Expansion

The command **AT+GTAEX** is used to configure the parameters of External Bluetooth Analog Input accessories. All these inputs are customizable.

- **AT+GTAEX=**

Example: AT+GTAEX=gv57,0,1,1,5,1,8000,32000,,,,,,FFFF$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv57
Analog Input Expansion Type	1	0	0
Bind BAS Index	1	0 - 9	0
Analog Input Number	1	1	
Analog Input ID	1	0|5	0
Mode	1	0|1|2	0
Min Threshold	<=5	8000 - 32000 (mV)	8000
Max Threshold	<=5	8000 - 32000 (mV)	32000
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

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

- <*Analog Expansion Type*>: The parameter that indicates what kind of extended device the following parameters can be used for.
  0: Bluetooth Analog Input accessory Setting.
- <*Bind BAS Index*>: The parameter that is used to bind the specific configuration in **AT+GTBAS**.
- <*Analog Input Number*>: The total number of configured Bluetooth Analog Input Setting. In one configuration, <*Analog Input ID*>, <*Mode*>, <*Min Threshold*> and <*Max Threshold*> are included and others are reserved.
- <*Analog Input ID*>: The ID 5 is Bluetooth Analog Input ID, the parameters <*Accessory Type*> and <*Accessory Model*> should be set in **AT+GTBAS**.
- <*Mode*>:The working mode of the analog input alarm (**+RESP:GTAIS**).
  - 0: Disable analog input alarm.
  - 1: Enable analog input alarm. If the current input voltage is within the range of (<*Min. Threshold*>, <*Max. Threshold*>), the alarm will be triggered.
  - 2: Enable analog input alarm: If the current input voltage is outside the range of (<*Min. Threshold*>, <*Max. Threshold*>), the alarm will be triggered.
- <*Min Threshold*>: The parameter that specifies the lower voltage limit for the analog input port to trigger the alarm when the <*Mode*> is set to 1 or 2.
- <*Max Threshold*>: This parameter that specifies the upper voltage limit for the analog input port to trigger the alarm when the <*Mode*> is set to 1 or 2.

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

- **+ACK:GTAEX,**

Example: +ACK:GTAEX,840501,867995030082104,,0029,20230415085637,0261$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=10	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.7.9.Output Expansion

The command **AT+GTOEX** is used to change the Bluetooth Output accessory status.

➢ **AT+GTOEX=**

Example: **AT+GTOEX=gv57,1,0,2,5,1,0,0,,,1,6,1,10,10,,,0,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv57
Output Expansion Type	1	1	1
Bind BAS Index	1	0 - 9	0
Output Number	1	1 - 2	
Output ID	1	5 - 6	
Status	1	0 - 1	
Duration	<=3	0 - 255(×100ms)	
Toggle Times	<=2	0 - 99	
Reserved	0		
Reserved	0		
DOS Report	1	0 - 1	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Output Expansion Type*>: The parameter that indicates what kind of extended device the following parameters can be used for.

1: Bluetooth Output Accessory Setting.

✧ <*Output Number*>: The parameter that indicates the number of configured Bluetooth Output Setting. In one configuration, <*Bind BAS Index*>, <*Output ID*>, <*Status*>, <*Duration*>, <*Toggle Times*>, <*Reserved*> and <*DOS Report*> are included and others are reserved.

✧ <*Output ID*>: The ID 5 or 6 represents Bluetooth Output ID and the parameters

<Accessory Type> and *<Accessory Model>* should be set in **AT+GTBAS**.

✧ *<DOS Report>*: Whether to report **+RESP:GTDOS** when wave shape 1 status of Bluetooth Output changes.

- 0: Do not Report **+RESP:GTDOS**.
- 1: Report **+RESP:GTDOS**.

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

➢ **+ACK:GTOEX,**

Example: **+ACK:GTOEX,840501,862170013988157,,002A,20110101000045,0008$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=10	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.7.10.ID Authentication

The command **AT+GTIDA** is used to protect against unauthorized use. This is achieved by connecting to the accessory via Bluetooth and connecting an external relay (normally closed relay is recommended) to cut off the starter or fuel pump. When the device is connected to Bluetooth, it obtains the Bluetooth MAC address. If the MAC is on the list, it will be authorized before the next ignition is turned off. After the ignition is turned off again, the authentication will last for a short period of time (settable). Within this period of time, the driver can turn on the engine again without the need to reidentify himself.

➢ **AT+GTIDA=**

Example: **AT+GTIDA=gv57,1,,,,30,7,30,,,,0,0,0,0,,0,0,,FFFF$**			
Parameter	**Length (Byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv57
Mode	1	0|1	0

Reserved	0		
Reserved	0		
Reserved	0		
Timeout after Ignition Off	<=3	0|15 – 600sec	30
Report Mode	1	0 – 7	0
ID Validity Time	<=3	15 – 600sec	30
Reserved	0		
Reserved	0		
Reserved	0		
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Reserved	0		
ID List Type	1	0|1	1
Bind BAS Index	1	0 – 9	0
Bind BAS	0	0|1	0
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Mode*>: The working mode of the ID authentication function.
  - 0: Disable this function.
  - 1: Enable this function: Only authorized ID cards can unlock the vehicle.
- <*Timeout after Ignition Off*>: If the ignition is turned off, it will still be authorized for a short time. In this period, re-authentication is not needed. 0 means “Lock the vehicle when the ignition is turned off”.
- <*Report Mode*>: The mode of reporting ID.
  - Bit 0: Report the ID which is authorized.
  - Bit 1: Reserved
  - Bit 2: Report the ID which has logged out. (If authorized ID meets the trigger conditions <*ID Validity Time*> and <*Timeout after Ignition Off*>, then the **+RESP:GTIDA** report will be sent to indicate the log-out event).

  For each bit, set it to 1 to enable the report, and set it to 0 to disable the report. If <*Report Mode*> is 0, no **+RESP:GTIDA** message will be reported.
- <*ID Validity Time*>: It will remain authorized for this period of time when the ID is valid.
- <*Output ID*>: It specifies the ID of the output port to output specified wave shape when

it is authorized.

✧ <*ID List Type*>: This parameter indicates which ID List to use.

- 0: Reserved
- 1: Use <*MAC List*> and <*Organization Unique Identifier*> in the command **AT+GTBID**. Please make sure the function **AT+GTBID** is configured properly. To enable this feature, the following conditions must be met:

  WKF300: Set <*Push Button Event*> to 1. If the <*Keyfob Detection Mode*> is mode 4, the ID with the strongest scanned signal is used for authorization, and don't need set <*Push Button Event*>. Furthermore there is at least one MAC address in the <*MAC List*>.

✧ <*Bind BAS Index*>: The index of the Bluetooth accessory. It is defined in **AT+GTBAS**.

✧ <*Bind BAS*>: Enable/disable <*Bind BAS Index*> parameter.

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

Note: If the <*Bind BAS*> is set to 0，disable WRL300 (NC Pin) when timeout after ignition off. When Push button event of WKF300 is detected and it is authorized, enable the Relay (NO Pin) during ignition off. Push button event after ignition on would not change Relay Status.

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

➢ **+ACK:GTIDA,**

Example: **+ACK:GTIDA,840501,862170013988157,,002A,20110101000045,0008$**			
Parameter	**Length (Byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.7.11.CANBUS Device Configuration

This command **AT+GTCAN** is used to set the CANBUS device configuration for reporting CANBUS device information (**+RESP:GTCAN**) which mainly contains VIN, vehicle speed, engine speed, engine coolant temperature and other information.

➢ **AT+GTCAN=**

Example: **AT+GTCAN=gv57,1,30,60,C00FFFFF,0,1,001FFFFF,,,FFFF$**			
Parameter	**Length (Byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gv57
Mode	1	0|1	0
CAN Report Interval	<=5	0|5 – 86400sec	0
CAN Report Interval IGF	<=5	0|5 – 86400sec	0
CAN Report Mask	8	0 – FFFFFFFF	C00FFFFF
Additional Event	1	0|1	0
Communication Type	1	1	1
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of this function.
- 0: Disable this function.
- 1: Enable this function.

✧ <*CAN Report Interval*>: The time interval for sending the **+RESP:GTCAN** report message to the backend server when the ignition is on. Its value range is 0|5 – 86400 and the unit is second. 0 means “Do not report the message **+RESP:GTCAN**”.

✧ <*CAN Report Interval IGF*>: The time interval for sending the **+RESP:GTCAN** report message to the backend server when the ignition is off. Its value range is 0|5 – 86400 and the unit is second. 0 means “Do not report the message **+RESP:GTCAN** in ignition off state.

✧ <*Additional Event*>: Whether to send the **+RESP:GTCAN** report message by additional event.
- 0: Ignore all additional events
- 1: By ignition on/off event

✧ <*Communication Type*>: The communication type of CANBUS device.
- 1: Communication with BLE.

✧ <*CAN Report Mask*>: Bitwise mask to configure the composition of CAN report message.

Note: Bit 31 (for <*GSM Information*>) and Bit 30 (for <*GNSS Information*>) of the <*CAN Report Mask*> only control the composition of **+RESP:GTCAN** in ASCII format (not in HEX format). <*+CAN Mask*> in **AT+GTHRM** controls the GSM information and GNSS information in **+RESP:GTCAN** in HEX format. Bit 22 of this <*CAN Report Mask*> only controls <*Total Distance Impulses*> in **+RESP:GTCAN** in HEX format.

Mask Bit	Item	Description
Bit 31	<*GSM Information*>	Including <*MCC*>, <*MNC*>, <*LAC*>, <*Cell ID*> and the <*Reserved*>
Bit 30	<*GNSS Information*>	Including <*GNSS Accuracy*>, <*Speed*>, <*Azimuth*>, <*Altitude*>, <*Longitude*>, <*Latitude*>, <*GNSS UTC Time*>
Bit 29	<*CAN Report Expansion Mask*>	If this bit is set to 1, the parameter <*CAN Report Expansion Mask*> in **AT+GTCAN** is valid. If this bit is set to 0, the parameter <*CAN Report Expansion Mask*> in **AT+GTCAN** is not valid.
Bit 28	Reserved	
Bit 27	Reserved	
Bit 26	Reserved	
Bit 25	Reserved	
Bit 24	Reserved	
Bit 23	Reserved	
Bit 22	<*Total Distance Impulses*>	Vehicle total distance measured in Impulses (if distance from dashboard is not available)
Bit 21	<*Total Vehicle Engine Overspeed Time*>	The total time when the vehicle engine speed is greater than the limit defined in CAN100 configuration
Bit 20	<*Total Vehicle Overspeed Time*>	The total time when the vehicle speed is greater than the limit defined in CAN100 configuration
Bit 19	<*Doors*>	An 8-bit hexadecimal number. Each bit indicates information of one door.
Bit 18	<*Lights*>	An 8-bit hexadecimal number. Each bit indicates information of one light.
Bit 17	<*Detailed Information / Indicators*>	A hexadecimal number. Each bit indicates information of one indicator.
Bit 16	<*Tachograph Information*>	Two bytes. The higher byte describes driver

		2 (the one whose card is inserted in tachograph slot 2), and the lower byte describes driver 1.
Bit 15	*<Axle Weight 2nd>*	Weight of vehicle's second axle
Bit 14	*<Total Idle Fuel Used>*	Number of liters of fuel used since vehicle manufacture or device installation
Bit 13	*<Total Engine Idle Time>*	Time of engine running during idling status (vehicle at a standstill) since vehicle manufacture or device installation
Bit 12	*<Total Driving Time>*	Time of engine running during driving (non-zero speed) since vehicle manufacture or device installation
Bit 11	*<Total Engine Hours>*	Time of engine running since vehicle manufacture or device installation
Bit 10	*<Accelerator Pedal Pressure>*	Pressure applied onto accelerator pedal
Bit 9	*<Range>*	The number of kilometers to drive on remaining fuel
Bit 8	*<Fuel Level>*	The level of fuel in vehicle's tank (in liters or percentage)
Bit 7	*<Fuel Consumption>*	The fuel consumption of the engine
Bit 6	*<Engine Coolant Temperature>*	Engine coolant temperature
Bit 5	*<Engine RPM>*	Revolutions per minute of the engine
Bit 4	*<Vehicle Speed>*	Vehicle road speed
Bit 3	*<Total Fuel Used>*	Number of liters of fuel used since vehicle manufacture or device installation
Bit 2	*<Total Distance>*	Vehicle total distance
Bit 1	*<Ignition Key>*	Ignition status
Bit 0	*<VIN>*	Vehicle identification number

✧ *<CAN Report Expansion Mask>*: Bitwise mask to configure the composition of expanded CANBUS information of the **+RESP:GTCAN** report message.

Mask Bit	Item	Description
Bit 31	Reserved	

⋮	Reserved	
Bit 23	*<Engine Torque>*	The engine torque. Unit: percentage.
Bit 22	*<Rapid Accelerations>*	Total number of rapid accelerations since installation (calculation based on CAN 100 settings of speed increase time and value)
Bit 21	*<Rapid Brakings>*	Total number of rapid brakings since installation (calculation based on CAN 100 settings of speed decrease time and value)
Bit 20	*<Expansion Information>*	A hexadecimal number. Each bit contains information of one indicator.
Bit 19	*<Registration Number>*	The vehicle registration number
Bit 18	*<Tachograph Driver 2 Name>*	The name of tachograph driver 2
Bit 17	*<Tachograph Driver 1 Name>*	The name of tachograph driver 1
Bit 16	*<Tachograph Driver 2 Card Number>*	The card number of tachograph driver 2
Bit 15	*<Tachograph Driver 1 Card Number>*	The card number of tachograph driver 1
Bit 14	*<Total Brake Applications>*	Count of applying brake pedal (braking process initiated by brake pedal)
Bit 13	*<Total Accelerator Kick-down Time>*	Total time when accelerator pedal is pressed over 90%
Bit 12	*<Total Cruise Control Time>*	Total time when the vehicle speed is controlled by cruise-control module
Bit 11	*<Total Effective Engine Speed Time>*	Total time when the vehicle engine speed is effective
Bit 10	*<Total Accelerator Kick-downs>*	Count of accelerator pedal kick-downs (with the pedal pressed over 90%)
Bit 9	*<Pedal Braking Factor>*	It measures how often the driver brakes with brake pedal or with engine and stores both counts (which are always increasing). Decreasing speed with brake pedal pressed causes increase of pedal braking factor.
Bit 8	*<Engine Braking Factor>*	It measures how often driver brakes with brake pedal or with engine and stores both

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		counts (which are always increasing). Decreasing speed with no pedal pressed causes increase of engine braking factor.
Bit 7	*<Analog Input Value>*	Analog input value
Bit 6	*<Tachograph Driving Direction>*	Vehicle driving direction from tachograph
Bit 5	*<Tachograph Vehicle Motion Signal>*	Vehicle motion signal from tachograph
Bit 4	*<Tachograph Overspeed Signal>*	Tachograph overspeed signal for the vehicle
Bit 3	*<Axle Weight 4th>*	Weight of vehicle's fourth axle
Bit 2	*<Axle Weight 3rd>*	Weight of vehicle's third axle
Bit 1	*<Axle Weight 1st>*	Weight of vehicle's first axle
Bit 0	*<Ad-Blue Level>*	The level of Ad-Blue

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

- **+ACK:GTCAN,**

Example: +ACK:GTCAN,690803,135790246811220,,000D,20090214093254,FFFF$			
Parameter	**Length (Byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.7.12.CANBUS Alarm Setting

The **AT+GTCLT** command is used to set alarm threshold of CANBUS data. The **AT+GTCLT** can support 20 CANBUS alarm groups at most. Each CAN alarm trigger condition consists of *<Alarm Mask 1>*, *<Alarm Mask 2>* and *<Alarm Mask 3>*. For the CAN alarm trigger event information, please refer to *<Detailed Information / Indicators>*, *<Lights>*, *<Doors>* and *<Engine RPM>* of the **+RESP:GTCAN** message. If *<Alarm Mask*

1>, <*Alarm Mask 2*> and <*Alarm Mask 3*> meet each trigger condition at the same time, and the trigger event duration time is longer than <*Debounce Time*>, the **+RESP:GTCLT** alarm message will be sent.

Note: The **AT+GTCLT** and **AT+GTCAN** commands are used together. Only when all of <*Alarm Mask 1*>, <*Alarm Mask 2*> and <*Alarm Mask 3*> meet trigger condition and the trigger event duration time is longer than <*Debounce Time*> will the **+RESP:GTCLT** alarm message be sent.

➢ **AT+GTCLT=**

Example: **AT+GTCLT=gv57,0,1,1,207FFFFF,6FFFFFF,3F003F,F,31,7,FFFFFF,,,,,,,,FFFF$**			
Parameter	**Length (Byte)**	**Range/Format**	**Default**
Password	4 – 20	'0'–'9' 'a'–'z' 'A'–'Z'	gv57
Group ID	<=2	0 – 19	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000–FFFF	

Tail Character	1	$	$

- ✧ <*Group ID*>: The ID of the CANBUS alarm group. A total of 20 groups are supported.
- ✧ <*Mode*>: The CANBUS alarm working mode for each group.
  - 0: Disable the CAN alarm function.
  - 1: Enable the CAN alarm function.
- ✧ <*Debounce Time*>: The time for CANBUS alarm trigger event debouncing.
- ✧ <*CAN Data Mask*>: Bitwise mask to configure the CAN data composition of the **+RESP:GTCLT** report message. (<*CAN Data Mask*> just works in **+RESP:GTCLT** ASCII message.)

Mask Bit	Item	Description
Bit 31	Reserved	
Bit 30	Reserved	
Bit 29	<*CAN Report Expansion Mask*>	If this bit is set to 1, the parameter <*CAN Report Expansion Mask*> in **AT+GTCLT** is valid. If this bit is set to 0, the parameter <*CAN Report Expansion Mask*> in **AT+GTCLT** is not valid.
⋮	Reserved	
Bit 22	<*Total Distance Impulses*>	Vehicle total distance measured in impulses (if distance from dashboard is not available)
Bit 21	<*Total Vehicle Engine Overspeed Time*>	The total time when the vehicle engine speed is greater than the limit defined in CAN100 configuration
Bit 20	<*Total Vehicle Overspeed Time*>	The total time when the vehicle speed is greater than the limit defined in CAN100 configuration
Bit 19	<*Doors*>	An 8-bit hexadecimal number. Each bit contains information of one door.
Bit 18	<*Lights*>	An 8-bit hexadecimal number. Each bit contains information of a light.
Bit 17	<*Detailed Information/Indicators*>	A hexadecimal number. Each bit contains information of one indicator.
Bit 16	<*Tachograph Information*>	Two bytes. The higher byte describes driver 2 (the one whose card is inserted in tachograph slot 2), and the lower byte describes driver 1.

Bit 15	*<Axle Weight 2nd>*	Weight of vehicle's second axle
Bit 14	*<Total Idle Fuel Used>*	Number of liters of fuel used since vehicle manufacture or device installation
Bit 13	*<Total Engine Idle Time>*	Time of engine running during idling status (vehicle at a standstill) since vehicle manufacture or device installation
Bit 12	*<Total Driving Time>*	Time of engine running during driving (non-zero speed) since vehicle manufacture or device installation
Bit 11	*<Total Engine Hours>*	Time of engine running since vehicle manufacture or device installation
Bit 10	*<Accelerator Pedal Pressure>*	The pressure applied on acceleration pedal
Bit 9	*<Range>*	The number of kilometers to drive on remaining fuel
Bit 8	*<Fuel Level>*	The level of fuel in vehicle's tank (in Liters or Percentage)
Bit 7	*<Fuel Consumption>*	The fuel consumption of the engine
Bit 6	*<Engine Coolant Temperature>*	The temperature of the engine coolant
Bit 5	*<Engine RPM>*	Revolutions per minute of the engine
Bit 4	*<Vehicle Speed>*	Vehicle road speed
Bit 3	*<Total Fuel Used>*	The number of liters of fuel used since vehicle manufacture or device installation
Bit 2	*<Total Distance>*	Vehicle total distance
Bit 1	*<Ignition Key>*	Ignition status
Bit 0	*<VIN>*	Vehicle identification number

✧ *Alarm Mask 1*>: Bitwise setting of the alarm mask. The alarm mask information is based on <*Detailed Information / Indicators*> and <*Expansion Information*> of the **+RESP:GTCAN** message. Please see the following alarm mask table.

Note: In the CAN100 firmware versions 2.0.xx and 2.1.xx, the parameter is 16-bit long (Bit 0 – Bit 15), which has been extended to 32 bits since the CAN100 version 2.2.0:

Bit	Alarm Mask 1
Bit 31	Reserved
Bit 30	Reserved

Bit 29	Reserved
Bit 28	OLL – oil level low indicator (1 – on, 0 – off or not available)
Bit 27	SC – service call indicator (1 – on, 0 – off or not available)
Bit 26	AIR – airbags indicator (1 – on, 0 – off or not available)
Bit 25	CHK –“check engine” indicator (1 – on, 0 – off or not available)
Bit 24	Reserved
Bit 23	ABS – ABS failure indicator (1 – on, 0 – off or not available)
Bit 22	EH – engine hot indicator (1 – on, 0 – off or not available)
Bit 21	OP – oil pressure indicator (1 – on, 0 – off or not available)
Bit 20	BF – brake system failure indicator (1 – on, 0 – off or not available)
Bit 19	BAT– battery indicator (1 – on, 0 – off or not available)
Bit 18	CLL – coolant level low indicator (1 – on, 0 – off or not available)
Bit 17	BFL – brake fluid low indicator (1 – on, 0 – off or not available)
Bit 16	W – webcast (1 – on, 0 – off or not available)
Bit 15	T – trunk (1 – opened, 0 – closed)
Bit 14	D – doors (1 – any door opened, 0 – all doors closed)
Bit 13	FFL – front fog lights (1 – on, 0 – off)
Bit 12	RFL – rear fog lights (1 – on, 0 – off)
Bit 11	HB – high beams (1 – on, 0 – off)
Bit 10	LB – low beams (1 – on, 0 – off)
Bit 9	RL – running lights (1 – on, 0 – off)
Bit 8	R – reverse gear (1 – on, 0 – off)
Bit 7	CL – central lock (1 – locked, 0 – unlocked)
Bit 6	H – handbrake (1 – pulled-up, 0 – released)
Bit 5	C – clutch pedal (1 – pressed; 0 – released)
Bit 4	B – brake pedal (1 – pressed; 0 – released)
Bit 3	CC – cruise control (1 – active, 0 - disabled)
Bit 2	AC – air conditioning (1 – on, 0 - off)
Bit 1	DS – driver seatbelt indicator (1 – indicator on, 0 – off).
Bit 0	FL – fuel low indicator (1 – indicator on, 0 – off).

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✧ <*Alarm Mask 2*>: Bitwise setting of the alarm mask. The alarm mask information is based on <*Lights*> and <*Doors*> of the **+RESP:GTCAN** message. Please see the following alarm mask table.

Bit	Alarm Mask 2
Bit 31	Reserved
⋮	Reserved
Bit 21	Hood (1 – opened, 0 – closed)
Bit 20	Trunk (1 – opened, 0 – closed)
Bit 19	Rear Right Door (1 – opened, 0 – closed)
Bit 18	Rear Left Door (1 – opened, 0 – closed)
Bit 17	Passenger Door (1 – opened, 0 – closed)
Bit 16	Driver Door (1 – opened, 0 – closed)
⋮	Reserved
Bit 5	Hazard Lights (1 – on, 0 – off)
Bit 4	Rear Fog Light (1 – on, 0 – off)
Bit 3	Front Fog Light (1 – on, 0 – off)
Bit 2	High Beam (1 – on, 0 – off)
Bit 1	Low Beam (1 – on, 0 – off)
Bit 0	Running Lights (1 – on, 0 – off)

✧ <*Alarm Mask 3*>: Bitwise setting of the alarm mask. The alarm mask information is based on <*Engine RPM*> of the **+RESP:GTCAN** message. Please see the following alarm mask table.

Bit	Alarm Mask 3
Bit 31	Reserved
…	…
Bit 3	Over High RPM Event (1 – Triggered, 0 – not triggered).
Bit 2	Under High RPM Event (1 – Triggered, 0 – not triggered).
Bit 1	Over Low RPM Event (1 – Triggered, 0 – not triggered).

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Bit 0	Under Low RPM Event (1 – Triggered, 0 – not triggered).

- <*High RPM Threshold*>: This is the threshold of the high engine RPM. If the current engine RPM is more than <*High RPM Threshold*>, it will trigger over high RPM event.
- <*Low RPM Threshold*>: This is the threshold of the low engine RPM. If the current engine RPM is less than <*Low RPM Threshold*>, it will trigger under low RPM event.
- <*CAN Report Expansion Mask*>: Bitwise mask to configure the composition of CANBUS expansion information of the **+RESP:GTCLT** report.

Mask Bit	Item	Description
Bit 31	Reserved	
⋮	Reserved	
Bit 23	<*Engine Torque*>	The engine torque. Unit: Percentage.
Bit 22	<*Rapid Accelerations*>	The number of total rapid accelerations since installation (calculation based on CAN 100 settings of speed increase time and value)
Bit 21	<*Rapid Brakings*>	The number of total rapid brakings since installation (calculation based on CAN 100 settings of speed decrease time and value)
Bit 20	<*Expansion Information*>	A hexadecimal number. Each bit represents information of one indicator.
Bit 19	<*Registration Number*>	The vehicle registration number
Bit 18	<*Tachograph Driver 2 Name*>	The name of tachograph driver 2
Bit 17	<*Tachograph Driver 1 Name*>	The name of tachograph driver 1
Bit 16	<*Tachograph Driver 2 Card Number*>	The card number of tachograph driver 2
Bit 15	<*Tachograph Driver 1 Card Number*>	The card number of tachograph driver 1
Bit 14	<*Total Brake Applications*>	Count of applying brake pedal (braking process initiated by brake pedal)
Bit 13	<*Total Accelerator Kick-down Time*>	Total time when accelerator pedal is pressed over 90%
Bit 12	<*Total Cruise Control Time*>	Total time when the vehicle speed is controlled by cruise-control module

Bit 11	*<Total Effective Engine Speed Time>*	Total time when the vehicle engine speed is effective
Bit 10	*<Total Accelerator Kick-downs>*	Count of accelerator pedal kick-downs (with the pedal pressed over 90%)
Bit 9	*<Pedal Braking Factor>*	It measures how often the driver brakes with brake pedal or with engine and stores both counts (which are always increasing). Decreasing speed with brake pedal pressed causes increase of pedal braking factor.
Bit 8	*<Engine Braking Factor>*	It measures how often the driver brakes with brake pedal or with engine and stores both counts (which are always increasing). Decreasing speed with no pedal pressed causes increase of engine braking factor.
Bit 7	*<Analog Input Value>*	Analog input value
Bit 6	*<Tachograph Driving Direction>*	Vehicle driving direction from tachograph
Bit 5	*<Tachograph Vehicle Motion Signal>*	Vehicle motion signal from tachograph
Bit 4	*<Tachograph Overspeed Signal>*	Tachograph overspeed signal for the vehicle
Bit 3	*<Axle Weight 4th>*	Weight of vehicle's fourth axle
Bit 2	*<Axle Weight 3rd>*	Weight of vehicle's third axle
Bit 1	*<Axle Weight 1st>*	Weight of vehicle's first axle
Bit 0	*<Ad-Blue Level>*	The level of Ad-Blue

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

- **+ACK:GTCLT,**

Example: **+ACK:GTCLT,690803,135790246811220,,1,000D,20090214093254,FFFF$**			
Parameter	**Length (Byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	IMEI	
Device Name	<=20	'0'–'9' 'a'–'z' 'A'–'Z''-''_'	
Group ID	<=2	0 – 19	0

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

3.2.8.Other Settings

3.2.8.1.Real Time Operation

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

➢ **AT+GTRTO=**

Example: **AT+GTRTO=gv57,2,FRI,,,,,0015$** **AT+GTRTO=gv57,2, 00000000000000000000008,,,,,0015$** **AT+GTRTO=gv57,A,,,,,,0015$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Sub Command	<=2	(HEX)	
AT Command / Configuration Mask / Satellite information Mask /Bluetooth Command/QBI Operation Mode / CAN100 Operation Mode	3|21|2|3|1	“SRI”|(HEX)|(HEX)|“BUS”|0 - 1|0-2	
Output Direction / Bind BAS Index / CAN Car Model ID	1	0|3|0 – 9|1-65535	
Reserved	0		
Reserved	0		
Sub Command Parameter	<=1	0|1|2|3	0
Serial Number	4	(HEX)	

Tail Character	1	$	$

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

- 0: ***GPS***. Get the GNSS related information via the message **+RESP:GTGPS**.
- 1: ***RTL***. Request the terminal to report its current position immediately via the message **+RESP:GTRTL**.
- 2: ***READ***. Get the current configuration of the terminal via the message **+RESP:GTALM.**
- 3: ***REBOOT***. Reboot the terminal.
- 4: ***RESET***. Reset all parameters to factory settings and clear all buffered messages.
- 5: ***PWROFF***. Power off the device.
- 6: ***CID***. Get the ICCID of the SIM card which is being used by the terminal via the message **+RESP:GTCID**.
- 7: ***CSQ***. Get the current signal level of the terminal via the message **+RESP:GTCSQ**.
- 8: ***VER***. Get the version information of the device via the message **+RESP:GTVER**.
- 9: ***BAT***. Get the external adapter status of the terminal via the message **+RESP:GTBAT**.
- 10: **CAN:** Get CAN information via the message **+RESP: GTCAN**. It works only when the <*Accessory Type*> of **AT+GTBAS** is 4 and the <*Accessory Model*> is 0. The <*Mode*> of **AT+GTCAN** also needs to be set to 1.
- A: ***IOS***. Get status of all the IO ports via the message **+RESP:GTIOS**.
- B: ***TMZ***. Get the time zone settings via the message **+RESP:GTTMZ**.
- D: ***DELBUF***. Delete all the buffered reports.
- E: ***GSV***. Request the device to report the GPS/GLONASS fix level.
- F: ***RJB***. Reset jamming behavior.
- 14: **BLE.** Commands for Bluetooth
- 1C: ***ATI***. Get the basic device information via the message **+RESP:GTATI**.
- 22: ***CAN100 Operation***: Set car model for CAN100, read car model from CAN100 or start CAN100 automatic synchronization. The <*Mode*> of **AT+GTCAN** also needs to be set to 1.
- 3A: RLY. Set the state of the WRL300.

✧ <*AT Command / ATI Mask / Configuration Mask / Satellite information Mask*/*Bluetooth Command/QBI Operation Mode / CAN100 Operation Mode* >:

- AT Command: To get a single AT command's configuration when <*Sub Command*> is set to 2, follow the format in the following example. For example, to get the configuration of **AT+GTFRI**, please set **AT+GTRTO=gv57,2,FRI,,,,,0015$,** and get it via **+RESP:GTALM**.
- ATI Mask: If <*Sub Command*> is set to 1C, the basic device information will be reported via the message **+RESP:GTATI** according to the <*ATI Mask*> setting.

ATI Mask Table:

Mask Bit	Item
Bit 0	Firmware Version
Bit 1	MCU Version
Bit 2 - Bit 6	Reserved
Bit 7	Modem Firmware Version
Bit 8 – Bit 11	Reserved
Bit 12	Hardware Version
Bit 13	Modem Hardware Version
Bit 14 - Bit 17	Reserved
Bit 18	Sensor ID
Bit 19 - Bit 31	Reserved

- Bluetooth Command: The parameter that specifies the <Bluetooth *Command*> to be executed when <*Sub Command*> is set to 14.

  "**BTI**": Request the device to report the Bluetooth information and the list of paired device(s) via the **+RESP:GTBTI** message.

  "**BUS**": Make the device discoverable for **QIoT**. The device will be discoverable for 30s, and other Bluetooth related functions will not work when this function is enabled.

- Configuration Mask: If <*Sub Command*> is set to 2, configuration information for a specific configuration mask can be obtained via the message **+RESP:GTALM**. The <*Configuration Mask*> must be 21 bytes. If it is less than 21 bytes, add '0' in the high bytes of the <Configuration Mask>.

Configuration Mask Table:

Mask Bit	Item
⋮	Reserved
Bit 92	BDI
Bit 91	Reserved
Bit 90	AEX
Bit 89	BID
⋮	Reserved
Bit 80	IGM
Bit 79	Reserved

Bit 78	SVR
⋮	Reserved
Bit 68	BAS
⋮	Reserved
Bit 65	BTS
Bit 64	GDO
Bit 63	AVS
Bit 62	VVS
Bit 61	Reserved
Bit 60	ASC
Bit59	GAM
Bit 58	Reserved
Bit 57	CLT
Bit 56	UPC
Bit 55	IEX
Bit 54	OEX
⋮	Reserved
Bit 50	UDF
Bit 49	CMD
⋮	Reserved
Bit 46	CAN
⋮	Reserved
Bit 44	PEO
Bit 43	RMD
⋮	Reserved
Bit 38	VMS

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Bit 37	Reserved
Bit 36	Reserved
Bit 35	FVR
Bit 34	Reserved
Bit 33	PDS
⋮	Reserved
Bit 31	IDA
⋮	Reserved
Bit29	SSR
Bit 28	JBS
Bit 27	FFC
Bit 26	Reserved
Bit 25	HRM
Bit 24	WLT
Bit 23	JDC
Bit 22	Reserved
Bit 21	HBM
Bit 20	HMC
Bit 19	IDL
Bit 18	Reserved
Bit 17	DOG
Bit 16	OWH
Bit 15	PIN
Bit 14	Reserved
Bit 13	SOS
Bit 12	SPD
Bit 11	GEO
Bit 10	FRI
Bit 9	TMA

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Bit 8	IOB
Bit 7	OUT
Bit 6	DIS
Bit 5	EPS
Bit 4	TOW
Bit 3	CFG
Bit 2	QSS
Bit 1	SRI
Bit 0	BSI

Set <*Sub Command*> to 4 to specify the configuration to be reset. To specify a configuration, use the last three letters of the protocol command. For example, to reset configuration of the **AT+GTFRI** command, send the command "**AT+GTRTO=gv57,4,FRI,,,,,000F$**". Also, the buffered messages saved can be deleted with the command "**AT+GTRTO=gv57,4,BUF,,,,,000F$**". Configuration of commands **AT+GTBSI**, **AT+GTSRI**, **AT+GTQSS**, **AT+GTCFG**, **AT+GTTMA**, **AT+GTPIN** and **AT+GTOEX** cannot be reset by this command.

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

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

- RLY Operation Mode: If the sub command is 3A, this parameter will work as follows.
  0: Disable relay of WRL300, relay NC pin switch to relay COM pin.
  1: Enable relay of WRL300, relay NO pin switch to relay COM pin.
- CAN100 Operation Mode: If the sub command is 22, this parameter will work as follows.
  0: Read the current car model and report it via the message **+RESP: GTCML**.
  1: Set car model. Please use the <*CAN100 Car Model ID*> parameter to set car model.
  2: Start CAN100 automatic synchronization. The synchronization result is reported via the **+RESP: GTCML** message.
  Note: The entire synchronization takes about 10-40s, and CAN100 will

restart immediately after the end of the synchronization regardless of the result. If automatic sync is enabled, please wait for the synchronization to finish before reading the current car model. If automatic synchronization has not ended, the subsequent synchronization command will be ignored

✧ <*Output Direction / Bind BAS Index / CAN Car Model ID* >:

- Output Direction: This parameter determines the destination to which the response message of the RTO command will be reported. This field is invalid for <*Sub Command*> 2(READ), 3(REBOOT), and 4(RESET).
  0: The message will be output to the backend server.
  1: Reserved
  2: Reserved
  3: If the command is received via SMS, the message will be output to the original SMS number; otherwise the message will be output to the backend server.
- Bind BAS Index: The index of the Bluetooth accessory. It is defined in **AT+GTBAS**.
- CAN Car Model ID: It works only when the sub command is 22 and the CAN100 operation mode is 0x01. This parameter value should be car model ID described in supported car model list (1-65535).

✧ <*Sub Command Parameter*>: This parameter is used for part of the sub commands. For the sub command RESET (4):

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

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

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

➢ **+ACK:GTRTO,**

Example: +ACK:GTRTO,840501,135790246811220,,IOS,002C,20230214093254,11F1$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Sub Command	<=6	Sub Command String	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	

Count Number	4	(HEX)	
Tail Character	1	$	$

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

3.2.8.2.Hour Meter Count

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

➢ **AT+GTHMC=**

Example: **AT+GTHMC=gv57,1,12345:12:34,,,,,,,,,0018$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Hour Meter Enable	1	0|1	0
Initial Hour Meter Count	11	HHHHH:MM:SS	00000:00:00
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Hour Meter Enable*>: Enable/disable the hour meter count function. If the hour meter count function is enabled, hour meter count will be increased when the device detects the vehicle ignition on. If the hour meter count function is disabled, hour meter count

will be reset to 0.

- 0: Disable the hour meter count function.
- 1: Enable the hour meter count function.

✧ <*Initial Hour Meter Count*>: It is formatted with 5 hour digits, 2 minute digits and 2 second digits, and ranges from 00000:00:00 – 99999:00:00. When the ignition is turned on for the first time, the <*Hour Meter Count*> which is reported in **+RESP:GTFRI**, **+RESP:GTIGN** / **+RESP:GTVGN** or **+RESP:GTIGF** / **+RESP:GTVGF** will be increased based on this value.

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

➢ **+ACK:GTHMC,**

Example: **+ACK:GTHMC,840501,135790246811220,,002C,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.8.3.Allowed Number List Configuration

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

➢ **AT+GTWLT=**

Example: **AT+GTWLT=gv57,0,1,1,2,13813888888,13913999999,,,,,0018$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Number Filter	1	0|4	0
Start Index	<=2	1 - 10	
End Index	<=2	1 - 10	
Phone Number List	<=20*10	(Call Number)	

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

✧ <*Number Filter*>: Bitwise mask to configure the allowlist for a specific use.

- Bit 0: Reserved.
- Bit 1: Reserved.
- Bit 2: Allowlist for SMS.

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

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

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

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

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

➢ **+ACK:GTWLT,**

Example: **+ACK:GTWLT,840501,135790246811220,,002D,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	

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

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

3.2.8.4.Command String Storage

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

➢ **AT+GTCMD=**

Example: **AT+GTCMD=gv57,1,1,AT+GTRTO=gv57,0,,,,,,000B$,,,,,0005$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
mode	1	0|1	0
Store cmd ID	<=2	0 - 31	
Command String	<=200	AT command	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

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

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

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

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

➢ **+ACK:GTCMD**

Example: **+ACK:GTCMD,840501,135790246811220,,002E,20100310172830,11F0$**

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

3.2.8.5.User Defined Function

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

➢ **AT+GTUDF=**

Example: **AT+GTUDF=gv57,1,1,FFFFFFFF,30,0,0,0,1,,,,,0005$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0 - 2	0
Group ID	<=2	0 - 31	
Input ID Mask	<=16	(HEX)	0
Debounce Time	<=5	0 - 86400(sec)	0
Inzizo Mask	<=5	(HEX)	0
Outzizo Mask	<=5	(HEX)	0
Stocmd ID Mask	<=8	(HEX)	0
Stocmd Ack	1	0|1	0
Inpeo Mask	<=5	(HEX)	0
Outpeo Mask	<=5	(HEX)	0
Reserved			
Reserved			
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of the user defined function.
- 0: Disable the group.
- 1: Enable the group.
- 2: Delete the group.

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

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

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

ID	Mask Bit	Item
1	**Bit 0**	Power on finished
2	**Bit 1**	Ignition on
3	**Bit 2**	Ignition off
4	**Bit 3**	Attached to the EGPRS/LTE network
5	**Bit 4**	Not attached to the EGPRS/LTE network
6	**Bit 5**	Registered on the EGPRS/LTE network
7	**Bit 6**	Not registered on the EGPRS/LTE network
8	**Bit 7**	Network roaming
9	**Bit 8**	Network non-roaming
10	**Bit 9**	SIM card is locked
11	**Bit 10**	GNSS is on
12	**Bit 11**	GNSS is off
13	**Bit 12**	The device is stationary
14	**Bit 13**	The device is moving
15	**Bit 14**	External charge inserted
16	**Bit 15**	No external charge
17	**Bit 16**	Reserved
18	**Bit 17**	Reserved
19	**Bit 18**	Reserved
20	**Bit 19**	Reserved
21	**Bit 20**	Digital input 1 is inactive
22	**Bit 21**	Digital input 1 is active
23	**Bit 22**	SIM card is inserted
24	**Bit 23**	SIM card is not inserted
25	**Bit 24**	Reserved
26	**Bit 25**	Reserved
27	**Bit 26**	Inside the speed range
28	**Bit 27**	Outside the speed range
29	**Bit 28**	Messages need to be sent
30	**Bit 29**	No messages need to be sent
31	**Bit 30**	Driver authorized
32	**Bit 31**	Driver unauthorized
…	**…**	Reserved
37	**Bit 36**	Network jamming is detected

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38	**Bit 37**	Network jamming is not detected
…	**…**	Reserved
41	**Bit 40**	Digital input6 is inactive.
42	**Bit 41**	Digital input6 is active.
43	**Bit 42**	Digital output1 is inactive.
44	**Bit 43**	Digital output1 is active.
…	**…**	Reserved
50	**Bit 49**	GNSS fix is successful
51	**Bit 50**	GNSS fix fails

✧ <*Debounce Time*>: The debounce time for input events before the specified stored commands are executed.

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

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

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

ID	Mask Bit	Item
1	**Bit 0**	Outside the Geo 0
2	**Bit 1**	Outside the Geo 1
3	**Bit 2**	Outside the Geo 2

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4	**Bit 3**	Outside the Geo 3
5	**Bit 4**	Outside the Geo 4
6	**Bit 5**	Outside the Geo 5
7	**Bit 6**	Outside the Geo 6
8	**Bit 7**	Outside the Geo 7
9	**Bit 8**	Outside the Geo 8
10	**Bit 9**	Outside the Geo 9
11	**Bit 10**	Outside the Geo 10
12	**Bit 11**	Outside the Geo 11
13	**Bit 12**	Outside the Geo 12
14	**Bit 13**	Outside the Geo 13
15	**Bit 14**	Outside the Geo 14
16	**Bit 15**	Outside the Geo 15
17	**Bit 16**	Outside the Geo 16
18	**Bit 17**	Outside the Geo 17
19	**Bit 18**	Outside the Geo 18
20	**Bit 19**	Outside the Geo 19

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

ID	Mask Bit	Item
1	**Bit 0**	Inside the Peo 0
2	**Bit 1**	Inside the Peo 1
3	**Bit 2**	Inside the Peo 2
4	**Bit 3**	Inside the Peo 3
5	**Bit 4**	Inside the Peo 4
6	**Bit 5**	Inside the Peo 5
7	**Bit 6**	Inside the Peo 6
8	**Bit 7**	Inside the Peo 7
9	**Bit 8**	Inside the Peo 8
10	**Bit 9**	Inside the Peo 9
11	**Bit 10**	Inside the Peo 10
12	**Bit 11**	Inside the Peo 11
13	**Bit 12**	Inside the Peo 12
14	**Bit 13**	Inside the Peo 13

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15	**Bit 14**	Inside the Peo 14
16	**Bit 15**	Inside the Peo 15
17	**Bit 16**	Inside the Peo 16
18	**Bit 17**	Inside the Peo 17
19	**Bit 18**	Inside the Peo 18
20	**Bit 19**	Inside the Peo 19

✧ <*Outpeo Mask*>: The bitwise mask to indicate the input events outside the polygon Geo-Fence.

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

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

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

➢ **+ACK:GTUDF**

Example: **+ACK:GTUDF,840501,135790246811220,,002F,20100310172830,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	

Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.8.6.GNSS-assisted Motion Measurement

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

➢ **AT+GTGAM=**

Example: **AT+GTGAM=gv57,1,1,10,10,10,5,,,,,0006$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Mode	1	0|1	1
Speed Mode	1	0|1	1
Motion Speed Threshold	<=2	5 - 50(km/h)	45
Motion Cumulative Time	<=3	10 - 100(sec)	10
Motionless Cumulative Time	<=3	10 - 250(sec)	60
GNSS Fix Failure Timeout	<=4	5 - 1800(sec)	60
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of this function.
- 0: Disable this function.
- 1: Enable this function.

✧ <*Speed Mode*>: Enable/disable the use of GNSS speed to assist with motion measurement based on motion sensor state.
- 0: Disable this feature.
- 1: Enable this feature.

✧ <*Motion Speed Threshold*>: The speed threshold which is combined with GNSS

speed to measure the status of movement.

- ✧ <*Motion Cumulative Time*>: If the average speed is higher than <*Motion Speed Threshold*> for <*Motion Cumulative Time*>, the device is considered to be in moving state.
- ✧ <*Motionless Cumulative Time*>: If the average speed is lower than <*Motion Speed Threshold*> for <*Motionless Cumulative Time*>, the device is considered to be in stationary state.
- ✧ <*GNSS Fix Failure Timeout*>: If it takes GNSS more than <*GNSS Fix Failure Timeout*> to get a fix, the device will update motion status by motion sensor again.

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

- ➢ **+ACK:GTGAM,**

Example: **+ACK:GTGAM,840501,135790246811220,,0030,20161206092906,000A$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.2.8.7.SMS Position Request

This command can only be sent via SMS, and configures the device to report an SMS message with a Google Maps hyperlink to the current position immediately. Please refer to the Chapter 3.3.6 Report with a Google Maps Hyperlink for details of the position report.

Command format	**get position**
Example	get position

get position: It is a command string to request the current position, and is not case sensitive.

3.3. Report

This section defines the formats of the report messages. Due to the size limit of an SMS message (160 bytes), it is recommended to carefully set the <*Report Composition Mask*>

in **AT+GTCFG** to limit the length of the report which contains GNSS position information in the case of SMS transmission. Otherwise the report will be truncated to fit the length of an SMS message.

3.3.1.Position Related Report

- **+RESP:GTTOW**,

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

- **+RESP:GTDIS,**

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

- **+RESP:GTIOB,**

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

- **+RESP:GTSPD**,

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

- **+RESP:GTSOS,**

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

- **+RESP:GTRTL**,

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

- **+RESP:GTDOG**,

The protocol watchdog reboot message.

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

The location message is for ignition on and ignition off.

- **+RESP:GTHBM**,

When <*Mode*> is set to 1 in the **AT+GTHBM** command and the change of speed within 5 seconds is greater than the corresponding threshold, the device will report the **+RESP:GTHBM** message to the backend server to indicate the harsh behavior.

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

Example:
+RESP:GTTOW,840501,865083030002554,,,00,1,2,0.0,156,53.7,117.201483,31.83289

5,20230731072951,0460,0001,5504,582B,00,0.1,20230731152952,01E8$

+RESP:GTDIS,840501,135790246811220,,,20,1,1,4.3,92,70.0,121.354335,31.222073,20230214013254,0460,0000,18d8,6141,00,2000.0,20230214093254,11F0$

+RESP:GTIOB,840501,865083030002554,,,10,1,1,4.3,92,70.0,121.354335,31.222073,20230214013254,0460,0000,18d8,6141,00,2000.0,20230214093254,11F0$

+RESP:GTSPD,840501,865083030002554,,,01,1,1,2.1,132,31.3,117.201630,31.833045,20230731073042,0460,0001,5504,582B,00,0.1,20230731153043,01F1$

+RESP:GTSOS,840501,135790246811220,,,00,1,1,4.3,92,70.0,121.354335,31.222073,20230214013254,0460,0000,18d8,6141,00,2000.0,20230214093254,11F0$

+RESP:GTRTL,840501,865083030002554,,,00,1,1,0.0,11,29.1,117.201647,31.833055,20230731073151,0460,0001,5504,582B,00,0.1,20230731153152,01F5$

+RESP:GTDOG,840501,865083030002554,,,01,1,1,0.0,11,29.1,117.201647,31.833055,20230731073300,0460,0001,5504,582B,00,0.1,20230731153301,01F7$

+RESP:GTIGL,840501,865083030002554,,,01,1,1,0.0,132,31.7,117.201622,31.833047,20230731073039,0460,0001,5504,582B,00,0.1,20230731153040,01F0$

+RESP:GTHBM,840501,865083030004642,,,21,1,1,73.7,214,44.4,117.234685,31.800972,20230731064758,0460,0001,5504,34B5,00,1037.0,20230731144758,3DBD$

+RESP:GTHBM,840501,865083030004642,,,20,1,1,67.7,213,48.0,117.233208,31.799128,20230731064810,0460,0001,5504,34B5,00,1037.3,20230731144810,3DBE$

+RESP:GTVGL,840501,865083030002117,,,41,1,0,0.0,22,74.4,117.294902,31.745847,20230707120858,0460,0000,560A,4D13,00,16.3,20230709095156,0424$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Reserved	0		
Report ID / Report Type	2	XY(X ∈ {0 - 7}, Y ∈ {0 - 6|8|9})	

Number	1	1	
GNSS Accuracy	<=2	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	
Mileage	<=9	0.0 - 4294967.0(km)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ *<Report ID / Report Type>*: It is a one-byte hexadecimal value represented by two ASCII bytes. The first byte (4 higher bits of the hexadecimal value) indicates Report ID and the second byte (4 lower bits of the hexadecimal value) indicates Report Type. Report ID has different meanings in different messages below.

- The ID of digital input port which triggers the report messages **+RESP:GTSOS**. The value is 1 or 6.
- The ID of Digital Input status which triggers the report message **+RESP:GTDIS**. The range is 1, 5 or 6.
- The ID of the digital input port which triggers the reboot message **+RESP:GTDOG**. The valid value is 1 or 6.
- The ID of the bound IO which triggers the report message **+RESP:GTIOB**. The range is 0 – 3.
- The speed level at which the harsh behavior is detected in the message **+RESP:GTHBM**. 3 represents high speed, 2 is for medium speed and 1 represents low speed. If the *<Mode>* of the command **AT+GTHBM** is set to 2, the value is always 0 which indicates unknown speed.
- If *<Ignition Detection Mode>* of the command **AT+GTVMS** is 2,4 or 7, the report ID is 2,4 or 7.

For other messages, it will always be 0.

Report Type has different meanings in different messages below.

- In the **+RESP:GTDIS** report message generated by a digital input
  0: The current logic status of the input port is “Disable status”.
  1: The current logic status of the input is “Enable status”.
- In the **+RESP:GTIOB** message generated by bound IO
  0: The current logic status of the bound IO does not meet the alarm condition.
  1: The current logic status of the bound IO meets the alarm condition.
- In the speed alarm message **+RESP:GTSPD**
  0: Outside the predefined speed range
  1: Inside the predefined speed range
- In the protocol watch dog reboot message **+RESP:GTDOG**
  1: Reboot message for time based working mode
  2: Reboot message for ignition on working mode
  3: Message for input triggered reboot
  4: Reboot message for no network watchdog
  5: Reboot message for no activation watchdog
  6: Reboot message for sending failure timeout watchdog
  7: Reserved
  8: Reboot message for Modem failure watchdog
  9: Reboot message for APP failure watchdog
- In the harsh behavior monitoring message **+RESP:GTHBM**
  0: Harsh braking behavior
  1: Harsh acceleration behavior
  2: Harsh cornering behavior
  3: Harsh braking and cornering behavior
  4: Harsh acceleration and cornering behavior
  5: Unknown harsh behavior
- In the ignition message **+RESP:GTIGL** and **+RESP:GTVGL**
  0: Ignition off
  1: Ignition on

For other messages, it will always be 0.

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

✧ <*GNSS Accuracy*>: A numeral to indicate the GNSS fix status and HDOP of the GNSS position. 0 means “The current GNSS fix fails and the last known GNSS position is used”. A non-zero value (1 - 50) means the current GNSS fix is successful and represents the HDOP of the current GNSS position.

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

✧ <*Azimuth*>: The azimuth of the GNSS fix.

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

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

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

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- ✧ <*GNSS UTC Time*>: The UTC time obtained from the GNSS chip.
- ✧ <*MCC*>: Mobile country code. It is 3 digits in length and ranges from 000–999.
- ✧ <*MNC*>: Mobile network code. It is 3 digits in length and ranges from 000–999.
- ✧ <*LAC*>: Location area code in hex format.
- ✧ <*Cell ID*>: Cell ID in hex format.
- ✧ <*Mileage*>: The current total mileage.

➢ **+RESP:GTFRI,**

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

Example:
+RESP:GTFRI,840501,865083030004642,,13337,10,1,1,18.6,272,30.8,117.201342,31.855243,20230712074622,0460,0001,5504,29CF,00,347.8,00021:54:10,,,65,220101,23,0,15,20230712154623,1854$
+RESP:GTFRI,840501,865083030004642,,13337,30,1,1,18.6,272,30.8,117.201342,31.855243,20230712074622,0460,0001,5504,29CF,00,347.8,00021:54:10,,,65,220101,23,0,15,20230712154623,1854$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	(HEX)	
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	XY(X∈{1 - 5}, Y∈{0 - 6})	
Number	1	1	
GNSS Accuracy	<=2	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	

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LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	
Mileage	<=9	0.0 - 4294967.0(km)	
Hour Meter Count	11	HHHHH:MM:SS	
Reserved	0		
Reserved	0		
Backup Battery Percentage	<=3	0 - 100	
Device Status	6	(HEX)	
CSQ RSSI	<=2	0 - 31|99	
CSQ BER	<=2	0 - 7|99	
Satellites in Use	<=2	0 - 15	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

- <*External Power Voltage*>: The voltage of the external power supply. If the command **AT+GTEPS** is used to configure the device to report the external power supply voltage periodically with fixed report, the device will send the current voltage along with the **+RESP:GTFRI** message to the backend server. If the device is not configured as such by the command **AT+GTEPS**, this field will be empty.
- <*Report ID / Report Type*>: It is a one-byte hexadecimal value represented by two ASCII bytes. The first byte (4 higher bits of the hexadecimal value) indicates Report ID and the second byte (4 lower bits of the hexadecimal value) indicates Report Type.

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

  Report Type has the following meanings:
  - 0: Normal fixed report
  - 1: Corner report which indicates that the device just turns around a corner
  - 2: FRI report frequency change which indicates the terminal enters into Geo-Fence or roaming status
  - 3: Corner report when FRI report frequency changes
  - 4: Mileage report when fixed report is mode 5

- 5: Reserved
- 6: Mileage report when fixed report is mode 5 and **AT+GTFFC** works

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

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

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

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

The current motion status of the device:

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

The status of input ports: A bitwise hex integer to represent the logical status of an input. Bit 0 represents the status of the ignition detection input and Bit 1 represents digital input 1: 0 means “Disable status”, and 1 means “Enable status”. Bit 6 represents the status of digital input6: 0 means “Disable status”, and 1 means “Enable status”. Bit 7 represents the status of the main power: 0 means “The main power supply is disconnected”, and 1 means “The main power supply is connected”. The other bits are 0.

The status of output port: A bitwise hex integer to represent the logical status of a digital output. The low bit represents the status of digital output1. For the low bit, 0 means “Disable status”, and 1 means “Enable status”. The high bit is 0.

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

CSQ RSSI	Signal Strength (dBm)
0	<-113

1	-111
2 – 30	-109 – -53
31	>-51
99	Unknown

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

✧ <*Satellites in Use*>: The number of satellites being used for tracking. The high nibble is reserved and the low nibble is valid.

➢ **+RESP:GTERI,**

If the <*ERI Mask*> in **AT+GTFRI** command is enable, the device will send the message **+RESP:GTERI** to the backend server instead of **+RESP:GTFRI**.

Example: **+RESP:GTERI,840501,865585040360574,,00008000,,10,1,0,,,,,,,0460,0000,1842,19B8,00,0.0,,,,65,418000,10,0,0,1,900,20230101000638,0046$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	IMEI	
Device Name	<=10	'0' - '9', 'a' - 'z', 'A' -' Z', '-', '_'	
ERI Mask	8	(HEX)	
External Power Supply	<=5	0 - 32000(mV)	
Report ID/Report Type	2	XY(X∈{1 - 5}, Y∈{0|1|4})	
Number	1	1	
GNSS Accuracy	<=2	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	-180 - 180	
Latitude	<=10	-90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	

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Cell ID		4|8	(HEX)	
Reserved		2	00	
Mileage		<=9	0.0 - 4294967.0(km)	
Hour Meter Count		11	HHHHH:MM:SS	
Reserved		0		
Reserved		0		
Backup Battery Percentage		<=3	0 - 100	
Device Status		<=10	(HEX)	
CSQ RSSI		<=2	0 - 31|99	
CSQ BER		<=2	0 - 7|99	
Satellites in Use		<=2	0 - 15	
RAT and Band Data (Optional)	RAT	1	0 - 3	
	Band	<= 4	0-39|850|900|1800|1900	
Bluetooth Accessory Data (Optional)	Bluetooth Accessory Number	<=2	0 - 10	
	Index	1	0 - 9	
	Accessory Type	1	0|6|8	
	Accessory Model	1	0	
	Raw Data	<=10	(HEX)	
	Accessory Append Mask	4	(HEX)	
	Accessory Name	<=20	(ASCII)	
	Accessory MAC	12	(HEX)	
	Accessory Status	1	0|1	
	Accessory Battery Level	<=4	0 - 5000(mV)	
	Accessory Temperature	<=3	-40 - 80℃	
	Accessory	<=3	0 - 100 rh	

	Humidity			
	Relay Config Result	1	0 - 4	
	Relay State	1	0|1	
Send Time		14	YYYYMMDDHHMMSS	
Count Number		4	(HEX)	
Tail Character		1	$	$

- <*RAT*>: Radio Access Technology.
  - 0: NOSERVICE mode
  - 1: EGPRS mode
  - 2: LTE Cat M1 mode
  - 3: LTE Cat NB 2 mode
- <*Band*>: 0 means invalid band, 1-39 means band number and others mean GSM number.
- <Bluetooth Accessory Number>: It indicates the number of Bluetooth accessories connected with the device.
- <Index>: The index of the Bluetooth accessory.
- <Accessory Type>: The type of the Bluetooth accessory.
- <Accessory Model>: The model of the Bluetooth accessory.
- <Raw Data>: The data is read from Bluetooth accessory. It varies depending on <Accessory Type> and <Accessory Model>.
- <Accessory Name>: The name of the Bluetooth accessory. It ends with 0x00.
- <Accessory MAC>: The MAC address of the Bluetooth accessory.
- <Accessory Status>: A numeral to indicate whether the accessory is available.
  - 0: The accessory is not available.
  - 1: The accessory is available.
- <Accessory Battery Level>: The battery voltage of the Bluetooth accessory.
- <Accessory Temperature>: Temperature data of the Bluetooth accessory.
- <Accessory Humidity>: The real time humidity detected by the sensor. If <Accessory Type> is 6, <Accessory Humidity> will be present.
- <Relay Configuration Result>: The number representing the response result of the relay.
  - 0: Configuration updated successfully.
  - 1: Error in connecting.
  - 2: The current password is incorrect.
  - 3: Password update error.
  - 4: Relay open or close error.

<Relay state>: The current state of the WRL300 sensor.

Note: The item denoted with “optional” means the item is controlled by the parameter <*ERI Mask*>.

➢ **+RESP:GTEPS,**

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

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

Example: **+RESP:GTEPS,840501,865083030002646,,12478,01,1,4,4.3,345,145.6,117.201383,31.831592,20230717055626,0460,0001,5504,582B,00,0.0,20230717135627,05C5$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
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	XY(X∈{0 - 2}, Y∈{0|1})	
Number	1	1	
GNSS Accuracy	<=2	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	
Mileage	<=9	0.0 - 4294967.0(km)	
Send Time	14	YYYYMMDDHHMMSS	

Count Number	4	(HEX)	
Tail Character	1	$	$

- ✧ <*External Power Voltage*>: The value of the external power voltage. When the voltage of the external input meets the alarm condition as set by the command **AT+GTEPS**, the device will send the current external input voltage with **+RESP:GTEPS** to the backend server
- ✧ <*Report ID / Report Type*>: It is a one-byte hexadecimal value represented by two ASCII bytes. The first byte (4 higher bits of the hexadecimal value) indicates Report ID and the second byte (4 lower bits of the hexadecimal value) indicates Report Type. The value of Report ID for the report message **+RESP:GTEPS** is 0.
  Report Type has two meanings:
  - 0: Outside the predefined range.
  - 1: Inside the predefined range.
- ✧ <*Number*>: The number of the GNSS position(s) included in the report message. Generally, it is 1.

➢ **+RESP:GTLBC,**

If Bit 4 of <*Location Request Mask*> in the command **AT+GTCFG** is set to 1, the device will get and send the current position to the backend server via the message **+RESP:GTLBC** when there is an SMS position request.

Example: **+RESP:GTLBC,840501,865083030002554,,17756084712,1,0.0,144,66.7,117.201548,31.833038,20230731074232,0460,0001,5504,582B,00,20230731154233,020B$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Call Number	<=20	(Call Number)	
GNSS Accuracy	<=2	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	

GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

➢ **+RESP:GTGES,**

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

Example:
+RESP:GTGES,840501,865083030004642,,,B1,21,1000,30,1,2,0.0,347,43.5,117.201167,31.832933,20230720074950,0460,0001,5504,582B,00,657.6,20230720154950,2880$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Reserved	0		
Report ID / Report Type	<=3	XY(X ∈ {0 - 13}, Y ∈ {0|1})	
Trigger Mode	<=2	0|21|22	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Number	1	1	
GNSS Accuracy	<=2	0 - 50	

Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	
Mileage	<=9	0.0 - 4294967.0(km)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

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

➢ **+RESP:GTGIN**

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

➢ **+RESP:GTGOT**

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

Example:
+RESP:GTGIN,840501,868487004371985,gv57,,,1,80000,,,,,1,1,0.0,183,58.2,121.348425,31.163380,20230712075615,0460,0000,1805,4732,00,0.1,20230712075615,0B21$.
+RESP:GTGOT,840501,868487004371985,gv57,,,1,00001,,,,,1,1,0.0,183,58.2,121.348425,31.163380,20230712074144,0460,0000,1807,44A8,00,0.1,20230712074144,0AE4$

Parameter	Length(byte)	Range/Format	Default

Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Reserved	0		
Reserved	0		
Area Type	1	0|1	
Area Mask	5	(HEX)	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Number	1	1	
GNSS Accuracy	<=2	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	
Mileage	<=9	0.0 - 4294967.0(km)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

- <*Area Type*>: 0 means “Polygon GEO-Fence”, and 1 means “Circular GEO-Fence”.
- <*Area Mask*>: It indicates the report message is for a single area or multiple area

overlapping.

- Bit 0: for area ID 0.
- Bit 1: for area ID 1.
- ...
- Bit 19: for area ID 19.

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

➢ **+RESP:GTAIS,**

If the analog input alarm is enabled by the **AT+GTAEX** command, the device will send the message **+RESP:GTAIS** to the backend server when analog input voltage enters the alarm range.

Example: **+RESP:GTAIS,840501,865585040014007,gv57,9414,11,1,1,0.0,355,88.9,117.129272,31.838892,20230519054902,0460,0000,550B,B984,00,85.2,20230519134904,2A22$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Analog Input VCC	<=5	0 - 99999(mV)	
Report ID / Report Type	2	XY(X∈{5}, Y∈{0|1})	
Number	1	1	
GNSS Accuracy	<=2	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)-180 - 180	
Latitude	<=10	(-)-90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	

Reserved	2	00	
Mileage	<=9	0.0 - 4294967.0(km)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

- <*Analog Input VCC*>: The voltage that eh analog input detects. If the voltage meets the alarm condition as set by the command **AT+GTAEX**, the device will send the current voltage with **+RESP:GTAIS** to the backend server.
- <*Report ID* / *Report Type*>: It is a one-byte hexadecimal value represented by two ASCII bytes. The first byte (4 higher bits of the hexadecimal value) indicates Report ID and the second byte (4 lower bits of the hexadecimal value) indicates Report Type. The value of Report ID for the report message **+RESP:GTAIS** is 5.
  Report Type has two meanings:
  - 0: Outside the predefined range.
  - 1: Inside the predefined range.

➢ **+RESP:GTIDA,**

According to <*Mode*> of the command **AT+GTIDA**, the reporting mode of **+RESP:GTIDA** varies.

Example: **+RESP:GTIDA,840501,866775050906544,GV57,,D0DF95D7,0,1,2,0.0,0,78.0,117.129264,31.839145,20220822111318,0460,0000,550B,0E9E30A5,00,0.0,20220822191319,4C95$**			
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			
ID	<=28	ASCII (not including '=' and ',')	
ID Report Type	1	1|2	
Number	1	1	
GNSS Accuracy	<=2	0|1 – 50	

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

✧ <*ID*>: The ID that is read currently.

✧ <*ID Report Type*>: A numeral to indicate the type of reported ID.

- 1: The ID is authorized.
- 2: The ID has logged out.

3.3.2.Device Information Report

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

➢ **+RESP:GTINF,**

Example: +RESP:GTINF,840501,865083030002554,gv57,11,898601168300090139 72,26,7,1,12356,,3.98,0,1,,,20230731074323,,,,00,00,+0800,0,20230731154326,020C$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	

Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Motion Status	2	11|12|16|1A|21|22|41|42	
ICCID	20	'0' - '9', 'A' - 'Z'	
CSQ RSSI	<=2	0 - 31|99	
CSQ BER	<=2	0 - 7|99	
External Power Supply	1	0|1	
External Power Voltage	<=5	0 - 99999(mV)	
Reserved	0		
Backup Battery Voltage	4	0.00 - 4.20(V)	
Charging	1	0|1	
LED On	1	1|2	
Reserved	0		
Reserved	0		
Last Fix UTC Time	14	YYYYMMDDHHMMSS	
Reserved	0		
Reserved	0		
Reserved	0		
Input Status	2	00 - C3	
Digital Output	2	00 - 01	
Time Zone Offset	5	+/- HHMM	
Daylight Saving	1	0|1	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

- 11 (**Ignition Off Rest**): The device attached vehicle is ignition off and it is motionless.
- 12 (**Ignition Off Motion**): The device attached vehicle is ignition off and it is moving before it is considered to be towed.
- 16 (**Tow**): The device attached vehicle is ignition off and it is towed.
- 1A (**Fake Tow**): The device attached vehicle is ignition off and it might be towed.
- 21 (**Ignition On Rest**): The device attached vehicle is ignition on and it is

motionless.

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

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

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

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

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

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

✧ <*Backup Battery VCC*>: The voltage of the backup battery.

✧ <Charging>: It indicates whether the backup battery is being charged when the main power supply is connected.

- 0: Not charging
- 1: Charging

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

✧ <*Input Status*>: A bitwise hex integer to represent the logical status of an input. Bit 1 represents the status of the ignition detection input and Bit 2 represents digital input 1: 0 means “Disable status”, and 1 means “Enable status”. Bit 6 represents the status of digital input6: 0 means “Disable status”, and 1 means “Enable status”. Bit 7 represents the status of the main power: 0 means “The main power supply is disconnected”, and 1 means “The main power supply is connected”. The other bits are 0.

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

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

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

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

3.3.3.Report for Real Time Querying

3.3.3.1.+RESP:GTGPS

After the device receives the command **AT+GTRTO** to read the GNSS information, it will

send the GNSS information to the backend server via the message **+RESP:GTGPS**.

➢ **+RESP:GTGPS,**

Example: **+RESP:GTGPS,840501,865083030002554,gv57,,,,003F,,,20230731074708,20230731154710,020E$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Reserved	0		
Reserved	0		
Reserved	0		
Report Composition Mask	4	(HEX)	
Reserved	0		
Reserved	0		
Last Fix UTC Time	14	YYYYMMDDHHMMSS	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

3.3.3.2.+RESP:GTALM

After the device receives the command **AT+GTRTO** to read all the configurations, it will send all configurations to the backend server via the message **+RESP:GTALM**. This message is only sent via EGPRS/LTE even if the report mode is forced SMS mode. The **+RESP:GTALM** does not support the HEX report.

Note: The length of every **+RESP:GTALM** message (including header and tail) should be less than or equal to 1500 characters.

➢ **+RESP:GTALM,**

Example:
+RESP:GTALM,840500,868487004371985,,25,1,BSI,cmnet,,,,,,00,0,SRI,4,,2,101.230.71.114,9032,queclink.3322.org,0,0,0,1,0,1,,1,0,QSS,cmnet,,,4,,2,101.230.71.114,9032,queclink.3322.org,0,0,0,1,0,,CFG,,GV57MG,1,0.1,,,003F,2,,23DFF,,1,1,86400,00,1,0,1,,0,0,TOW,1,5,2,300,0,0,0,0,2,3,2,,,,,,,,,EPS,2,10000,14800,1,1,0,0,0,0,1,0,0,10,DIS,0,1,,,1,0,0,0,,,,,,,,,,,,OUT,,,,,,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,,,,,TMA,+,0,0,0,,,,,,FRI,1,0,,0,0000,0000,,,15,1000,1000,,,0,60,00008000,,,,GEO,0,3,121.000000,90.000000,500,60,0,0,0,0,0,0,,,1,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,2,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,3,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,4,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,5,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,6,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,7,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,8,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,9,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,10,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,11,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,12,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,13,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,14,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,15,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,16,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,17,0,0.000000,0.000000,50,0,0,0,0,0,0,0,,,20230712080118,0B38$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Total Packets	<=2	1 - 25	
Current Packet	<=2	1 - 25	
Configurations	< 1500		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

The configuration parameters of all commands are as follows:

BSI	3	BSI	BSI
APN	<=40	(ASCII)	

APN User Name	<=30	(ASCII)	
APN Password	<=30	(ASCII)	
Backup APN	<=40	(ASCII)	
Backup APN User Name	<=30	(ASCII)	
Backup APN Password	<=30	(ASCII)	
APN Authentication Methods / Network Mode	2	00 - 33	
LTE Mode	1	0 - 5	
SRI	3	SRI	SRI
Report Mode	1	0 - 8	
Reserved	0		
Buffer Mode	1	0 - 2	
Main Server IP / Domain Name	<=60	(ASCII)	
Main Server Port	<=5	0 - 65535	
Backup Server IP / Domain Name	<=60	(ASCII)	
Backup Server Port	<=5	0 - 65535	
SMS Gateway	<=20	(Call Number)	
Heartbeat Interval	<=3	0|2 - 360(min)	
SACK Enable	1	0 - 2	
Protocol Format	1	0|1	0
SMS ACK Enable	1	0|1	0
Reserved	0		
Special SACK Enable	1	0|1	0
Encryption Mode	1	0 - 2	0
DNS Lookup	4	0-1440 min	0

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Interval			
QSS	3	QSS	QSS
APN	<=40	(ASCII)	
APN User Name	<=30	(ASCII)	
APN Password	<=30	(ASCII)	
Report Mode	1	0 - 8	0
Reserved	0		
Buffer Mode	1	0 - 2	1
Main Server IP / Domain Name	<=60	(ASCII)	
Main Server Port	<=5	0 - 65535	
Backup Server IP / Domain Name	<=60	(ASCII)	
Backup Server Port	<=5	0 - 65535	
SMS Gateway	<=20	(Call Number)	
Heartbeat Interval	<=3	0|2 - 360(min)	0
SACK Enable	1	0 - 2	0
Protocol Format	1	0|1	0
SMS ACK Enable	1	0|1	0
CFG	3	CFG	CFG
New Password	4 - 20	'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 - 4294967.0(km)	
Reserved	0		
Reserved	0		
Report Composition Mask	4	(HEX)	
Power Saving Mode	1	0 - 3|4(GV57MGPlus)	

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Reserved	0		
Event Mask	<=6	(HEX)	
Reserved	0		
LED On	1	1|2	
Info Report Enable	1	0|1	
Info Report Interval	<=5	30 - 86400(sec)	
Location Request Mask	2	00|10|20	
Backup Battery On	1	0|1	
Backup Battery Charge Mode	1	0|1	
AGPS Mode	1	0|1	0
Reserved	0		
GNSS Lost Time	<=2	0 - 30(min)	0
Invert Output State	1	0|1	0
Wakeup Hour Interval(GV57MG Plus)	<=3	1-720(hour)	24
Work Time per Wakeup(GV57MG Plus)	<=2	5-60(min)	15
TOW	3	TOW	TOW
Tow Enable	1	0|1	
Engine off to Tow	<=2	5 - 15(min)	
Fake Tow Delay	<=2	0 - 10(min)	
Tow Interval	<=5	30 - 86400(sec)	
Tow Output ID	1	0|1	
Tow Output Status	1	0 - 3	
Tow Output Duration	<=5	0 - 65535 (*100ms)	
Tow Output Toggle Times	<=3	0 - 255	

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Rest Duration	<=3	1 - 255(*15sec)	
Motion Duration	<=2	1 - 10(*100ms)	
Motion Threshold	1	1 - 9	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
EPS	3	EPS	EPS
Mode	1	0 - 2	
Min Threshold	<=5	7000 - 28000(mV)	
Max Threshold	<=5	7000 - 28000(mV)	
Sample Period	<=2	0 - 12(*2sec)	
Debounce Time	1	0 - 5(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Sync with FRI	1	0|1	
Voltage Margin Error	<=3	0 - 100(*10mV)	0
Debounce Voltage Threshold	<=3	0 - 100(*100mV)	0
MPN/MPF Validity Time	<=2	0 - 255(sec)	
DIS	3	DIS	DIS
Ignition Detection	1	0	0
Sample Period	<=2	0 - 12(*2sec)	

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Reserved	0		
Reserved	0		
Input ID 1	1	1	
Enable	1	0|1	
Debounce Time	<=2	0 - 20(*10ms)	
Validity Time	<=2	0 - 12(*2sec)	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
OUT	3	OUT	OUT
Output1 Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Reserved	0		
Reserved	0		
Reserved	0		
DOS Report	1	0|1	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

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Reserved	0		
Reserved	0		
IOB	3	IOB	IOB
IOB ID	1	0 - 3	
Input Mask	4	0000 - 0042	0
Trigger Mask	4	0000 - 0042	0
Input Sample Period	<=2	0 - 12(*2sec)	0
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
TMA	3	TMA	TMA
Sign	1	+|-	+
Hour Offset	<=2	0 - 12	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		
FRI	3	FRI	FRI
Mode	1	0 - 5	
Discard No Fix	1	0|1	
Reserved	0		
Period Enable	1	0|1	

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Begin Time	4	HHMM	
End Time	4	HHMM	
Reserved	0		
Send Interval	<=5	5 - 86400(sec)	
Distance	<=5	50 - 65535(m)	
Mileage	<=5	50 - 65535(m)	
Reserved	0		
Corner Report	<=3	0 - 180	
IGF Report Interval	<=5	0|5 - 86400(sec)	
ERI Mask	<=8	(HEX)	0
Reserved	0		
Reserved	0		
Reserved	0		
GEO	3	GEO	GEO
GEO ID0	1	0	0
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID1	1	1	1
Mode	1	0 - 3	

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Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID2	1	2	2
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID3	1	3	3
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	

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Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID4	1	4	4
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID5	1	5	5
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	

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Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID6	1	6	6
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID7	1	7	7
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	

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Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID8	1	8	8
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID9	1	9	9
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	

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Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID10	2	10	10
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID11	2	11	11
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0

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Reserved	0		
Reserved	0		
GEO ID12	2	12	12
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID13	2	13	13
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		

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GEO ID14	2	14	14
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID15	2	15	15
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID16	2	16	16
Mode	1	0 - 3	

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Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID17	2	17	17
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID18	2	18	18
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	

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Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
GEO ID19	2	19	19
Mode	1	0 - 3	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
Radius	<=7	50 - 6000000(m)	
Check Interval	<=5	0|5 - 86400(sec)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Trigger Mode	<=2	0|21|22	0
Trigger Report	1	0|1	0
Reserved	0		
Reserved	0		
SPD	3	SPD	SPD
Mode	1	0 - 3	
Min Speed	<=3	0 - 400(km/h)	
Max Speed	<=3	0 - 400(km/h)	
Validity	<=4	0 - 3600(sec)	
Send Interval	<=4	30 - 3600(sec)	

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Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
SOS	3	SOS	SOS
Mode	1	0 - 2	
Digital Input ID	1	0|1|6	
SOS Number	<=20	(Call Number)	
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
PIN	3	PIN	PIN
Enable Auto-unlock PIN	1	0|1	
PIN	4 - 8	'0' - '9'	

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Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
OWH	3	OWH	OWH
Mode	1	0|1	
Day of Work	<=2	0 - 7F	
Working Hours Start1	4	HHMM	
Working Hours End1	4	HHMM	
Working Hours Start2	4	HHMM	
Working Hours End2	4	HHMM	
Reserved	0		
Reserved	0		
Reserved	0		
Digital Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
DOG	3	DOG	DOG
Mode	1	0 - 2	0
Ignition Frequency	<=3	10 - 120(min)	60
Interval	<=2	1 - 30(day)	30
Time	4	HHMM	0200

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Reserved	0		
Report Before Reboot	1	0|1	1
Input ID	1	0|1|6	0
Reserved	0		
No Network Interval	<=4	0|5 - 1440(min)	60
No Activation Interval	<=4	0|5 - 1440(min)	60
Send Failure Timeout	<=4	0|5 - 1440(min)	60
JDC	3	JDC	JDC
Mode	1	0 - 2	0
LTE Threshold 1	<=2	0 - 20	15
LTE Threshold 2	<=3	0 - 130	70
Reserved	0		
2G Threshold1	<=2	0 - 99	70
2G Threshold2	1	0 - 6	2
Enter Jamming Timer Threshold	<=4	0 - 3600(sec)	60
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Quit Jamming Timer Threshold	<=4	0 - 3600(sec)	10
IDL	3	IDL	IDL
Mode	1	0|1	
Time to Idling	<=2	1 - 30(min)	
Time to Movement	1	1 - 5(min)	
Debounce Distance	<=4	0|100 - 9999(m)	0
Reserved	0		

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Reserved	0		
Reserved	0		
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
HBM	3	HBM	HBM
Mode	1	0|1	0
Reserved	0		
Discard Unknown Event	1	0|1	0
High Speed	3	100 - 400(km/h)	
ΔVhb	<=3	0 - 100(km/h)	
ΔVha	<=3	0 - 100(km/h)	
Reserved	0		
Medium Speed	<=3	60 - 100(km/h)	
ΔVmb	<=3	0 - 100(km/h)	
ΔVma	<=3	0 - 100(km/h)	
Reserved	0		
Reserved	0		
ΔVlb	<=3	0 - 100(km/h)	
ΔVla	<=3	0 - 100(km/h)	
Reserved	0		
Output ID	1	0|1	
Output Status	1	0 - 3	
Duration	<=5	0 - 65535(*100ms)	
Toggle Times	<=3	0 - 255	

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Cornering and Braking Threshold	2	15 - 70	30
Cornering and Braking Duration	<=3	40 - 100(*8ms)	50
Acceleration Threshold	2	15 - 50	20
Acceleration Duration	<=3	50 - 250(*8ms)	65
HMC	3	HMC	HMC
Hour Meter Enable	1	0|1	
Initial Hour Meter Count	11	HHHHH:MM:SS	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
WLT	3	WLT	WLT
Number Filter	1	0|4	0
Phone Number List	<=20*10	(Call Number)	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
HRM	3	HRM	HRM
Reserved	0		
Reserved	0		
+ACK Mask	<=2	(HEX)	6F

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+RSP Mask	<=8	(HEX)	FE17BF
+EVT Mask	<=8	(HEX)	FE17BF
+INF Mask	<=8	(HEX)	F77D
+HBD Mask	<=2	(HEX)	EF
+CRD Mask	<=4	(HEX)	FFFF
Reserved	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 - 86400(sec)	30
FRI Report Distance	<=5	50 - 65535(m)	500
FRI Report Mileage	<=5	50 - 65535(m)	500
FRI IGF Report Interval	<=5	0|5 - 86400(sec)	300
Reserved	0		
Corner Report	<=3	0 - 180	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

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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 - 86400(sec)	30
FRI Report Distance	<=5	50 - 65535(m)	500
FRI Report Mileage	<=5	50 - 65535(m)	500
FRI IGF Report Interval	<=5	0|5 - 86400(sec)	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		

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FRI IGN Report Interval	<=5	5 - 86400(sec)	30
FRI Report Distance	<=5	50 - 65535(m)	500
FRI Report Mileage	<=5	50 - 65535(m)	500
FRI IGF Report Interval	<=5	0|5 - 86400(sec)	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 - 86400(sec)	30
FRI Report Distance	<=5	50 - 65535(m)	500
FRI Report Mileage	<=5	50 - 65535(m)	500
FRI IGF Report Interval	<=5	0|5 - 86400(sec)	300
Reserved	0		
Corner Report	<=3	0 - 180	0

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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 - 86400(sec)	30
FRI Report Distance	<=5	50 - 65535(m)	500
FRI Report Mileage	<=5	50 - 65535(m)	500
FRI IGF Report Interval	<=5	0|5 - 86400(sec)	300
Reserved	0		
Corner Report	<=3	0 - 180	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
JBS	3	JBS	JBS
Mode	1	0|1	0
Reserved	0		
Siren On Timer (T1)	<=5	1 - 65535(*100ms)	10

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Siren Off Timer (T2)	<=5	1 - 65535(*100ms)	10
Siren Alarm Duration (T3)	<=5	1 - 65535(sec)	60
Preparing Alarm Timer (T4)	<=5	1 - 65535(sec)	30
Cut Fuel Timer (T5)	<=5	1 - 65535(sec)	3600
Motion Sensor	1	0|1	1
Speed Limit	<=3	0 - 999(km/h)	30
GNSS Fix Failure Timer (T6)	<=5	30 - 65535(sec)	120
Output 1 Init State	1	0|1	0
Output Mode	1	0|1	0
Reserved	0		
SSR	3	SSR	SSR
Mode	1	0|1	0
Time to Stop	<=2	0 - 30(min)	2
Time to Start	1	0 - 5(min)	1
Start Speed	<=2	1 - 10(km/h)	5
Long Stop	<=5	0 - 43200(min)	0
Reserved	0		
Reserved	0		
Reserved	0		
IDA	3	IDA	IDA
Mode	1	0|1	0
Reserved	0		
Reserved	0		
Reserved	0		
Timeout after Ignition Off	<=3	0|15 – 600sec	30
Report Mode	1	0 – 7	0

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ID Validity Time	<=3	15 – 600sec	30
Reserved	0		
Reserved	0		
Reserved	0		
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Reserved	0		
ID List Type	1	0|1	1
Bind BAS Index	1	0 – 9	0
Bind BAS	0	0|1	0
IGM	3	IGM	IGM
Input ID	1	6	6
Enable	1	0|1	0
Report Mode	1	0 - 3	0
Debounce Time	<=2	0 - 20(*10ms)	0
Validity Time	<=2	0 - 12(*2sec)	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
PDS	3	PDS	PDS
Mode	1	0 - 2	0
Mask	4	(HEX)	0
Reserved			
Reserved			
Reserved			
Reserved			

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Reserved			
Reserved			
VMS	3	VMS	VMS
Virtual Ignition Mode	1	0 - 4|7	1
Virtual Ignition On Mask	2	(HEX)(01 - 03)	3
Virtual Ignition Off Mask	2	(HEX)(01 - 03)	3
Virtual Ignition On Logic	1	0|1	1
Voltage Idle Vehicle Event	1	0|1	0
CRA	3	CRA	CRA
Mode	1	0 – 3	0
Threshold_X	<=2	0 – 80	50
Threshold_Y	<=2	0 – 80	50
Threshold_Z	<=2	0 – 80	50
Sampling Start	1	0|1	1
Samples Before Crash	<=4	1 - 1500	500
Samples After Crash	<=4	1 - 1500	500
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Reserved	0		
Report ACC	1	0|1	0
Speed Confirmation	<=2	0|10 – 80(km/h)	20
ODO Confirmation	<=3	0|50 – 200(m)	100
Confirmation Time	<=2	3 – 15(seconds)	10

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Fall Degrees	2	20 – 80	60
RMD	3	RMD	RMD
Mode	1	0|1	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Home Operator List	<=6*10	(ASCII)	
Reserved	0		
Reserved	0		
Roaming Operator List	<=6*100	(ASCII)	
Reserved	0		
Reserved	0		
Blocked Operator List	<=6*20	(ASCII)	
Reserved	0		
Reserved	0		
Known Roaming Event Mask	<=6	(HEX)	23DFF
Reserved	0		
Reserved	0		
Unknown Roaming Event Mask	<=6	(HEX)	23DFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Output ID	1	0|1	0
Output Status	1	0 - 3	0

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Duration	<=5	0 - 65535(*100ms)	0
Toggle Times	<=3	0 - 255	0
Reserved	0		
Reserved	0		
CMD	3	CMD	CMD
Mode	1	0|1	0
Stored cmd ID	<=2	0 - 31	
Command String	<=200	AT command	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
UDF	3	UDF	UDF
Mode	1	0 - 2	0
Group ID	<=2	0 - 31	
Input ID Mask	16	(HEX)	0
Debounce Time	<=5	0 - 86400(sec)	0
Inzizo Mask	5	(HEX)	0
Outzizo Mask	5	(HEX)	0
Stocmd ID Mask	8	(HEX)	0
Stocmd Ack	1	0|1	0
Inpeo Mask	<=5	(HEX)	0
Outpeo Mask	<=5	(HEX)	0
Reserved			
Reserved			
OEX	3	OEX	OEX
Output Expansion Type	1	1	1
Bind BAS Index	1	0 - 9	0
Output Number	1	1 - 2	
Output ID	1	5 - 6	

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Status	1	0 - 1	
Duration	<=3	0 - 255(×100ms)	
Toggle Times	<=2	0 - 99	
Reserved	0		
Reserved	0		
DOS Report	1	0 - 1	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
IEX	3	IEX	IEX
Input Expansion Type	1	1	1
Bind BAS Index	1	0 - 9	0
Input Number	1	1	
Input ID	1	0|5	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
UPC	3	UPC	UPC
Max. Download Retry	1	0 - 3	0
Download Timeout	<=2	5 - 30(min)	10
Download Protocol	1	0	0
Enable Report	1	0|1	0
Update Interval	<=4	0 - 8760(h)	0

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Download URL	<=100	(URL)	
Mode	1	0|1	0
Reserved	0		
Extended Status Report	1	0|1	0
Identifier Number	<=8	(HEX)	0
Reserved	0		
Update Status Mask	1	(HEX)	3
CLT	3	CLT	CLT
CLT ID 0	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 1	1	0	0
Mode	1	0|1	0

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Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 2	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		

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Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 3	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 4	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0

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Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 5	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

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Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 6	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 7	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30

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Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 8	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 9	1	0	0

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Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 10	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF

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Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 11	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 12	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF

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Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 13	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		

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Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 14	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 15	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0

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High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 16	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

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Reserved	0		
CLT ID 17	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 18	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8

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CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
CLT ID 19	1	0	0
Mode	1	0|1	0
Debounce Time	<=3	0 – 255(×1s)	0
CAN Data Mask	8	0 – FFFFFFFF	000FFFFF
Alarm Mask 1	<=8	0 – FFFFFFFF	0
Alarm Mask 2	<=8	0 – FFFFFFFF	0
Alarm Mask 3	<=8	0 – FFFFFFFF	0
High RPM Threshold	<=3	1 – 100(x100 rpm)	30
Low RPM Threshold	<=3	0 – 99(x100 rpm)	8
CAN Report Expansion Mask	8	0 – FFFFFFFF	001FFFFF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
GAM	3	GAM	GAM
Mode	1	0|1	1
Speed Mode	1	0|1	1

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Motion Speed Threshold	<=2	5 - 50(km/h)	45
Motion Cumulative Time	<=3	10 - 100(sec)	10
Motionless Cumulative Time	<=3	10 - 250(sec)	60
GNSS Fix Failure Timeout	<=4	5 - 1800(sec)	60
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
FVR	3	FVR	FVR
Configuration Name	<=40	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Configuration Version	4	0000 - 9999	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Digital Signature	32	‘0’-‘9’, ‘a’-‘z’, ‘A’-‘Z’	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Generation Time	14	YYYYMMDDHHMMSS	
VVS	3	VVS	VVS
Ignition on Voltage	<=5	250 - 28000(mV)	13500
Voltage offset	<=4	200 - 2000(mV)	600
Ignition on Debounce	<=3	5 - 255 (*2sec)	10

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Smart Voltage Adjustment	1	0|1	1
Ignition off Debounce	<=3	5 - 255 (*2sec)	10
AVS	3	AVS	AVS
Rest Validity	<=3	1 - 255(sec)	20
Movement Validity	<=3	1 - 255(sec)	60
Reserved	0		
Reserved	0		
Reserved	0		
GDO	3	GDO	GDO
Time of First Active Phase (ON Time) / Time of First Inactive Phase (OFF Time)	<=3	0 - 100(*100ms)	0
Cycle Time (Total Time)	<=3	0 - 100(*100ms)	30
Incremental Step	<=3	0 - 100(*100ms)	1
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
BTS	3	BTS	BTS
Mode	1	0|1	0
Reserved	0		
Bluetooth Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'(ASCII)	GV57MG_BT
Bluetooth Service	1	7	7
Discoverable Mode	1	0 - 3	3
Discoverable Time	<=4	0 – 1440(Min)	0

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Bluetooth Report Mask	<=4	(HEX)	0D03
Bluetooth Event Mask	<=4	(HEX)	0003
Reserved	0		
Reserved	0		
Advertising Type	1	0|2	0
Reserved	0		
Reserved	0		
Reserved	0		
Advertising Data Type	1	0|3	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
BAS	3	BAS	BAS
Index	1	0 - 9	0
Accessory Type	<=2	0|4|6|8|13	0
Accessory Model	1	0|4	0
Accessory Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'(ASCII)	
Accessory MAC	12	(HEX)	FFFFFFFFFFFF
Accessory Append Mask	<=4	(HEX)	000F
Reserved			
Low Voltage Threshold	<=4	0 – 5000mV	2400
Reserved			
Reserved (Optional)	0		

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Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved			
Reserved			
SVR	3	SVR	SVR
Mode	1	0 - 1	0
Ghost MAC Address	12	(HEX)	
Connect Interval	<=4	10|20|30|60|120|180|240|360|480|720|1440	10
Connect Fail Count	<=2	1 - 10	1
Match Connected IMEI	15	(IMEI)	
BTI Report Interval	<=4	0 - 1440	0
Reserved	0		
Reserved	0		
Ghost Bluetooth Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'(ASCII)	GL53MG

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BID	3	BID	BID
Index	10	0 - 2	0
Enable	1	0|1	0
Beacon ID Model	1	0|3|4	0
Accessory Append Mask	<=4	(HEX)	000A
Low Voltage Threshold	<=4	0 - 5000(mV)	2400
Expand Organization Unique Identifier Numbers	1	0 – 4	0
Start Index	<=3	1 - 300	
End Index	<=3	1 - 300	
MAC List	<=12*75		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Organization Unique Identifier	6	(HEX)	
Organization Unique Identifier1 (Optional)	6	(HEX)	
Organization Unique Identifier2 (Optional)	6	(HEX)	
Organization Unique Identifier3 (Optional)	6	(HEX)	

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Organization Unique Identifier4 (Optional)	6	(HEX)	
Output ID	1	0|1	0
Output Status	1	0 - 3	0
Duration	<=5	0 - 65535 (*100ms)	0
Toggle Times	<=3	0 - 255	0
Message Type	1	0|1	
Reserved	0		
AEX	3	AEX	AEX
Analog Input Expansion Type	1	0	0
Bind BAS Index	1	0 - 9	0
Analog Input Number	1	1	
Analog Input ID	1	0|5	0
Mode	1	0|1|2	0
Min Threshold	<=5	8000 - 32000 (mV)	8000
Max Threshold	<=5	8000 - 32000 (mV)	32000
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
BDI	3	BDI	BDI
Enable	1	0|1	0
Driver ID List	<=8*20	00000001 - FFFFFFFF	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

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3.3.3.3.+RESP:GTCID

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

- **+RESP:GTCID,**

Example: +RESP:GTCID,840501,865083030002554,,89860116830009013972,20230731155533, 021A$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
ICCID	20	'0' - '9', 'A' - 'Z'	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.3.3.4.+RESP:GTCSQ

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

- **+RESP:GTCSQ,**

Example: +RESP:GTCSQ,840501,865083030002554,,23,0,20230731155603,021C$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
CSQ RSSI	<=2	0 - 31|99	

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

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

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

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

3.3.3.5.+RESP:GTVER

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

➢ **+RESP:GTVER,**

Example: +RESP:GTVER,840501,865083030002554,,GV57MG,040E,0101,20230731155607,021E$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Device Type	<=10	'0' - '9', 'a' - 'z', 'A' - 'Z'	
Software Version	4	(HEX)	
Hardware Version	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	

Tail Character	1	$	$

- ✧ <*Device Type*>: The type of the device.
- ✧ <*Software Version*>: The software version of the device. The first two characters represent the major version and the last two characters represent the minor version. For example, **010A** means the version **1.10**.
- ✧ <*Hardware Version*>: The hardware version of the device. The first two characters represent the major version and the last two characters represent the minor version. For example, **010A** means the version **1.10**.

3.3.3.6.+RESP:GTBAT

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

➢ **+RESP:GTBAT,**

Example: +RESP:GTBAT,840501,865083030002554,,,0,,3.98,,1,20230731155611,0220$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Reserved	0		
External Power Voltage	<=5	0 - 99999(mV)	
Reserved	0		
Backup Battery Voltage	4	0.00 - 4.20(V)	
Reserved	0		
LED On	1	1|2	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.3.3.7.+RESP:GTIOS

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

➢ **+RESP:GTIOS,**

Example: +RESP:GTIOS,840501,865083030002554,,,,,00,00,20230731155616,0222$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Reserved	0		
Reserved	0		
Reserved	0		
Input Status	2	00 - C3	
Digital Output Status	2	00 - 03	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.3.3.8.+RESP:GTTMZ

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

➢ **+RESP:GTTMZ,**

Example: +RESP:GTTMZ,840501,865083030002554,,+0800,0,20230731155620,0224$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-',	

		' _ '	
Time Zone Offset	5	+/- HHMM	
Daylight Saving	1	0|1	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

3.3.3.9.+RESP:GTGSV

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

➢ **+RESP:GTGSV,**

Example: **+RESP:GTGSV,840501,865083030002554,,12,19,33,19,20,6,34,17,29,2,36,41,31,9,0,12,39,5,30,23,0,25,26,28,0,20230731155831,0227$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', ' _ '	
SV Count	<=2	0 - 24	
SV ID	<=2	0 - 99	
SV Power	<=2	0 - 51	
……			
SV ID	<=2	0 - 99	
SV Power	<=2	0 - 51	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ <*SV Count*>: The number of satellites GNSS finds.

✧ <*SV ID*>: Satellite ID. If there is no satellite, the field will be filled with zero.

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

3.3.3.10.+RESP:GTRSV

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

➢ **+RESP:GTRSV,**

Example: +RESP:GTRSV,840501,865083030002554,,0,20230731155834,0229$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
SV Count	<=2	0 - 32	
SV ID	<=2	0 - 99	
SV Power	<=2	0 - 51	
……			
SV ID	<=2	0 - 99	
SV Power	<=2	0 - 51	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ <*SV Count*>: The number of satellites GLONASS finds.
✧ <*SV ID*>: Satellite ID. If there is no satellite, the field is filled with zero.
✧ <*SV Power*>: Satellite power. If there is no satellite, the field is filled with zero.

3.3.3.11.+RESP:GTATI

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

➢ **+RESP:GTATI,**

Example: +RESP:GTATI,840501,135790246811220,GV57MG,GV57MG,00000001,042D,0817,0220,0102,02320,11,20230404092603,0A71$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Device Type	<=10	'0' - '9', 'a' - 'z', 'A' - 'Z'	
ATI Mask	8	(HEX)	
Firmware Version	4	(HEX)	
MCU Version	4	(HEX)	
Modem Firmware Version	4	0000 - 9999	
Hardware Version	4	(HEX)	
Modem Hardware Version	4	(HEX)	
Sensor ID	2	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

- <*Device Type*>: The type of the device.
- <*ATI Mask*>: Please refer to <*Sub AT Command / ATI Mask*> in the command **AT+GTRTO**.
- <*Firmware Version*>: The firmware version of the device. The first two characters represent the major version and the last two characters represent the minor version. For example, **010A** means the version **1.10**.
- <*MCU Version*>: The MCU 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**.
- <*Modem Firmware Version*>: The modem software version of the device. The first two characters indicate the major version and the last two characters indicate the minor version. For example, **0301** means the version **3.01.**
- <*Hardware Version*>: The hardware version of the device. The first two characters represent the major version and the last two characters represent the minor version.

For example, **010A** means the version **1.10**.

- ✧ <*Modem Hardware Version*>: The modem hardware version of the device. The first two characters indicate the major version and the last two characters indicate the minor version. For example, **0102** means the version **1.02**.
- ✧ <*Sensor ID*>: It indicates the type of the sensor currently used by the device.

3.3.3.12.+RESP:GTBTI

The device reports the Bluetooth peripheral information and the list of connected peripherals via the **+RESP:GTBTI** message.

➢ **+RESP:GTBTI,**

Example: +RESP:GTBTI,840501,865084030960726,gv57,GV57MG_BT,78054100B5DE,0,1,GL53, C63B383FEBFA,1,0,65,000A,,,,,,,20230411114040,03C0$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Bluetooth Name	<=20	(ASCII)	
Bluetooth MAC Address	12	(HEX)	
Bluetooth State	1	0|1	
Connected Device Number	<=2	0 - 11	
Connected Device Name	<=20	(ASCII)	
Connected Device MAC	12	(HEX)	
Role	1	0|1	
Real-Time State	1	0 - 1	
Ghost Battery Percentage	<=3	0 - 100	
Ghost Status	4	0000 - FFFF	
Reserved	0		
Reserved	0		

Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

- <*Bluetooth State*>: The connection status of the Bluetooth when the device role is slave.
  - 0: Bluetooth is not connected.
  - 1: Bluetooth is connected.
- <*Connected Device Number*>: The number of the peripheral device connected.
- <*Connected Device Name*>: The name of the peripheral device connected.
- <*Connected Device MAC*>: The MAC address of the device connected.
- <*Role*>: The role type of the peripheral device.
  - 0: Master
  - 1: Slave
- <*Real-Time State*>: The parameter that is used to indicate whether Ghost Data is real-time data or historical data read from Ghost.
- <*Ghost Battery Percentage*>: The current volume of the backup battery is in percentage.
- <*Ghost Status*>: Bitwise mask to define status of the Ghost device. 0 indicates “normal status”, and 1 indicates “A specific abnormal status is detected”. For specific details of each bit, please see below.
  - Bit 0: Reserved.
  - Bit 1: GNSS fix failure.
  - Bit 2: Detected fake cell.
  - Bit 3: Battery low warning.
  - Bit 4: Failure to get RTC time.
  - Bit 5: SIM card error.
  - Bit 6: GSM unavailable.
  - Bit 7: GPRS unavailable.
  - Bit 8: Failure to connect to backend server.
  - Bit 9 – Bit 14: Reserved.
  - Bit 15: Communication error between MCU and BB.

Note: The parameters <*Real-Time State*>, <*Ghost Battery Percentage*> and <*Ghost Status*> are empty if <*Mode*> in the command **AT+GTSVR** is 0.

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3.3.3.13.+RESP:GTCML

After the device receives the command **AT+GTRTO** to get the car model ID of the CAN100, it will send the information to the backend server via the message **+RESP: GTCML**.

➢ **+RESP: GTCML,**

Example: +RESP:GTCML,780100,866775050904473,GV305CEU-4473,25,sync,,,,20220901152726,1400$			
Parameter	**Length (Byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
CAN100 Car Model ID	<=5	0 – 65535	
CAN100 Car Name	<=50	ASCII	
CAN100 Sync Status	1	1 – 4	
Reserved			
Reserved			
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ <*CAN100 Car Model ID*>: The car model ID of the CAN100 device. If the value is 0, it means that no model has been obtained.

✧ <*CAN100 Car Name*>: Car Name is human readable make and model of the car. If this string value is equal to "sync", then the <*CAN100 Car Model ID*> of the query is a class ID that has been synchronized.

✧ <*Car Syn Status*>: The car synchronization status.

- 0: parameter currently not available.
- 1: The synchronization is successful.
- 2: The device is not properly connected to CAN-bus.
- 3: The car is not supported by the firmware version of CAN Chipset.
- 4: CAN Chipset is not responding.

3.3.4.Event Report

The following event reports are triggered when certain events occur.
+RESP:GTPNA: Power on report
+RESP:GTPFA: Power off report
+RESP:GTMPN: The report for connecting main power supply
+RESP:GTMPF: The report for disconnecting main power supply
+RESP:GTBTC: Backup-battery-starts-charging report
+RESP:GTSTC: Backup-battery-stops-charging report
+RESP:GTBPL: Backup battery low (reported 4 times before power off)
+RESP:GTSTT: The report for the change of the device's motion status
+RESP:GTPDP: EGPRS/LTE connection establishment report
+RESP:GTIGN: Ignition on report
+RESP:GTIGF: Ignition off report
+RESP:GTIDN: Enter into idling status
+RESP:GTIDF: Leave idling status
+RESP:GTJDR: Jamming indication
+RESP:GTJDS: Jamming indication
+RESP:GTGSS: GNSS signal status
+RESP:GTCRA: Crash report
+RESP:GTASC: The report for the calibration result
+RESP:GTSTR: Vehicle enters into Start status
+RESP:GTSTP: Vehicle enters into Stop status
+RESP:GTLSP: Vehicle enters into Long Stop status
+RESP:GTDOS: Wave shape 1 output status changes
+RESP:GTRMD: The report for entering or leaving network roaming state
+RESP:GTVGN: Virtual ignition on report/Voltage high vehicle report
+RESP:GTVGF: Virtual ignition off report/Voltage low vehicle report
+RESP:GTUPC: The report for over-the-air configuration update
+RESP:GTDRM: Device removal report
+RESP:GTBCS: Bluetooth connect report
+RESP:GTBDS: Bluetooth disconnect report
+RESP:GTBDL: Driver login/logout report
+RESP:GTBKS: Keyfob(s) detecting status report
+RESP:GTSVR: Stolen Vehicle Recovery alarm

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

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

Example: **+RESP:GTPFA,840501,865083030002554,,20230731153304,01F8$** **+RESP:GTPNA,840501,865083030002554,,20230731153318,01F9$** **+RESP:GTPDP,840501,865083030002554,,20230731153326,01FA$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

Example: **+RESP:GTMPF,840501,865083030002554,,0,0.0,144,66.7,117.201548,31.833038,20230731080153,0460,0001,5504,582B,00,20230731160155,022D$** **+RESP:GTMPN,840501,865083030002554,,0,1.7,30,64.2,117.201528,31.833023,20230731080156,0460,0001,5504,582B,00,20230731160159,022E$** **+RESP:GTBTC,840501,865083030002554,,0,1.7,30,64.2,117.201528,31.833023,20230731080156,0460,0001,5504,582B,00,20230731160159,022E$** **+RESP:GTDRM,840501,865083030002554,,0,1.7,30,64.2,117.201528,31.833023,20230731080156,0460,0001,5504,582B,00,20230731160159,022E$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	

Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

➢ **+RESP:GTSTC,**

Example: **+RESP:GTSTC,840501,135790246811220,,,0,4.3,92,70.0,121.354335,31.222073,20180214013254,0460,0000,18D8,6141,00,20180214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Reserved	0		
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	

LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

➢ **+RESP:GTBPL,**

Example: **+RESP:GTBPL,840501,135790246811220,,3.53,0,4.3,92,70.0,121.354335,31.222073,20180214013254,0460,0000,18D8,6141,00,20180214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Backup Battery Voltage	4	0.00 - 4.20(V)	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	

Tail Character	1	$	$

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

➢ **+RESP:GTJDR,**

Example: **+RESP:GTJDR,840501,135790246811220,,1,0,4.3,92,70.0,121.354335,31.222073,20230214013254,0460,0000,18D8,6141,00,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range / Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Jamming Net	1	1 - 3	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Jamming Net*>: The network mode.

- 1: EGPRS
- 2: LTE
- 3: Both LTE and EGPRS

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

➢ **+RESP:GTJDS,**

Example: **+RESP:GTJDS,840501,135790246811220,,2,1,0,4.3,92,70.0,121.354335,31.222073,20230214013254,0460,0000,18D8,6141,00,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range / Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Jamming Status	1	1|2	
Jamming Net	1	1 - 3	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

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

➢ **+RESP:GTSTT,**

Example: **+RESP:GTSTT,840501,865083030002554,,41,0,0.0,24,63.3,117.201525,31.833040,20230731080235,0460,0001,5504,582B,00,20230731160236,022F$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Motion Status	2	11|12|16|21|22|41|42|1A	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

- 11 (**Ignition Off Rest**): The device attached vehicle is ignition off and it is motionless.
- 12 (**Ignition Off Motion**): The device attached vehicle is ignition off and it is moving before it is considered to be towed.
- 16 (**Tow**): The device attached vehicle is ignition off and it is towed.
- 21 (**Ignition On Rest**): The device attached vehicle is ignition on and it is motionless.
- 22 (**Ignition On Motion**): The device attached vehicle is ignition on and it is

moving.

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

Note: To avoid generating a large number of **+RESP:GTSTT** messages, 1A (Fake Tow) state is ignored.

➢ **+RESP:GTIGN,**

Example: **+RESP:GTIGN,840501,865083030002554,,1377,0,0.0,24,63.3,117.201525,31.833040,20230731080420,0460,0001,5504,582B,00,00001:00:09,0.1,20230731160423,0233$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Duration of Ignition Off	<=6	0 - 999999(sec)	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	
Hour Meter Count	11	HHHHH:MM:SS	
Mileage	<=9	0.0 - 4294967.0(km)	
Send Time	14	YYYYMMDDHHMMSS	

Count Number	4	(HEX)	
Tail Character	1	$	$

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

➢ **+RESP:GTVGN,**

Example: **+RESP:GTVGN,840501,865083030002117,,00,4,824,0,0.0,22,74.4,117.294902,31.745847,20230707120858,0460,0000,560A,6703,00,00001:00:09,16.3,20230709203840,0502$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Reserved	2	00	
Report Type	1	0 - 5|7	
Duration of Ignition Off	<=6	0 - 999999(sec)	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	

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Cell ID	4|8	(HEX)	
Reserved	2	00	
Hour Meter Count	11	HHHHH:MM:SS	
Mileage	<=9	0.0 - 4294967.0(km)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Report Type*>: This parameter indicates the reason which input triggers this ignition event.
- 0: Reserved
- 1: Reserved
- 2: External power voltage mode (virtual ignition detection)
- 3: Reserved
- 4: Accelerometer mode (virtual ignition detection)
- 5: External power voltage event
- 7: Combined detection mode

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

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

➢ **+RESP:GTIGF,**

Example:
+RESP:GTIGF,840501,865083030002554,,115,0,0.0,24,63.3,117.201525,31.833040,20230731080617,0460,0001,5504,582B,00,00001:00:09,0.1,20230731160618,0238$

Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Duration of Ignition On	<=6	0 - 999999(sec)	
GNSS Accuracy	1	0 - 50	

Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	
Hour Meter Count	11	HHHHH:MM:SS	
Mileage	<=9	0.0 - 4294967.0(km)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

➢ **+RESP:GTVGF,**

Example: **+RESP:GTVGF,840501,865083030002117,,00,4,32,0,0.0,22,74.4,117.294902,31.745847,20230707120858,0460,0000,560A,6703,00,00001:00:41,16.3,20230709203912,0504$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-',	

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		' _ '	
Reserved	2	00	
Report Type	1	0 - 5|7	
Duration of Ignition On	<=6	0 - 999999(sec)	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	
Hour Meter Count	11	HHHHH:MM:SS	
Mileage	<=9	0.0 - 4294967.0(km)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

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

Example:
+RESP:GTIDN,840501,865083030004642,,,,0,0.0,291,48.3,117.177670,31.820310,20230731075611,0460,0001,5502,465D,00,1061.0,20230731155614,3EAD$
+RESP:GTSTR,840501,865083030004642,,,,0,36.4,271,35.0,117.201547,31.829752,20230731074759,0460,0001,5504,582C,00,1057.6,20230731154802,3E80$
+RESP:GTSTP,840501,865083030004642,,,,0,0.0,291,48.3,117.177670,31.820310,20230731075941,0460,0001,5502,465D,00,1061.0,20230731155944,3EB5$
+RESP:GTLSP,840501,865083030004642,,,,0,0.0,203,52.5,117.202360,31.832648,20230728181824,0460,0001,5504,582B,00,1006.0,20230729021852,3B23$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Reserved	0		
Reserved	0		
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	00
Mileage	<=9	0.0 - 4294967.0(km)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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➢ **+RESP:GTIDF,**

Example: **+RESP:GTIDF,840501,865083030004642,,22,444,0,56.7,292,50.9,117.172603,31.822037,20230731080338,0460,0001,5502,465D,00,1061.5,20230731160338,3EBF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Motion Status	2	11|12|22	
Duration of Idling Status	<=6	0 - 999999(sec)	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	00
Mileage	<=9	0.0 - 4294967.0(km)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Motion Status*>: The motion status when the vehicle leaves idling status.

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

➢ **+RESP:GTGSS,**

Example: **+RESP:GTGSS,840501,865083030002117,,1,5,22,,0,20.1,352,79.6,117.281003,31.749642,20230709231353,0460,0000,560A,60BA,00,20230710071354,05B2$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
GNSS Signal Status	1	0|1	
Satellite in Use	<=2	0 - 15	
Motion Status	2	11|12|16|1A|21|22|41|42	
Reserved	0		
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

- <*GNSS Signal Status*>: 0 means “Lost GNSS signal or no successful GNSS fix”, and 1 means “GNSS signal recovered and successful GNSS fix”.
- <*Satellites in Use*>: The number of satellites being used for tracking. The high nibble is reserved and the low nibble is valid.
- <*Motion Status*>: The current motion status of the device.

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

➢ **+RESP:GTCRA,**

Example: +RESP:GTCRA,840501,868487004360475,,89,0,0.0,0,49.2,121.348402,31.163293,20230711070725,0460,0000,1807,44A8,00,0,1,20230711150725,0901$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Crash Counter	2	(HEX)	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)-180 - 180	
Latitude	<=10	(-)-90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	00		
Trigger Degrees	<=3	0 - 180	

Engine Status	1	0 - 1	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

- <*Crash Counter*>: The parameter that indicates the crash sequence. It combines the report of **+RESP:GTCRA** and **+RESP:GTCRD** into one crash event. It rolls from 0x00 to 0xFF.
- <*Trigger Degrees*>: The parameter that indicates the degrees before and after crashing event.
- <*Engine Status*>: “0” means engine is turn off. “1” means engine is turn on.

➢ **+RESP:GTASC,**

Example:
+RESP:GTASC,840501,868487004360475,,0.70,-0.68,-0.24,0.68,0.84,0.03,0.15,-0.18,0.94,0,60.2,255,12.3,121.453967,31.015475,20230506064644,0460,0000,1805,4732,00,20230506145822,01A3$840501

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
X_Forward	<=5	-1.00 - 1.00	
Y_Forward	<=5	-1.00 - 1.00	
Z_Forward	<=5	-1.00 - 1.00	
X_Side	<=5	-1.00 - 1.00	
Y_Side	<=5	-1.00 - 1.00	
Z_Side	<=5	-1.00 - 1.00	
X_Vertical	<=5	-1.00 - 1.00	
Y_Vertical	<=5	-1.00 - 1.00	
Z_Vertical	<=5	-1.00 - 1.00	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Heading	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	

Longitude	<=11	(-)-180 - 180	
Latitude	<=10	(-)-90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

- <*X_Forward*>, <Y_Forward>, <*Z_Forward*>: The factors to calculate the new acceleration in forward direction. The formula to calculate the acceleration in Forward direction Xnew is Xnew = <*X_Forward*> * X + <*Y_Forward*> * Y + <*Z_Forward*> * Z.
- <*X_Side*>, <*Y_Side*>, <*Z_Side*>: The factors to calculate the new acceleration in side direction. The formula to calculate the acceleration in Side direction Ynew is Ynew = <*X_Side*> * X + <*Y_Side*> * Y + <*Z_Side*> * Z.
- <*X_Vertical*>, <*Y_Vertical*>, <*Z_Vertical*>: The factors to calculate the new acceleration in vertical direction. The formula to calculate the acceleration in Vertical direction Znew is Znew = <*X_Vertical*> * X + <*Y_Vertical*> * Y + <*Z_Vertical*> * Z.

➢ **+RESP:GTDOS,**

Example: **+RESP:GTDOS,840501,865083030002554,,1,1,0,0.0,24,63.3,117.201525,31.833040,20230731081256,0460,0001,5504,582B,00,20230731161258,023E$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Wave1 Output ID	1	1 | 5 - 6	
Wave1 Ouptut Active	1	0 - 3	
GNSS Accuracy	1	0 - 50	

Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

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

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

➢ **+RESP:GTRMD,**

Example: **+RESP:GTRMD,840501,865083030002554,,2,0,0.0,24,63.3,117.201525,31.833040,20230731081347,0460,0001,5504,582B,00,20230731161350,0241$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Roaming State	1	0 - 3	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	

Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

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

➢ **+RESP:GTUPC,**

Example: +RESP:GTUPC,840501,135790246811220,GV57MG,0,100,http://180.184.235.202:21022/U21023_at.ini,20230402061037,0C88$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Command ID	<=3	0 - 999	
Result	3	100 - 103|200 - 202|300 - 302|304 - 306	
Download URL	<=100	(URL)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Command ID*>: The command ID in the update configuration file. It is always 0 before the device starts to update the configuration. It indicates the total number of the commands when the response code is 301. It indicates the ID of the command in wrong format when the response code is 302. It is empty when the response code is

304, 305 or 306.

✧ <*Result*>: A numeral to indicate whether the configuration is updated successfully.

- 100: The update command is starting.
- 101: The update command is confirmed by the device.
- 102: The update command is refused by the device.
- 103: The update process is refused because the battery is low.
- 200: The device starts to download the package.
- 201: The device finishes downloading the package successfully.
- 202: The device fails to download the package.
- 300: The device starts to update the device configuration.
- 301: The device finishes updating the device configuration successfully.
- 302: The device fails to update the device configuration.
- 303: Reserved.
- 304: Reserved.
- 305: The update process is interrupted by abnormal reboot.
- 306: The update process is interrupted by MD5 verification error.

✧ <*Download URL*>: The complete URL to download the configuration. It includes the file name.

➢ **+RESP:GTEUC,**

Example: **+RESP:GTEUC,840501,135790246811220,,0,101,http://180.184.235.202:9034/866425037536481.ini,FFFFFFFF,,,,,20230415014708,004E$**			
Parameter	**Length(Byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Command ID	<=3	0 - 999	
Result	3	100 - 103|200 - 202|300 - 302|304 - 306	
Download URL	<=100	(URL)	
Identifier Number	8	(HEX)	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Command ID*>: The command ID in the update configuration file. It is always 0 before the device starts to update the configuration. It indicates the total number of the commands when the response code is 301. It indicates the ID of the command in wrong format when the response code is 302. It is empty when the response code is

304, 305 or 306.

✧ <*Result*>: A numeral to indicate whether the configuration is updated successfully.

- 100: The update command is starting.
- 101: The update command is confirmed by the device.
- 102: The update command is refused by the device.
- 103: The update process is refused because the battery is low.
- 200: The device starts to download the package.
- 201: The device finishes downloading the package successfully.
- 202: The device fails to download the package.
- 300: The device starts to update the device configuration.
- 301: The device finishes updating the device configuration successfully.
- 302: The device fails to update the device configuration.
- 303: Reserved.
- 304: Reserved.
- 305: The update process is interrupted by abnormal reboot.
- 306: The update process is interrupted by MD5 verification error.

✧ <*Download URL*>: The complete URL to download the configuration. It includes the file name.

<*Identifier Number*>: Please refer to the parameter <*Identifier Number*> in the command **AT+GTUPC**.

➢ **+RESP:GTBCS,**

➢ **+RESP:GTBDS,**

Example:
+RESP:GTBCS,840501,865084030960726,,,0,0.0,0,113.1,117.129138,31.839143,20230411034415,0460,0000,550B,B984,00,0D03,GV57MG_BT,78054100B5DE,0,1,067DA3C26E54,,,,,20230411114418,03C7$
+RESP:GTBDS,840501,865084030960726,,,0,0.0,221,73.4,117.129486,31.839373,20230411040124,0460,0000,550B,B984,00,0D03,GV57MG_BT,78054100B5DE,0,1,067DA3C26E54,,,,,20230411120125,0414$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Reserved	0		
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	

Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)-180 - 180	
Latitude	<=10	(-)-90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	00
Bluetooth Report Mask	4	(HEX)	
Bluetooth Name	<=20	(ASCII)	
Bluetooth Mac Address	12	(HEX)	
Peer Role	1	0|1	
Peer Address Type	1	0|1	
Peer MAC Address	12	(HEX)	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Peer Role*>: The role type of the peripheral device.
- 0: Master
- 1: Slave

✧ <*Peer Address Type*>: The address type of the peripheral device.
- 0: Public Device Address or Public Identity Address
- 1: Random Device Address or Random (static) Identity

➢ **+RESP:GTBDL,**

Example:
+RESP:GTBDL,840501,865585040360751,gv57,13813888,0,,,,,20220324083452,0044$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' – '9', 'a' – 'z', 'A' – 'Z', '-', '_'	
Driver ID	8	(HEX)	
Login Status	1	0|1	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ <Login Status>: The login status of driver.

- 0: Logout
- 1: Login

➢ **+RESP:GTBKS,**

Example: **+RESP:GTBKS,840501,865585040360751,gv57,1,,112233445566,0,0.0,22,74.4,117.294902,31.745847,20230302120858,0460,0000,560A,4D13,00,16.3,,,,20230324083452,0044$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' – '9', 'a' – 'z', 'A' – 'Z', '-', '_'	
Keyfob(s) Detecting Status	1	0 - 2	0
Reserved	0		
Registered Accessory	12	(HEX)	

MAC			
GNSS Accuracy	<=2	0 - 50	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)180 - 180	
Latitude	<=10	(-)90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	
Mileage	<=9	0.0 - 4294967.0(km)	
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ *<Keyfob(s) detecting status>*: The login status of driver.

- 0: Unread keyfob event.
- 1: Unlocked event.
- 2: Logout event.

✧ *<Registered Accessory MAC>*: The MAC address of the Bluetooth beacon accessory.

➢ **+RESP:GTSVR,**

Example:
+RESP:GTSVR,840501,135790246811220,gv57,0,61064EBA3743,,,2,0.0,215,23.8,121.392722,31.163987,20180517081522,0460,0000,1877,8524,00,20180517081523,07C3$

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', '-', '_'	
SVR Working State	1	0|1|2	
Ghost MAC Broadcast	12	000000000000 - FFFFFFFFFFFF	
SVR Appending Information	<=30		
Reserved	1	0	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(-)-180 – 180	
Latitude	<=10	(-)-90 – 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

- 0: Primary loses connection with Ghost device.
- 1: Primary regains connection with Ghost device normally.
- 2: Primary fails to match Ghost device during installation phase.

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

information.

- **+RESP:GTBAA,**

Example: +RESP:GTBAA,840501,865585040277182,gv57,FF,3,0,0,000A,WRL300,78054101F4A3,1,2962,25,23,-72,2,1,0,0.2,0,85.4,117.129380,31.839252,20230114082808,0460,0000,550B,B1E2,00,20230114082809,0014$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(HEX)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Index	1	0 - 9	
Accessory Type	<=2	0|3|6|13	
Accessory Model / Beacon ID Model	1	0|4	
Alarm Type	2	(HEX)	
Append Mask	4	(HEX)	
Accessory Name	<=20	'0' – '9', 'a' – 'z', 'A' – 'Z', '-', '_'	
Accessory MAC	12	'0' – '9', 'A' – 'F'	
Accessory Status	1	0|1	
Accessory Battery Level	<=4	0 - 5000(mV)	
Accessory Temperature	<=3	-40 - 80(℃)	
Accessory Humidity	<=3	0 - 100%(rh)	
Accessory Signal Strength	<=4	-120 – 0(dBm)	
Relay Config Result	1	0 - 4	
Relay State	1	0 - 1	
GNSS Accuracy	<=2	0 - 50	
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	

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Longitude	<=11	(-)-180 – 180	
Latitude	<=10	(-)-90 – 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4|8	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Index*>: The index of the Bluetooth accessory.
- The index of the Bluetooth accessory defined in the **AT+GTBAS** command which triggers the **+RESP: GTBAA** message.
  Note: For BID Accessory, it is 0xFF.

✧ <*Accessory Type*>: The type of the Bluetooth accessory which is defined in the <Index>.
- 0: No Bluetooth accessory.
- 3: Bluetooth beacon accessory.
- 6: Multi-functional beacon sensor.
- 13: Relay Bluetooth accessory.

✧ <*Accessory Model / Beacon ID Model*>: The model of the Bluetooth accessory which is defined in **AT+GTBAS**.

✧ <*Alarm Type*>: The type of the alarm which is generated by the Bluetooth accessory specified by <*Accessory Type*> and <*Accessory Model*> in the **AT+GTBAS** command.
- 0: The voltage of the Bluetooth accessory is low.
- 1: Temperature alarm. The current temperature value falls below <*Low Temperature*> set in the **AT+GTBAS** command.
- 2: Temperature alarm. The current temperature value is higher than <*High Temperature*> set in the **AT+GTBAS** command.
- 3: Temperature alarm. The current temperature value is within the range defined by <*Low Temperature*> and <*High Temperature*> set in the **AT+GTBAS** command.
- 4: Pushbutton event for WKF300 is detected.
- 7: Humidity alarm. The current humidity value falls below <*Low Humidity*> set in the **AT+GTBAS** command.
- 8: Humidity alarm. The current humidity value is higher than <*High Humidity*> set in the **AT+GTBAS** command.

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- 9: Humidity alarm. The current humidity value is within the range defined by <*Low Humidity*> and <*High Humidity*>, which are set in the **AT+GTBAS** command.
- 13: Door opened.
- 14: Door closed.
- 15: Relay event notification.

✧ <*Append Mask*>: Bitwise mask defined in the AT+GTBAS command to indicate the reported Bluetooth accessory data fields.

- Bit 0: <Accessory Name>
- Bit 1: <Accessory MAC>
- Bit 2: <Accessory Status>
- Bit 3: <Accessory Battery Level>
- Bit 4: <Accessory Temperature>
- Bit 5: <Accessory Humidity>
- Bit 14: <Relay Data>

✧ <*Accessory Name*>: The name of the Bluetooth accessory.

✧ <*Accessory MAC*>: The MAC address of the Bluetooth accessory.

✧ <*Accessory Status*>: A numeral to indicate whether the accessory is available.

- 0: The accessory is not available.
- 1: The accessory is available.

✧ <*Accessory Battery Level*>: The battery voltage of the Bluetooth accessory.

✧ <*Accessory Temperature*>: Temperature data for the Bluetooth accessory.

✧ <*Accessory Humidity*>: Humidity data for the Bluetooth accessory.

✧ <*Relay Config Result*>: The number representing the response result of the relay, which is controlled and reported by Bit14 of <*Accessory Append Mask*> in the **AT+GTBAS** command.

- 0: Configuration updated successfully.
- 1: Error in connecting.
- 2: The current password is incorrect.
- 3: Password update error.
- 4: Relay open or close error.

✧ <Relay state>: The current state of the WRL300 sensor.

➢ **+RESP:GTBID,**

Example:
+RESP:GTBID,840501,865585040277182,gv57,1,3,000A,78054101F4A3,2962,-79,0,0.2,0,85.4,117.129380,31.839252,20200114082808,0460,0000,550B,B1E2,00,20200114082809,0014$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(HEX)	

Device Name	<=20	'0' – '9', 'a' – 'z', 'A' – 'Z', '-', '_'	
Beacon Number	<=2	0 - 15	
Beacon ID Model	1	0|3|4	
Append Mask	4	(HEX)	
Accessory MAC	12	'0' - '9', 'A' - 'F'	
Accessory Battery Level	<=4	0 - 5000(mV)	
Accessory Signal Strength	<=4	-120 - 0	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(-)-180 – 180	
Latitude	<=10	(-)-90 – 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

- Bit 5: Reserved.
- Bit 6: <*Signal Strength*>.

✧ <*Accessory MAC*>: The MAC address of the Bluetooth beacon accessory.

✧ <*Accessory Battery Level*>: The battery voltage of the Bluetooth beacon accessory.

✧ <*Accessory Signal Strength*>: The signal strength of the Bluetooth beacon accessory.

➢ **+RESP:GTBIE,**

Example: **+RESP:GTBIE,840501,865585040277182,gv57,1,1,1,1,3,000A,78054101F4A3,2962,-72,0,0.2,0,85.4,117.129380,31.839252,20200114082808,0460,0000,550B,B1E2,00,20200114082809,0014$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(HEX)	
Device Name	<=20	'0' – '9', 'a' – 'z', 'A' – 'Z', '-', '_'	
Detected Count	<=4	0 - 9999	
Total Frame	1	1 - 4	
Frame Index	1	1 - 4	
Beacon Number	<=2	0 - 30	
Beacon ID Model	1	0|3|4	
Append Mask	4	(HEX)	
Accessory MAC	12	'0' - '9', 'A' - 'F'	
Accessory Battery Level	<=4	0 - 5000(mV)	
Accessory Signal Strength	<=4	-120 - 0	
GNSS Accuracy	1	0 - 50	
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(-)-180 – 180	
Latitude	<=10	(-)-90 – 90	

GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

- <*Detected Count*>: The value to indicate the sequence number of beacon have been detected. It will start at 0 when it over 9999.
- <*Total Frame*>: A numeral to indicate the total number of frames that the following data takes up.
- <*Frame Index*>: A numeral to indicate the index of the current frame.
- <*Beacon Number*>: The number of the Bluetooth beacon accessories**.**
- <*Beacon ID Model*>: The model of the Bluetooth beacon ID accessory which is defined in **AT+GTBID.**
- <*Accessory Append Mask*>: Bitwise mask defined in the **AT+GTBID** command to indicate the reported Bluetooth beacon accessory data fields.
  - Bit 0: Reserved
  - Bit 1: <*Accessory Mac*>
  - Bit 2: Reserved
  - Bit 3: <*Accessory Battery Level*>
  - Bit 4: Reserved
  - Bit 5: Reserved.
  - Bit 6: <*Accessory Signal Strength*>.
- <*Accessory MAC*>: The MAC address of the Bluetooth beacon accessory.
- <*Accessory Battery Level*>: The battery voltage of the Bluetooth beacon accessory.
- <*Accessory Signal Strength*>: The signal strength of Bluetooth accessory.

➢ **+RESP:GTCLT,**

Example: **+RESP:GTCLT,690803,866775050990563,gv57,0,00000000,00000000,00000004,,,FFFF,,2,H779133,50.56,20,40,90,,L87.40,3960,32,2.14,1.17,0.97,7436.45,4365,,,3,0.0,0,82.7,117.129258,31.838964,20221101055700,0460,0000,550B,085BE2AA,00,20221101150701,0259$**			
Parameter	**Length**	**Range/Format**	**Default**

	(Byte)		
Protocol Version	6	XX0000 – XXFFFF, X∈{'A'–'Z','0'–'9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z''-''_'	
Group ID	<=2	0 – 19	
Alarm Mask 1	<=8	0 – FFFFFFFF	
Alarm Mask 2	<=8	0 – FFFFFFFF	
Alarm Mask 3	<=8	0 – FFFFFFFF	
Reserved	0		
Reserved	0		
CANBUS Data Mask	<=8	0 – FFFFFFFF	
VIN	17	'0' - '9''A' - 'Z' except 'I', 'O', 'Q'	
Ignition Key	1	0|1|2	
Total Distance	<=12	H(0 – 99999999)/I(0 – 2147483647)	
Total Fuel Used	<=9	0.00 – 999999.99l	
Engine RPM	<=5	0 – 16383 rpm	
Vehicle Speed	<=3	0 – 455Km/h	
Engine Coolant Temperature	<=4	-40 – +215 ℃	
Fuel Consumption	<=5	0.0 – 999.9L/100km | Inf | NaN	
Fuel Level	<=7	L(0.00 – 9999.99)/P(0.00 – 100.00)	
Range	<=8	0 – 99999999	
Accelerator Pedal Pressure	<=3	0 – 100%	
Total Engine Hours	<=8	0.00 – 99999.99h	
Total Driving Time	<=8	0.00 – 99999.99h	
Total Engine Idle Time	<=8	0 .00 – 99999.99h	

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Total Idle Fuel Used	<=9	0.00 – 999999.99l	
Axle Weight 2nd	<=5	0 – 65535kg	
Tachograph Information	<=4	00 – FFFF	
Detailed Information / Indicators	4	00 – FFFF	
Lights	2	0 – FF	
Doors	2	0 – FF	
Total Vehicle Overspeed Time	<=8	0.00 – 99999.99h	
Total Vehicle Engine Overspeed Time	<=8	0.00 – 99999.99h	
CAN Report Expansion Mask	<=8	0 – FFFFFFFF	
Ad-Blue Level	<=3	0 – 100L	
Axle Weight 1st	<=5	0 – 65535kg	
Axle Weight 3rd	<=5	0 – 65535kg	
Axle Weight 4th	<=5	0 – 65535kg	
Tachograph Overspeed Signal	1	0|1	
Tachograph Vehicle Motion Signal	1	0|1	
Tachograph Driving Direction	1	0|1	
Analog Input Value	<=5	0 – 99999mv	
Engine Braking Factor	<=6	0 – 999999	
Pedal Braking Factor	<=6	0 – 999999	
Total Accelerator Kick-downs	<=6	0 – 999999	
Total Effective Engine Speed Time	<=8	0.00 – 99999.99h	
Total Cruise Control Time	<=8	0.00 – 99999.99h	
Total Accelerator Kick-	<=8	0.00 – 99999.99h	

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down Time			
Total Brake Applications	<=6	0 – 999999	
Tachograph Driver 1 Card Number	<=40	0 – 9999999999	
Tachograph Driver 2 Card Number	<=40	0 – 9999999999	
Tachograph Driver 1 Name	<=40	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Tachograph Driver 2 Name	<=40	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Registration Number	<=40	0 – 9999999999	
Expansion Information	4	00 – FFFF	
Rapid Brakings	<=6	0 – 999999	
Rapid Accelerations	<=6	0 – 999999	
Engine Torque	<=3	0 – 100%	
Reserved	0		
Reserved	0		
GNSS Accuracy	<=2	0|1 – 50	
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4|8	XXXX/XXXXXXXX	
Reserved	2	00	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	

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Tail Character	1	$	$

3.3.5.Buffer Report

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

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

The buffered messages will be sent to the backend server when the connection to the server recovers. The buffered reports are saved to the built-in non-volatile memory in case the device is reset. The terminal can buffer up to 10000 messages.

Detailed information about buffer report is listed below.

- ✧ Only **+RESP** messages except **+RESP:GTALM**, **+RESP:GTPDP** are buffered.
- ✧ In the buffer report, the original header string "**+RESP**" is replaced by "**+BUFF**" while the other content including the original sending time and count number is kept unchanged.
- ✧ Buffered messages will be sent only via EGPRS/LTE by TCP or UDP connection. They cannot be sent via SMS. If the current report is forced SMS mode, the buffered messages will not be sent until the report mode is changed to TCP or UDP.
- ✧ The buffered messages will be sent after real time messages if <*Buffer Mode*> in **AT+GTSRI** is set to 1.
- ✧ The buffered messages will be sent before real time messages if <*Buffer Mode*> in **AT+GTSRI** is set to 2. 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,840501,863487004352365,GV57MG,,10,1,1,0.0,0,-33.4,121.409324,31.175315,20231224193643,0000,0000,0000,0000,00,0.0,,,,,418000,0,0,10,20231224193648,9B51$

3.3.6.Report with Google Maps Hyperlink

If <*Location Request Mask*> in the command **AT+GTCFG** is set to 20, the device will send its current location to the incoming phone call's number via SMS with a Google Maps hyperlink.

➢ **Google Maps Hyperlink**

Example:
gv57:
<http://maps.google.com/maps?q=31.222073,121.354335

F1 D2023/01/01T00:00:00>			
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	(-)90 - 90	
Longitude	<=11	(-)180 - 180	
GNSS Fix	<=3	F0 - F50	
GNSS UTC Time	20	DYYYY/MM/DDTHH:MM:SS	

✧ <*GNSS Fix*>: The accuracy of the location information. F0 means “No GNSS fix”.

3.3.7.Crash Data Packet

The message contains 15s tri-axial acceleration data before and after crash at most. When crash accident is detected, tri-axial acceleration data before crash will be reported to backend server packed in several frames. And the device will continue to record tri-axial data and report it to backend server packed with several frames.

➢ **+RESP:GTCRD,**

Example:

+RESP:GTCRD,840501,868487004360103,GV57MG,04,06,5,1,00080007004A000A00
07004A00080007004A00080007004A00090006004A00060007004C00060003004A00
0A0008004900080008004C000A0007004A00080003004A00080006004A0008000700
4900080007004A000800030049000600070004C000A0003004A0006000600490009000
8004A000A0009004A00080007004A00080003004A000A0007004A00080007004C000
80007004A00090008004A00080006004A00080007004A00080003004A00080007004
C00090003004A0006000700490000A0007004A00060008004A00080007004A0006000
7004A00080007004A00080007004A000A0006004A000A0003004C00080003004C000
80007004A000A0007004C00080007004C00090003004A00080007004A00080006004
900080007004A00080008004A00090003004A00080007004A00080007004A000A000
7004A00080007004A00080007004C00090007004A0008000700490008000 6004A000
A0007004C00080007004A00090003004C00060006004A00080003004A00080007004
A00080007004A00090007004A00080003004A00090007004D0008000600490008000
6004900080003004A00080007004C00080007004A00080007004A00060003004C000
80007004A0006000800490008000 8004A00080008004A0008000700490008000 7004A
00060003004A00090007004A00090003004C00080003004A00080003004A000A0007
004C00080003004C00080007004A00080007004C000A0003004A000A0007004C0008

0006004C00080007004A00080007004C00080008004A00080008004A00080003004A00080007004900090006004A,20230712112051,0A07$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Crash Counter	2	(HEX)	
Data Type	2	00 - 7F	
Total Frame	<=2	1 - 15	
Frame Number	<=2	1 - 15	
Data	<=1200	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

- <*Crash Counter*>: The parameter that indicates the sequence number of the crash event. The report of **+RESP:GTCRA** and **+RESP:GTCRD** are combined into one crash event. It rolls from 0x00 to 0xFF.
- <*Data Type*>: A hexadecimal parameter to indicate the time of the data (before crash or after crash) and crash direction (+X, -X, +Y, -Y, +Z, -Z or several of them). Please refer to the following table for the detailed syntax.

Bits	Description	Range
Bit 0	0: before crash 1: after crash	0-1
Bit 1	0: X-axis crash not detected 1: X-axis crash detected	0-1
Bit 2	0: X-axis positive direction 1: X-axis negative direction	0-1
Bit 3	0: Y-axis crash not detected 1: Y-axis crash detected	0-1
Bit 4	0: Y-axis positive direction 1: Y-axis negative direction	0-1
Bit 5	0: Z-axis crash not detected 1: Z-axis crash detected	0-1
Bit 6	0: Z-axis positive direction 1: Z-axis negative direction	0-1
Bit 7	Fixed value	0

- <*Total Frame*>: The total number of data frames reported to the server.
- <*Frame Number*>: The sequence number of the current data frame.
- <*Data*>: There are 1200 ASCII characters in one message at most which includes acceleration samples in 1 second at most. There are 12 characters in a group. The first 4 characters of these 12 characters represent X axis acceleration data, the middle 4 characters represent Y axis acceleration data and the last 4 characters represent Z axis acceleration data. The ASCII “0001” is equal to 0x0001 in hex format, and the

ASCII “AFFF” is equal to 0xAFFF in hex format. They are two’s complement.

Example:
+RESP:GTCRD,840501,868487004360103,GV57MG,04,06,5,1,000100010055… ,20120330120443,005C$
This is the oldest XYZ-axis acceleration data:
Conversion to hex format: X (axis acceleration data) = 0x0001; Y = 0x0001; Z = 0x0055;
Decimal format: X (axis acceleration data) = 1; Y = 1; Z = 85;

+RESP:GTCRD,840501,868487004360103,GV57MG,04,06,5,1,...ffffff10052,20120330115736,005A$
This is the latest XYZ-axis acceleration data:
Conversion to hex format: X (axis acceleration data) = 0xFFFF; Y = 0xFFF1; Z = 0x0052;
Decimal format: X (axis acceleration data) = -1; Y = -15; Z = 82;

Note: Acceleration of gravity (+g) is 82 in decimal format and –g is −82. The linearized acceleration data 1312 represents +16g and −1312 represents −16g.

3.3.8.Acceleration Data Packet

- **+RESP:GTACC,**

Example:
+RESP:GTACC,840501,863286020138401,,fffc00090059fffc000a005afffc000a0057fffb0008005afffd0009005afffb00070058fffc00090058fffb00090057fffd00090054fffc00080059fffc0008005cfffb00090059fffc00090058fffb0009005afffd00080058fffe00080056fffb00090058fffb00090059fffb00090055fffc00090057fffd0008005bfffb00080059fffd00080056fffb00080057fffd000a0059fffb0009005afffc00080058fffd0009005afff f00060058fff900080057fffd00090057fffe000a0057fffc000a0059fffb00090058fff900090059fffd00090058fffa0007005bfffc00090059fffd00080058fffe00090059fffa00090059fffc00090057fffc00090059fffa00090059fffe00090056fffc000a0057fffa0009005afffb00090058fffa0009005cfffb00090059fffc0009005afffc0009005afffa00090057fffd00090059fffb00090057fffc000b005afffb0008005bfffc00080059fffc0008005bfffa00090056fffc00080058fffd00090058fffc000a0056fffb00080059fffb0008005bfffd0009005afffd00090059fffc00090058fffd0009005afffb0009005afffb00090057fffd0009005cfffd00090057fffc00090059fffe0009005b,,,,20141226015738,0019$

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'	
Data	12*75	‘0’ – ‘9’ ‘a’ – ‘f’	

Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Data*>: There are 12*75 ASCII characters in the message with 12 characters as a group. The first 4 characters of these 12 characters represent X axis acceleration data, the middle 4 characters represent Y axis acceleration data and the last 4 characters are for Z axis acceleration data. The ASCII “0001” means HEX value “0x0001”, so the acceleration is 1. The ASCII “FFFD” means HEX value “0xFFFD” which is the compliment of -3, so the acceleration is -3.

Example:
+RESP:GTACC,310201,
868034001591584 ,000100010055… ,,,20120330120443,005C$
This is the oldest XYZ-axis acceleration data:
Conversion to hex format: X (axis acceleration data) = 0x0001; Y = 0x0001; Z = 0x0055;
Equal to decimal format: X (axis acceleration data) = 1; Y = 1; Z = 85;
+RESP:GTACC,310201, 868034001591584 , ffffff10052… ,,,20120330120443,005C$
This is the last XYZ-axis acceleration data:
Conversion to hex format: X (axis acceleration data) = 0xFFFF; Y = 0xFFF1; Z = 0x0052;
Equal to decimal format: X (axis acceleration data) = -1; Y = -15; Z = 82;

Note: Acceleration of gravity (+g) is 82 in decimal format and –g is -82. The acceleration data 1312 represents +16g and -1312 represents -16g.

3.3.9.Transparent Data Transmission

The device supports transparent data transfer to the backend server.

Data to the Backend Server

➢ **+RESP:GTDAT (Short Format),**

Example: +RESP:GTDAT,840501,863286020138401,,datatothebackendserver,20230411135049,0497$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	

Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Data to the Backend Server	<=245	(ASCII)(String)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

➢ **+RESP:GTDAT (Long Format),**

Example:
+RESP:GTDAT,840501,863286020138401,,1,,,datatothebackendserver,0,0.0,359,49.7,117.129416,31.839089,20230411055030,0460,0000,550B,B984,00,,,,,20230411135034,0495$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Report Type	1	0 - 4	
Reserved	0		
Reserved	0		
Data to the Backend Server	<=245	(ASCII)(String)	
GNSS Accuracy	1	0	
Speed	<=5	0.0 - 999.9(km/h)	
Azimuth	<=3	0 - 359	
Altitude	<=8	(-)XXXXX.X(m)	
Longitude	<=11	(-)-180 - 180	
Latitude	<=10	(-)-90 - 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	

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MNC	4	0XXX	
LAC	4	(HEX)	
Cell ID	4|8	(HEX)	
Reserved	2	00	00
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Report Type*>: The parameter that indicates where the data comes from.

- 0: Reserved.
- 1: **AT+GTDAT** from main serial port.
- 2: **AT+GTDAT** from Bluetooth.
- 3: **AT+GTDAT** from over the air.
- 4: **AT+GTDAT** triggered by events in **AT+GTUDF**.

3.3.10.CANBUS Device Information Report

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

➢ **+RESP:GTCAN,**

Example: **+RESP:GTCAN,690803,866775050984103,GV57MG,0,1,C00FFFFF,,0,,,,,,,,,0.00,,,,,,0000,,00,,,5,0.0,181,82.9,117.129364,31.839131,20221021074929,0460,0000,550B,B7B1,00,20221021165930,00FE$**			
Parameter	**Length (Byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Report Type	1	0|1|2	

CANBUS Device State	1	0|1	
CANBUS Report Mask	<=8	(HEX)	
VIN	17	'0' - '9' 'A' - 'Z' except 'I', 'O', 'Q'	
Ignition Key	1	0|1|2	
Total Distance	<=12	H(0 – 99999999)/I(0 – 2147483647)	
Total Fuel Used	<=9	0.00 – 999999.99l	
Engine RPM	<=5	0 – 16383 rpm	
Vehicle Speed	<=3	0 - 455Km/h	
Engine Coolant Temperature	<=4	-40 – +215 ℃	
Fuel Consumption	<=5	L/100km(0.0–999.9)|L/H(0.0–999.9)	
Fuel Level	<=7	L(0.00–9999.99)/P(0.00 – 100.00)	
Range	<=8	0 – 99999999hm	
Accelerator Pedal Pressure	<=3	0 – 100%	
Total Engine Hours	<=8	0.00 – 99999.99h	
Total Driving Time	<=8	0.00 – 99999.99h	
Total Engine Idle Time	<=8	0 .00 – 99999.99h	
Total Idle Fuel Used	<=9	0.00 – 999999.99l	
Axle Weight 2nd	<=5	0 – 65535kg	
Tachograph Information	<=4	(HEX)	
Detailed Information | Indicators	4	(HEX)	
Lights	2	(HEX)	
Doors	2	(HEX)	
Total Vehicle Overspeed Time	<=8	0.00 – 99999.99h	
Total Vehicle Engine Overspeed Time	<=8	0.00 – 99999.99h	

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CAN Report Expansion Mask	<=8	(HEX)	
Ad-Blue Level	<=3	0 – 100%	
Axle Weight 1st	<=5	0 – 65535kg	
Axle Weight 3rd	<=5	0 – 65535kg	
Axle Weight 4th	<=5	0 – 65535kg	
Tachograph Overspeed Signal	1	0|1	
Tachograph Vehicle Motion Signal	1	0|1	
Tachograph Driving Direction	1	0|1	
Analog Input Value	<=5	0 – 99999mv	
Engine Braking Factor	<=6	0 – 999999	
Pedal Braking Factor	<=6	0 – 999999	
Total Accelerator Kick-downs	<=6	0 – 999999	
Total Effective Engine Speed Time	<=8	0.00 – 99999.99h	
Total Cruise Control Time	<=8	0.00 – 99999.99h	
Total Accelerator Kick-down Time	<=8	0.00 – 99999.99h	
Total Brake Applications	<=6	0 – 999999	
Tachograph Driver 1 Card Number	<=40	0 – 9999999999	
Tachograph Driver 2 Card Number	<=40	0 – 9999999999	
Tachograph Driver 1 Name	<=40	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Tachograph Driver 2 Name	<=40	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Registration Number	<=40	0 – 9999999999	

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Expansion Information	4	(HEX)	
Rapid Brakings	<=6	0 – 999999	
Rapid Accelerations	<=6	0 – 999999	
Engine Torque	<=3	0 – 100%	
Reserved	0		
Reserved	0		
GNSS Accuracy	<=2	0 - 50	
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	(–)xxx.xxxxxx	
Latitude	<=10	(–)xx.xxxxxx	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4|8	XXXX/XXXXXXXX	
Reserved	2	00	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

✧ <*Report Type*>: A numeral to indicate the report type.
- 0: Periodical report
- 1: Real time request report
- 2: Ignition on/off report

✧ <*CANBUS Device State*>: A numeral to indicate the communication state with the external CANBUS device.
- 0: Abnormal. It fails to receive data from the external CANBUS device.
- 1: Normal. It is able to receive data from the external CANBUS device.

✧ <*CANBUS Report Mask*>: Please refer to <*CAN Report Mask*> in **AT+GTCAN**.

✧ <*VIN*>: Vehicle identification number.

✧ <*Ignition Key*>: A numeral to indicate the ignition status.
- 0: Ignition off.
- 1: Ignition on.

- 2: Engine on.

✧ <*Total Distance*>: Vehicle total distance. The number is always increasing. The unit is hectometer (H) or distance impulse (I) (if distance from dashboard is not available).

✧ <*Total Fuel Used*>: The number of liters of fuel used since vehicle manufacture or device installation. The unit is liter.

✧ <*Fuel Level*>: The level of fuel in vehicle tank. The unit is liter (L) or percentage (P).

✧ <*Range*>: The number of hectometers to drive on remaining fuel. The unit is hectometer.

✧ <*Vehicle Speed*>: The vehicle speed based on wheel. The unit is km/h.

✧ <*Engine RPM*>: The revolutions per minute. The unit is rpm.

✧ <*Accelerator Pedal Pressure*>: The unit is percentage.

✧ <*Engine Coolant Temperature*>: The unit is Celsius. Negative value is preceded by negative sign (-), e.g. “-2”. If the value is positive, no extra character is inserted, e.g. “20”.

✧ <*Fuel Consumption*>: The fuel consumption is calculated based on values read from vehicle. The unit is L/100Km(M) or L/H(H).

✧ <*Total Engine Hours*>: Time of engine running since vehicle manufacture or device installation. The unit is hour.

✧ <*Total Driving Time*>: Time of engine running (non-zero speed) since vehicle manufacture or device installation. The unit is hour.

✧ <*Total Engine Idle Time*>: Time of engine running during idling status (vehicle at rest) since vehicle manufacture or device installation. The unit is hour.

✧ <*Total Idle Fuel Used*>: The number of liters of fuel used since vehicle manufacture or device installation. The unit is liter.

✧ <*Axle Weight 2nd*>: Weight of vehicle’s second axle. The unit is kg.

✧ <*Tachograph Information*>: Two bytes. The high byte describes driver 2, while the low byte describes driver 1.

Each byte format:

V	R	W1	W0	C	T2	T1	T0

V: Validity mark (0 – valid driver data, 1 – no valid data)

R: Reserved

C: Driver card (1 – card inserted, 0 – no card inserted)

T2-T0: Driving time related states:

- 0: Normal / no limits reached.
- 1: 15min before 4½h.
- 2: 4½h reached.
- 3: 15min before 9h.
- 4: 9h reached.
- 5: 15minute before 16h (without 8h rest during the last 24h).
- 6: 16h reached.
- 7: Other limit.

W1-W0: Driver working states:

- 0: Rest - sleeping.
- 1: Driver available – short break.

- 2: Work – loading, unloading, working in an office.
- 3: Drive – behind the wheel.

✧ <*Detailed Information / Indicators*>: A hexadecimal number. Each bit contains information of one indicator.

- Bit 0: FL – fuel low indicator (1 – indicator on, 0 – indicator off).
- Bit 1: DS – driver seatbelt indicator (1 – indicator on, 0 – indicator off).
- Bit 2: AC – air conditioning (1 – on, 0 - off).
- Bit 3: CC – cruise control (1 – active, 0 - disabled).
- Bit 4: B – brake pedal (1 – pressed, 0 – released).
- Bit 5: C – clutch pedal (1 – pressed, 0 – released).
- Bit 6: H – handbrake (1 – pulled-up, 0 – released).
- Bit 7: CL – central lock (1 – locked, 0 – unlocked).
- Bit 8: R – reverse gear (1 – on, 0 – off).
- Bit 9: RL – running lights (1 – on, 0 – off).
- Bit 10: LB – low beams (1 – on, 0 – off).
- Bit 11: HB – high beams (1 – on, 0 – off).
- Bit 12: RFL – rear fog lights (1 – on, 0 – off).
- Bit 13: FFL – front fog lights (1 – on, 0 – off).
- Bit 14: D – doors (1 – any door opened, 0 – all doors closed).
- Bit 15: T – trunk (1 – opened, 0 – closed).

✧ <*Lights*>: A hexadecimal number. Each bit contains information of one type of light.

- Bit 0: Running Lights (1 – on, 0 – off).
- Bit 1: Low Beam (1 – on, 0 – off).
- Bit 2: High Beam (1 – on, 0 – off).
- Bit 3: Front Fog Light (1 – on, 0 – off).
- Bit 4: Rear Fog Light (1 – on, 0 – off).
- Bit 5: Hazard Lights (1 – on, 0 – off).
- Bit 6: Reserved.
- Bit 7: Reserved.

✧ <*Doors*>: A hexadecimal number. Each bit contains information of one door.

- Bit 0: Driver Door (1 – opened, 0 – closed).
- Bit 1: Passenger Door (1 – opened, 0 – closed).
- Bit 2: Rear Left Door (1 – opened, 0 – closed)
- Bit 3: Rear Right Door (1 – opened, 0 – closed).
- Bit 4: Trunk (1 – opened, 0 – closed).
- Bit 5: Hood (1 – opened, 0 – closed).
- Bit 6: Reserved.
- Bit 7: Reserved.

✧ <*Total Vehicle Overspeed Time*>: The total time when the vehicle speed is greater than the limit defined in CAN100's configuration.

✧ <*Total Vehicle Engine Overspeed Time*>: The total time when the vehicle engine speed is greater than the limit defined in CAN100's configuration.

✧ <*Ad-Blue Level*>: The level of Ad-Blue.

✧ <*Axle Weight 1st*>: Vehicle first axle weight. The unit is Kg.

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- <*Axle Weight 3rd*>: Vehicle third axle weight. The unit is Kg.
- <*Axle Weight 4th*>: Vehicle fourth axle weight. The unit is Kg.
- <*Tachograph Overspeed Signal*>: Vehicle overspeed signal from the tachograph.
  - 0: Overspeed is not detected.
  - 1: Overspeed is detected.
- <*Tachograph Vehicle Motion Signal*>: The vehicle motion signal in the tachograph.
  - 0: Motion is not detected
  - 1: Motion is detected.
- <*Tachograph Driving Direction*>: Vehicle driving direction from the tachograph.
  - 0: Driving forward.
  - 1: Driving backward.
- <*Analog Input Value*>: The value of analog input. The unit is mV.
- <*Rapid Brakings*>: The count of rapid brakings of the vehicle.
- <*Engine Braking Factor*>: It measures how often driver brakes with brake pedal or with engine and stores both counts (always increasing). Decreasing speed with no pedal pressed causes an increase in engine braking factor.
- <*Pedal Braking Factor*>: It measures how often driver brakes with brake pedal or with engine and stores both counts (which are always increasing). Decreasing speed with brake pedal pressed causes an increase in pedal braking factor.
- <*Total Accelerator Kick-downs*>: The count of accelerator pedal kick-downs (with the pedal pressed over 90%).
- <*Total Effective Engine Speed Time*>: Total time when the vehicle engine speed is effective. The unit is h.
- <*Total Cruise Control Time*>: Total time when vehicle speed is controlled by cruise-control module. The unit is h.
- <*Total Accelerator Kick-down Time*>: Total time when accelerator pedal is pressed over 90%. The unit is h.
- <*Total Brake Applications*>: The total number of braking processes initiated by brake pedal.
- <*Tachograph Driver 1 Card Number*>: The card number of tachograph driver 1.
- <*Tachograph Driver 2 Card Number*>: The card number of tachograph driver 2.
- <*Tachograph Driver 1 Name*>: The name of tachograph driver 1.
- <*Tachograph Driver 2 Name*>: The name of tachograph driver 2.
- <*Registration Number*>: The vehicle registration number.
- <*Expansion Information*>: A hexadecimal number. Each bit contains information of one indicator.
  - Bit 0: W – webasto (1 – on, 0 – off or not available).
  - Bit 1: BFL – brake fluid low indicator (1 – on, 0 – off or not available)
  - Bit 2: CLL – coolant level low indicator (1 – on, 0 – off or not available)
  - Bit 3: BAT – battery indicator (1 – on, 0 – off or not available)
  - Bit 4: BF – brake system failure indicator (1 – on, 0 – off or not available)
  - Bit 5: OP – oil pressure indicator (1 – on, 0 – off or not available)
  - Bit 6: EH – engine hot indicator (1 – on, 0 – off or not available)
  - Bit 7: ABS – ABS failure indicator (1 – on, 0 – off or not available)

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- Bit 8: Reserved.
- Bit 9: CHK – “check engine” indicator (1 – on, 0 – off or not available)
- Bit 10: AIR – airbag indicator (1 – on, 0 – off or not available)
- Bit 11: SC – service call indicator (1 – on, 0 – off or not available)
- Bit 12: OLL – oil level low indicator (1 – on, 0 – off or not available)

✧ <*Rapid Brakings*>: The number of total rapid brakings since installation (calculation based on CAN 100 settings of speed decrease time and value).

✧ <*Rapid Accelerations*>: The number of total rapid accelerations since installation (calculation based on CAN 100 settings of speed increase time and value).

✧ <*Engine Torque*>: The engine torque. Unit: percentage.

3.4. Heartbeat

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

➢ **+ACK:GTHBD,**

Example: **+ACK:GTHBD,840501,865083030004642,,20230718163021,252F$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

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

➢ **+SACK:GTHBD,**

Example: **+SACK:GTHBD,840501,11F0$** **+SACK:GTHBD,,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Count Number	4	(HEX)	

Tail Character	1	$	$

✧ <*Protocol Version*>: The device type and the protocol version that the backend server supports. This field is optional. The backend server could just send an empty field to decrease the length of the heartbeat data acknowledgement.

✧ <*Count Number*>: The backend server uses the <*Count Number*> extracted from the heartbeat package from the device as the <*Count Number*> in the server acknowledgement of the heartbeat.

3.5. Server Acknowledgement

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

➢ **+SACK:**

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

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

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4. HEX Format Report Message

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

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

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

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

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

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

4.1. HEX Report Mask

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

- **AT+GTHRM=**

Example: **AT+GTHRM=gv57,,,6F,00FE17BF,00FE17BF,0000F77D,EF,,007D,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 - 6	'0' - '9', 'a' - 'z', 'A' - 'Z'	gv57
Reserved	0		
Reserved	0		

+ACK Mask	<=2	(HEX)	6F
+RSP Mask	<=8	(HEX)	FE17BF
+EVT Mask	<=8	(HEX)	FE17BF
+INF Mask	<=8	(HEX)	777D
+HBD Mask	<=2	(HEX)	EF
Reserved	0		
+CRD Mask	<=4	0000-FFFF	7D
+CAN Mask	<=8	(HEX)	7FF
Reserved	0		
Reserved	0		
Serial Number	4	(HEX)	
Tail Character	1	$	$

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

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

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

Mask Bit	Item
Bit 31	Reserved
Bit 30	Reserved
Bit 29	Reserved
Bit 28	<*Driver ID Length / Driver ID*>
Bit 27	Reserved

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

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

Mask Bit	Item
Bit 31	Reserved

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Bit 30	*<Driver ID Length / Driver ID>*
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 in Use>*
Bit 18	*<Motion Status>*
Bit 17	*<Digital IO Status>*
Bit 16	Reserved
Bit 15	Reserved
Bit 14	Reserved
Bit 13	Reserved
Bit 12	*<External Power Voltage>*
Bit 11	*<Battery Level>*
Bit 10	*<Firmware Version>*
Bit 9	*<Protocol Version>*
Bit 8	*<Device Type>*
Bit 7	*<Length>*
Bit 6	*<Device Name>*
Bit 5	*<Count Number>*
Bit 4	*<Send Time>*
Bit 3	*<MCC / MNC / LAC / Cell ID / Reserved>*
Bit 2	*<Altitude>*
Bit 1	*<Azimuth>*

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Bit 0	<*Speed*>

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

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

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

Mask Bit	Item
Bit 15	Reserved
Bit 14	**+RESP:GTRSV**
Bit 13	Reserved
Bit 12	Reserved
Bit 11	Reserved
Bit 10	Reserved

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Bit 9	**+RESP:GTBTI**
Bit 8	Reserved
Bit 7	Reserved
Bit 6	**+RESP:GTCML**
Bit 5	Reserved
Bit 4	Reserved
Bit 3	Reserved
Bit 2	Reserved
Bit 1	Reserved
Bit 0	**+RESP:GTGSV**

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

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

✧ <*+CRD Mask*>: Component mask of the crash data packet.

Mask Bit	Item
Bit 15	Reserved
Bit 14	Reserved
Bit 13	Reserved
Bit 12	Reserved
Bit 11	Reserved
Bit 10	Reserved
Bit 9	Reserved

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Bit 8	Reserved
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	*< Device Name>*
Bit 0	*<Length>*

✧ *<+CAN Mask>*: Component mask of the CANBUS Information packet in HEX format.

Mask Bit	Item
Bit 31	Reserved
Bit 30	Reserved
Bit 29	Reserved
Bit 28	Reserved
Bit 27	Reserved
Bit 26	Reserved
Bit 25	Reserved
Bit 24	Reserved
Bit 23	Reserved
Bit 22	Reserved
Bit 21	Reserved
Bit 20	Reserved
Bit 19	Reserved
Bit 18	Reserved
Bit 17	Reserved
Bit 16	Reserved
Bit 15	Reserved
Bit 14	Reserved

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Bit 13	Reserved
Bit 12	Reserved
Bit 11	Reserved
Bit 10	*<Firmware Version>*
Bit 9	*<Protocol Version>*
Bit 8	*<Device Type>*
Bit 7	*<Length>*
Bit 6	*<Device Name>*
Bit 5	*<Count Number>*
Bit 4	*<Send Time>*
Bit 3	*<Network Data>*
Bit 2	*<Altitude>*
Bit 1	*<Azimuth>*
Bit 0	*<Speed>*

- Bit 3 for *<Network Data>*, including *<MCC>*, *<MNC>*, *<LAC>*, *<Cell ID>* and the *<Reserved>*

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

➢ **+ACK:GTHRM,**

Example: **+ACK:GTHRM, 840501,135790246811220,,0019,20230214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Serial Number	4	(HEX)	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	(HEX)	
Tail Character	1	$	$

4.2. Acknowledgement +ACK

➢ **+ACK,**

Example: **2B 41 43 4B 04 7F 24 84 02 00 01 08 56 30 38 00 00 00 00 00 00 00 C4 07 E4 0B 18 08 03 19 00 89 C6 A9 0D 0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	(+ACK)	+ACK
Message Type	1	(HEX)	
Report Mask	1	(HEX)	
Length	1	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
ID	1	0 - 31	
Serial Number	2	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

Command	**ID**
AT+GTBSI	0
AT+GTSRI	1
AT+GTQSS	2
Reserved	3
AT+GTCFG	4
AT+GTTOW	5
AT+GTEPS	6
AT+GTDIS	7
AT+GTOUT	8
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
AT+GTDAT	23
AT+GTOWH	24
AT+GTDOG	25
Reserved	26
AT+GTJDC	27
AT+GTIDL	28
AT+GTHBM	29
AT+GTHMC	30
Reserved	31
Reserved	32
Reserved	33
AT+GTWLT	34
AT+GTHRM	35
AT+GTFFC	36
AT+GTJBS	37
AT+GTSSR	38
Reserved	39

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Reserved	40
Reserved	41
AT+GTIGM	42
AT+GTIDA	43
Reserved	44
AT+GTPDS	45
AT+GTCRA	46
Reserved	…
AT+GTRMD	53
AT+GTPEO	54
Reserved	…
AT+GTCAN	57
Reserved	…
AT+GTCMD	61
AT+GTUDF	62
Reserved	63
Reserved	64
AT+GTGAM	65
Reserved	…
AT+GTOEX	68
AT+GTIEX	69
AT+GTUPC	70
AT+GTCLT	71
Reserved	…
AT+GTASC	79
Reserved	80
AT+GTFVR	81
AT+GTSVR	82
Reserved	…
AT+GTBTS	89

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Reserved	90
AT+GTVVS	91
AT+GTAVS	92
AT+GTGDO	93
Reserved	…
AT+GTVMS	102
AT+GTBAS	103
Reserved	…
AT+GTBID	109
Reserved	…
AT+GTAEX	116
Reserved	…
AT+GTBDI	130

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

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

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

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

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

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

✧ <*Checksum*>: The CRC16 checksum of data between the fields of <Message Header> and <Checksum> (exclude <Message Header> and <Checksum>).

4.3. Location Report +RSP

Location report messages including **+RESP:GTTOW**, **+RESP:GTEPS**, **+RESP:GTFRI**, **+RESP:GTSPD**, **+RESP:GTRTL**, **+RESP:GTDOG**, **+RESP:GTIGL**, **+RESP:GTVGL**, **+RESP:GTIOB** , **+RESP:GTDIS , +RESP:GTAIS** and **+RESP:GTHBM** use the format below. For the message **+RESP:GTEPS**, the <External Power Voltage> field will always be present regardless of the <+RSP Mask> setting. For the message **+RESP:GTSPD**, the <Speed> field will always be present regardless of the <+RSP Mask> setting. For the message **+RESP:GTHBM**, the <Speed> and <Azimuth> fields will always be present regardless of the <+RSP Mask> setting.

➢ **+RSP,**

Example:
2B 52 53 50 01 04 FE 1F FF 00 63 84 02 00 01 0D 56 31 33 00 00 00 00 00 62 2F B4 80 01 16 0B 00 01 01 00 00 00 00 00 00 0E 07 3C 8E 64 01 DB B2 E9 07 E4 0C 16 07 1B 11 04 60 00 02 18 77 00 00 87 90 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 1E 00 07 E4 0C 16 07 1B 11 00 12 EB F8 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	(+RSP)	+RSP
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	

Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Report ID / Report Type	1	(HEX)	
Number	1	1	
GNSS Accuracy	1	0 - 50	
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
Reserved	1	00	
Current Mileage	3	0.0 - 65535.0(km)	
Total Mileage	5	0.0 - 4294967.0(km)	
Current Hour Meter Count	3	(HHMMSS)	
Total Hour Meter Count	6	(HHHHHHHHMMSS)	
CSQ RSSI	1	0 - 31|99	
CSQ BER	1	0 - 7|99	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

Message	ID
Reserved	0
+RESP:GTTOW	1
Reserved	2
+RESP:GTLBC	3
+RESP:GTEPS	4
+RESP:GTDIS	5
+RESP:GTIOB	6
+RESP:GTFRI	7
Reserved	8
+RESP:GTSPD	9
+RESP:GTSOS	10
+RESP:GTRTL	11
+RESP:GTDOG	12
Reserved	13
+RESP:GTAIS	14
+RESP:GTHBM	15
+RESP:GTIGL	16
+RESP:GTIDA	17
+RESP:GTERI	18
…...	…...
+RESP:GTGIN	20
+RESP:GTGOT	21
…...	…...
+RESP:GTVGL	26

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

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

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

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

- < *Battery Level* >: Before battery percentage is detected, this field is reported as FF.
- <*Input Status*>: The mask of digital input1 and the external power state.

Input Status Mask	**ID**
Ignition Detection	0x01
digital input 1	0x02
Reserved	
Reserved	
……	……
Digital Input6	0x40
Main Power	0x80

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

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

- <*Motion Status*>: The current motion status of the device. 0x1A is a state which is before 0x16 state.
- <*Satellites in Use*>: The number of satellites being used for tracking. The high nibble is reserved and the low nibble is valid.
- <*Report ID / Report Type*>: The high nibble is for <*Report ID*> and the low nibble is for <*Report Type*>.
- <*Speed*>: 3 bytes in total. The first 2 bytes are for the integer part of the speed and the last byte is for the fractional part. The fractional part has 1 digit.
- <*Longitude*>: The longitude of the current position. 4 bytes in total. The device

converts the longitude to an integer with 6 implicit decimals and reports this integer in HEX format. If the value of the longitude is negative, it is represented in 2's complement format.

Longitude 121.390847	121390847			
HEX	07	3C	46	FF

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

Latitude 31.164503	31164503			
HEX	01	DB	88	57

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

✧ <*GNSS UTC Time*>: The UTC time obtained from the GNSS chip. 7 bytes in total. The first 2 bytes are for year, and the remaining 5 bytes are for month, day, hour, minute and second respectively.

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

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

Current Mileage	0		0
HEX	00	00	00

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

Total Mileage	0				0
HEX	00	00	00	00	00

✧ <*Current Hour Meter Count*>: 3 bytes in total. The first is the hour part, the secondary byte is the minute part, and the third byte is the second part.

Current Hour Meter Count	0	0	0
HEX	00	00	00

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

Total Hour Meter Count	0	0	0

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

Note: If the <*Current Hour Meter Count*> reach the maximum, hour meter count will be reset to 0.

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

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

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

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

➢ **+RSP,**

Example:
2B 52 53 50 03 04 FE 1F FF 00 6A 84 02 00 01 08 56 30 38 00 00 00 00 00 FF 2F 9C 81 00 22 0A 00 70 17 62 15 58 15 6F 01 01 00 00 00 00 EA 00 10 07 3C 8C F3 01 DB B2 43 07 E4 0B 18 08 05 09 04 60 00 02 18 77 00 00 87 90 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 1B 00 07 E4 0B 18 08 05 09 00 8C 1D FE 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	(+RSP)	+RSP
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	

Satellites in Use	1	0 - 15	
Report ID / Report Type	1	(HEX)	
Number Length / Number Type	1	(HEX)	
Phone Number	<=10	(Call Number)	
Number	1	1	
GNSS Accuracy	1	0 - 50	
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
Reserved	1	00	00
Current Mileage	3	0.0 - 65535.0(km)	
Total Mileage	5	0.0 - 4294967.0(km)	
Current Hour Meter Count	3	(HHMMSS)	
Total Hour Meter Count	6	(HHHHHHHHMMSS)	
CSQ RSSI	1	0 - 31|99	
CSQ BER	1	0 - 7|99	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

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

✧ <*Phone Number*>: No more than 10 bytes. In each byte, the high nibble and low nibble are used to represent one digit of the phone number respectively. If there is no digit for the last low nibble to represent, fill it with 0xF.

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

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

➢ **+RSP,**

Example:
2B 52 53 50 0A 04 FE 1F FF 00 63 84 02 00 01 08 56 30 38 00 00 00 00 00 FF 2F 7C 81 00 21 0A 10 01 01 00 00 00 00 3B 00 0F 07 3C 8D 3E 01 DB B2 5F 07 E4 0B 18 08 06 0B 04 60 00 02 18 77 00 00 87 90 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 19 00 07 E4 0B 18 08 06 0B 00 90 3F 3C 0D 0A

Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	(+RSP)	+RSP
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	

Satellites in Use	1	0 - 15	
Report ID / Report Type	1	(HEX)	
Reserved	1	00	
Number	1	1	
GNSS Accuracy	1	0 - 50	
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
Reserved	1	00	
Current Mileage	3	0.0 - 65535.0(km)	
Total Mileage	5	0.0 - 4294967.0(km)	
Current Hour Meter Count	3	(HHMMSS)	
Total Hour Meter Count	6	(HHHHHHHHMMSS)	
CSQ RSSI	1	0 - 31|99	
CSQ BER	1	0 - 7|99	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

➢ **+RSP,**

Example:
2B 52 53 50 12 00 FE 17 BF 00 00 80 00 00 67 84 03 04 03 0B 56 37 55 04 03 3C 39 04 11 7A 80 00 41 00 10 04 00 08 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 04 60 00 00 5B 83 01 99 26 1A 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 07 E6 04 0C 07 30 07 00 AA EE 11 0D 0A

Parameter		Length(byte)	Range/Format	Default
Message Header		4	(+RSP)	+RSP
Message Type		1	(HEX)	
Report Mask		4	(HEX)	
ERI Mask		4	(HEX)	
Length		2	(Length)	
Device Type		1	84|89	
Protocol Version		2	(HEX)	
Firmware Version		2	(HEX)	
Unique ID		8	(IMEI|Device Name)	
Battery Level		1	(0 - 100(%)|FF)	
External Power Voltage		2		
Input Status		1	00 - 0F	
Digital Output Status		1	00 - 03	
Device Status		1	11|12|21|22|41|42|16|1A	
Satellites in Use		1	0 - 15	
Report ID / Report Type		1	(HEX)	
RAT and Band Data (Optional)	RAT	1	0 - 3	
	Band	2	0-39|850|900|1800|1900	
Bluetooth Accessory Data (Optional)	Bluetooth Accessory Number	1	0 - 10	
	Index	1	0 - 9	
	Accessory Type	1	0|6|8	

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	Accessory Model	1	0	
	Raw Data	1	(HEX)	
	Accessory Append Mask	2	(HEX)	
	Accessory Name	<=20	(ASCII)	
	Accessory MAC	6	(HEX)	
	Accessory Status	1	0|1	
	Accessory Battery Level	2	0 - 5000(mV)	
	Accessory Temperature	1	-40 – 80℃	
	Accessory Humidity	1	0 - 100 rh	
	Relay Config Result	1	0-4	
	Relay State	1	0|1	
Number		1	1 - 15	
GNSS Accuracy		1	0 - 50	
Speed		3	0.0 - 999.9(km/h)	
Azimuth		2	0 - 359	
Altitude		2		
Longitude		4	(-180 - 180)	
Latitude		4	(-90 - 90)	
GNSS UTC Time		7	(YYYYMMDDHHMMSS)	
MCC		2	0000 - 0FFF	
MNC		2	0000 - 0FFF	
LAC		2	(HEX)	
Cell ID		4	(HEX)	
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)	

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CSQ RSSI	1	0 - 31|99	
CSQ BER	1	0 - 7|99	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

- <*RAT*>: Radio Access Technology.
  - 0: NOSERVICE mode
  - 1: EGPRS mode
  - 2: LTE Cat M1 mode
  - 3: LTE Cat NB 2 mode
- <*Band*>: 0 means invalid band, 1-39 means band number and others mean GSM number.
- <Bluetooth Accessory Number>: It indicates the number of Bluetooth accessories connected with the device.
- <Index>: The index of the Bluetooth accessory.
- <Accessory Type>: The type of the Bluetooth accessory.
- <Accessory Model>: The model of the Bluetooth accessory.
- <Raw Data>: The data is read from Bluetooth accessory. It varies depending on <Accessory Type> and <Accessory Model>.
- <Accessory Name>: The name of the Bluetooth accessory. It ends with 0x00.
- <Accessory MAC>: The MAC address of the Bluetooth accessory.
- <Accessory Status>: A numeral to indicate whether the accessory is available.
  - 0: The accessory is not available.
  - 1: The accessory is available.
- <Accessory Battery Level>: The battery voltage of the Bluetooth accessory.
- <Accessory Temperature>: Temperature data of the Bluetooth accessory.
- <Accessory Humidity>: The real time humidity detected by the sensor. If <Accessory Type> is 6, <Accessory Humidity> will be present.
- <Relay Configuration Result>: The number representing the response result of the relay.
  - 0: Configuration updated successfully.
  - 1: Error in connecting.
  - 2: The current password is incorrect.
  - 3: Password update error.
  - 4: Relay open or close error.

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<Relay state>: The current state of the WRL300 sensor

Note: The item denoted with “optional” means the item is controlled by the parameter *<ERI Mask>*.

Location report messages **+RESP:GTGIN** and **+RESP:GTGOT** use below format.

➢ **+RSP,**

Example: **2B 52 53 50 15 04 FE 1F FF 00 6C 84 02 00 01 08 56 30 38 00 00 00 00 00 FF 2F 6C 81 00 21 09 01 01 00 00 00 00 00 00 00 01 01 01 00 00 00 00 3B 00 0F 07 3C 8D 3E 01 DB B2 5F 07 E4 0B 18 08 09 11 04 60 00 02 18 77 00 00 87 90 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 1A 00 07 E4 0B 18 08 09 11 00 94 EF 44 0D 0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	(+RSP)	+RSP
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Area Type	1	0|1	
Group Mask	1	01 - 1F	
GEO ID Group	8	0000000000000001 - 00000000000FFFFF	
Number	1	1	
GNSS Accuracy	1	0 - 50	

Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
Reserved	1	00	00
Current Mileage	3	0.0 - 65535.0(km)	
Total Mileage	5	0.0 - 4294967.0(km)	
Current Hour Meter Count	3	(HHMMSS)	
Total Hour Meter Count	6	(HHHHHHHHMMSS)	
CSQ RSSI	1	0 - 31|99	
CSQ BER	1	0 - 7|99	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

- <*Area Type*>: 0 means “Polygon GEO-Fence”, and 1 means “Circular GEO-Fence”.
- <*Group Mask*>: The bitwise mask to indicate the reported <*GEO ID Group*>. For GV57MG, only Bit 0 is valid and it should be 1.
- <*GEO ID Group*>: The bitwise mask for trigger condition composition of the corresponding GEO ID. For GV57MG, only the lowest 20 bits are valid. Each bit, from Bit 0 to Bit 19, represents the logic status of the corresponding GEO ID to trigger the entering or exiting event. 1 means that the event of the GEO ID set is triggered and 0 means the event of the GEO ID set is not triggered.

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

➢ **+RSP,**

Example: **2B 52 53 50 11 04 FE 1F FF 00 6C 84 01 00 01 08 56 30 38 00 00 00 00 00 FF 2F 6C 81 00 21 09 01 01 00 00 00 00 00 00 00 01 01 01 00 00 00 00 3B 00 0F 07 3C 8D 3E 01 DB B2 5F 07 E4 0B 18 08 09 11 04 60 00 02 18 77 00 00 87 90 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 1A 00 07 E4 0B 18 08 09 11 00 94 EF 44 0D 0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	(+RSP)	+RSP
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Report ID / Report Type	1	(HEX)	
ID Length	1	0 – 28	
ID	<=28	ASCII (not including '=' and ',')	
ID Report Type	1	1|2	
Number	1	1	
GNSS Accuracy	1	0 - 50	
Speed	3	0.0 - 999.9(km/h)	

Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
Reserved	1	00	00
Current Mileage	3	0.0 - 65535.0(km)	
Total Mileage	5	0.0 - 4294967.0(km)	
Current Hour Meter Count	3	(HHMMSS)	
Total Hour Meter Count	6	(HHHHHHHHMMSS)	
CSQ RSSI	1	0 - 31|99	
CSQ BER	1	0 - 7|99	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

- ✧ *<ID>*: The ID that is currently read.
- ✧ *<ID Report Type>*: The type of reported ID.
  - 1: The ID is authorized.
  - 2: The ID has logged out.

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**, **+RESP:GTGSV**, **+RESP:GTBTI** and **+RESP:GTRSV**. These messages use the same format as shown below. However, only **+RESP:GTINF** includes all the items while others only include information related to themselves.

- **+INF,**

Example:
2B 49 4E 46 01 7F FF 40 01 00 95 56 30 38 00 00 00 00 00 84 02 00 01 08 01 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 81 00 00 21 00 0A 00 07 E4 0B 18 08 03 19 00 01 00 7F 00 00 1E 00 02 58 00 00 00 90 2F 9C 00 00 FF 89 86 00 C0 09 16 F7 01 82 38 19 00 00 00 00 16 20 18 1F 27 19 14 1A 00 0A 26 1D 1D 16 24 C3 12 0C 12 28 1C 17 00 14 00 03 13 10 00 C1 00 C2 00 45 00 50 13 4F 00 46 1B 44 00 49 00 00 07 E4 0B 18 08 03 19 00 8A A9 47 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	(+INF)	+INF
Message Type	1	(HEX)	
Report Mask	2	(HEX)	
INF Expansion Mask	2	(HEX)	
Length	2	(Length)	
Unique ID	8	(IMEI|Device Name)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Hardware Version	2	(HEX)	**+RESP:GTVER**
Reserved	2	0000	
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	

Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Reserved	1	00	
Motion Status	1	11|12|21|22|41|42|16|1A	**+RESP:GTGPS**
Reserved	1	00	
Satellites in Use	1	0 - 15	
Power Saving Enable / OWH Mode / Outside Working Hours	1	(HEX)	
Last Fix UTC Time	7	(YYYYMMDDHHMMSS)	
Reserved	1	00	
FRI Discard No Fix	1	0|1	
Response Report Item Mask	2	(HEX)	
IGN Interval	3	5 - 86400(sec)	
IGF Interval	3	0|5 - 86400(sec)	
Reserved	2	0000	
Reserved	1	00	
External Power Supply / Backup Battery On / Charging / LED State / Backup Battery Charge Mode	1	(HEX)	**+RESP:GTBAT**
External Power Voltage	2	0 - 99999(mV)	
Backup Battery Voltage	2	0 - 4200(mV)	
Backup Battery Level	1	(0 - 100(%)|FF)	
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	(HEX)	**+RESP:GTTMZ**
Time Zone Offset	2	(HHMM)	
SV Count	1	0 - 24	**+RESP:GTGSV**
SV ID	1	0 - 99	

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SV Power	1	0 - 51	
…...			
SV ID	1	0 - 99	
SV Power	1	0 - 51	
CAN100 Car Model ID	2	(HEX)	**+RESP:GTCML**
CAN100 Car Name Length	1	0 - 50	
CAN100 Car Name	<=50		
CAN100 Sync Status	1	0 - 4	
Bluetooth Name	<=20	(ASCII)	**+RESP:GTBTI**
Bluetooth MAC Address	6	000000000000 – FFFFFFFFFFFF	
Bluetooth State	1	0|1	
Connected Device Number	1	0 – 11	
Connected Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Connected Device MAC	6	000000000000 – FFFFFFFFFFFF	
Role	1	0|1	
Real-Time State	1	0 - 1	
Ghost Battery Percentage	1	0 - 100	
Ghost Status	2	0000-FFFF	
Reserved	2	0000	
SV Count	1	0 - 32	**+RESP:GTRSV**
SV ID	1	(>=0)	
SV Power	1	(>=0)	
…...			
SV ID	1	(>=0)	
SV Power	1	(>=0)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	

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Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

Message	ID
+RESP:GTINF	1
+RESP:GTGPS	2
+RESP:GTCID	4
+RESP:GTCSQ	5
+RESP:GTVER	6
+RESP:GTBAT	7
+RESP:GTIOS	8
+RESP:GTTMZ	9
Reserved	10
+RESP:GTGSV	11
…...	…...
+RESP:GTRSV	21
…...	…...
+RESP:GTBTI	24
+RESP:GTCML	26

✧ <*Report Mask*>: Please refer to Bit 0 – Bit 15 of <+*INF Mask*> in **AT+GTHRM**.

✧ <*Expansion Mask*>: Please refer to Bit 16 – Bit 31 of <+*INF Mask*> in **AT+GTHRM**.

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

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

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

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

- <*Power Saving Enable / OWH Mode / Outside Working Hours*>: The highest bit, bit 7 is reserved, bit 5 and bit 6 are for <*Power Saving Enable*>, bit 4 and bit 3 are for <*OWH Mode*>, and bit 2 is for <*Outside Working Hours*>. Bit 0 is reserved. <*Outside Working Hours*> is used to indicate whether the device is currently outside working hours. 1 means “Outside working hours”.
- <*External Power Supply / Backup Battery On / Charging / LED State / Backup Battery Charge Mode*>: The highest bit, or Bit 7, is for <*Main Supply*> which indicates whether the external power supply is connected to the device. Bit 6, which is for <*Backup Battery On*>, indicates whether the backup battery is working. Bit 5 is for <*Charging*>, indicating whether the backup battery is currently charging. Bit 4 is for <*LED State*>, indicating at least one LED indicator is either flashing or steady on when it is 1 and all LED indicators are off when it is 0. Bit 0 and Bit 1 is for <*Backup Battery Charge Mode*>.
- <*ICCID*>: ICCID is a 20-digit string. In the HEX format message, every 4 bits are used to represent one digit of the 20 digits of the ICCID.

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

- <*Time Zone Offset Sign / Daylight Saving Enable*>: Bit 1 is for <*Daylight Saving Enable*> which indicates whether the daylight saving function is currently enabled. Bit 0 is for <*Time Zone Offset Sign*> which indicates the positive or negative offset of the local time from UTC. 1 means “Negative offset”.
- <*Cell Number*>: The number of cells. It also indicates the number of cell information groups. One cell information group consists of MCC, MNC, LAC, and Cell ID.

4.5. Event Report +EVT

Event report messages including **+RESP:GTPNA**, **+RESP:GTPFA**, **+RESP:GTSTT**, **+RESP:GTPDP**, **+RESP:GTJDR**, **+RESP:GTIDN**, **+RESP:GTSTR**, **+RESP:GTSTP, +RESP:GTLSP and +RESP:GTDRM** and **+RESP:GTBDL** use the format below. For the message **+RESP:GTSTT**, the <Motion Status> field will always be present regardless of the <+EVT Mask> setting.

- **+EVT,**

Example: **2B 45 56 54 09 00 FE 17 FF 00 5F 84 02 00 01 08 56 30 38 00 00 00 00 00 2F 9C 80 00 41 0B 01 00 00 00 00 01 0B 00 0D 07 3C 8C F8 01 DB B2 4D 07 E4 0B 18 07 3B 01 04 60 00 02 18 77 00 00 87 90 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 07 E4 0B 18 07 3B 02 00 82 3F 9D 0D 0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**

Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	

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Total Hour Meter Count	6	(HHHHHHHHMMSS)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

Message	ID
+RESP:GTPNA	1
+RESP:GTPFA	2
+RESP:GTMPN	3
+RESP:GTMPF	4
Reserved	5
+RESP:GTBPL	6
+RESP:GTBTC	7
+RESP:GTSTC	8
+RESP:GTSTT	9
Reserved	10
Reserved	11
+RESP:GTPDP	12
+RESP:GTIGN	13
+RESP:GTIGF	14
+RESP:GTUPD	15
+RESP:GTIDN	16
+RESP:GTIDF	17
+RESP:GTDAT	18
Reserved	19
+RESP:GTJDR	20
+RESP:GTGSS	21

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Reserved	22
+RESP:GTSTR	23
+RESP:GTSTP	24
+RESP:GTCRA	25
Reserved	26
+RESP:GTDOS	27
+RESP:GTGES	28
+RESP:GTLSP	29
Reserved	30
Reserved	31
+RESP:GTJDS	32
+RESP:GTRMD	33
+RESP:GTDRM	34
……	……
+RESP:GTUPC	40
+RESP:GTCLT	41
……	……
+RESP:GTVGN	45
+RESP:GTVGF	46
+RESP:GTASC	47
……	……
+RESP:GTBCS	52
+RESP:GTBDS	53
……	……
+RESP:GTBAA	65
Reserved	66
+RESP:GTBID	67
……	……
+RESP:GTSVR	73
……	……

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+RESP:GTBIE	77
+RESP:GTBDL	78
+RESP:GTBKS	79
…...	…...

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

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

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

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

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

- ➢ **+EVT,**

Example:
2B 45 56 54 0D 00 FE 17 FF 00 63 84 02 00 01 08 56 30 38 00 00 00 00 00 00 00 81 00 21 09 00 00 00 8C 01 00 00 00 00 00 3B 00 0F 07 3C 8D 3E 01 DB B2 5F 07 E4 0B 18 08 11 34 04 60 00 02 18 77 00 00 87 90 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 07 E4 0B 18 08 11 34 00 A4 22 8B 0D 0A

Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	

Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Duration of Ignition On or Ignition Off	4	0 - 999999(sec)	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	

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Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

- **+EVT,**

Example:
2B 45 56 54 06 00 FE 17 FF 00 61 84 02 00 01 08 56 30 38 00 00 00 00 00 00 00 00 00 11 0A 0E 2D 01 00 00 00 00 00 3B 00 0F 07 3C 8D 3E 01 DB B2 5F 07 E4 0B 18 08 14 2E 04 60 00 02 18 77 00 00 87 90 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 07 E4 0B 18 08 14 2F 00 B1 E5 F4 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Backup Battery Voltage	2	0 - 4200(mV)	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	

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Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

- **+EVT,**

Example:
2B 45 56 54 14 00 FE 17 FF 00 60 84 02 00 01 08 56 30 38 00 00 00 00 00 B5 11 80 00 42 00 02 01 00 00 05 01 00 97 00 29 07 3C 8F 12 01 DB B1 84 07 E4 0B 18 08 2F 30 00 00 00 00 00 00 00 00 00 00 00 00 00 01 00 00 00 00 02 00 00 00 00 00 00 00 00 00 07 E4 0B 18 10 30 13 60 B5 70 C1 0D 0A

Parameter	Length (byte)	Range / Format	Default
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	

Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Supply Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Jamming Net	1	1 - 3	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

- **+EVT,**

Example:
2B 45 56 54 20 00 FE 17 FF 00 61 84 02 00 01 08 56 30 38 00 00 00 00 00 B4 6F 80 00 41 00 01 02 01 00 00 01 05 00 7D FF 4A 07 3C 94 96 01 DB AE 30 07 E4 0B 18 09 09 16 04 60 00 00 00 00 01 83 99 1B 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 07 E4 0B 18 11 0F 2F 60 E2 4A FF 0D 0A

Parameter	Length (byte)	Range / Format	Default
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Supply Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Jamming Status	1	1|2	

Jamming Net	1	1 - 3	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

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

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

➢ **+EVT,**

Example: **2B 45 56 54 2D 00 FE 17 FF 00 66 84 02 00 01 08 47 56 35 37 4D 47 00 00 30 1C 80 00 22 0F 00 00 04 00 00 05 C5 01 00 00 00 00 01 2B 00 0B 07 3C 8E 22 01 DB B2 64 07 E4 0B 17 09 2D 36 04 60 00 02 18 77 00 00 87 90 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 07 E4 0B 17 0A 0A 1E 00 4C 34 C6 0D 0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Reserved	2	0000	
Report Type	1	0 - 5|7	
Duration of Ignition On or Ignition Off	4	0 - 999999(sec)	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	

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GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

- **+EVT,**

Example:
2B 45 56 54 0F 00 FE 17 BF 00 62 84 02 00 01 06 56 37 55 04 03 18 3A 08 00 00 00 00 41 0A 00 C9 01 01 00 00 00 00 00 46 00 11 07 3C 8C E7 01 DB B1 F6 07 E4 0B 18 05 3B 09 04 60 00 02 18 77 00 00 87 90 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 07 E4 0B 18 05 3B 0A 00 10 93 EB 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	

Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Code	2	100 - 103|110 - 113|170 - 173|200 - 203|210 - 213|270 - 272|300 - 303|310 - 313|370 - 373	
Retry	1	0 - 3	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

The event report message **+RESP:GTIDF** uses the format below. For this message, the *<Device Status>* field will always be present regardless of the *<+EVT Mask>* setting.

- **+EVT,**

Example:
2B 45 56 54 11 00 FE 17 FF 00 63 84 02 00 01 08 56 30 38 00 00 00 00 00 2F 7C 82 00 11 0B 00 00 00 30 01 00 00 00 00 01 1D 00 03 07 3C 8D 59 01 DB B2 32 07 E4 0B 18 08 1F 10 04 60 00 02 18 77 00 00 87 90 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 07 E4 0B 18 08 1F 10 00 C3 63 56 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16	

		|1A	
Satellites in Use	1	0 - 15	
Duration of Idling	4	0 - 999999(sec)	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

The event report message **+RESP:GTGSS** uses the format below. For this message, the <Satellites in Use> field will always be present regardless of the <+EVT Mask> setting.

- **+EVT,**

Example:
2B 45 56 54 15 00 FE 17 FF 00 64 84 02 00 01 08 56 30 38 00 00 00 00 00 B5 51 80 00 42 08 01 00 00 00 00 01 00 00 01 05 00 7D FF 4A 07 3C 94 96 01 DB AE 30 07 E4 0B 18 09 09 16 04 60 00 00 5B 5D 01 83 99 1B 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 07 E4 0B 18 11 10 1C 60 E5 B6 AC 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
GNSS Signal Status	1	0|1	
Reserved	4	00000000	00000000
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	

MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

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

➢ **+EVT,**

Example:
**2B 45 56 54 1B 00 FE 17 FF 00 61 84 02 00 01 08 56 30 38 00 00 00 00 00 00 00 01 00 42 00 01 01 01 00 00 00 00 00 00 00

Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Supply Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Wave1 Output ID	1	1|2	
Wave1 Ouptut Active	1	0|1	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	

Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

- **+EVT,**

Example:
2B 45 56 54 1C 00 FE 17 FF 00 6B 84 02 00 01 08 56 30 38 00 00 00 00 00 2F A4 80 00 41 08 00 00 01 15 00 00 01 F4 00 00 00 0A 01 01 00 00 00 00 79 FF A2 07 3C 90 F2 01 DB B0 BF 07 E4 0B 18 09 15 05 04 60 00 02 18 77 00 00 87 90 00 00 00 04 00 00 00 00 05 00 00 00 00 00 00 00 00 00 07 E4 0B 18 09 15 05 00 DF BB 8B 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Supply Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Trigger GEO ID	2	0 - 19	
Trigger GEO Enable	1	0|1	
Trigger Mode	1	0|21|22	
Radius	4	50 - 6000000(m)	

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Check Interval	4	0|5 - 86400(sec)	
Number	1	1	
GNSS Accuracy	1	0 - 50	
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

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

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

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

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

- **+EVT,**

Example: **2B 45 56 54 21 00 FE 17 FF 00 60 84 02 00 01 08 56 30 38 00 00 00 00 00 2F 8C 80 00 42 00 01 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 04 60 00 00 18 77 00 00 87 90 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 07 E2 01 01 00 00 03 00 D5 38 3B 0D 0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Supply Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Roam State	1	0 - 3	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	

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GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

- **+EVT,**

Example:
2B 45 56 54 28 00 FE 17 FF 00 98 84 02 00 01 08 47 56 35 37 4D 47 00 00 30 44 80 00 11 0F 00 00 64 68 74 74 70 3A 2F 2F 31 38 30 2E 31 36 39 2E 32 33 35 2E 32 30 32 3A 39 30 35 36 2F 47 56 35 37 4D 47 2F 67 76 35 37 6D 67 2D 31 31 32 33 5F 61 74 2E 84 6E 84 00 01 00 00 00 00 01 2B 00 0B 07 3C 8E 22 01 DB B2 64 07 E4 0B 17 09 2D 36 04 60 00 02 18 77 00 00 87 90 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 07 E4 0B 17 0A 05 35 00 49 82 28 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	

Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Command ID	1	0 - 999	
Result	2	100 - 103|200 - 202|300 - 302|304 - 306	
Download URL	<=101	(URL)	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
Reserved	1	00	00
Current Mileage	3	0.0 - 65535.0(km)	
Total Mileage	5	0.0 - 4294967.0(km)	

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Current Hour Meter Count	3	(HHMMSS)	
Total Hour Meter Count	6	(HHHHHHHHMMSS)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

- <*Command ID*>: The command ID in the update configuration file. It is always 0 before the device starts to update the configuration. It indicates the total number of commands when the response code is 301. It indicates the ID of the command in wrong format when the response code is 302. It is 0 when the response code is 304, 305 or 306.
- <*Result*>: A numeral to indicate whether the configuration is updated successfully.
  - 100: The update command is starting.
  - 101: The update command is confirmed by the device.
  - 102: The update command is refused by the device.
  - 103: The update process is refused because the battery is low.
  - 200: The device starts to download the package.
  - 201: The device finishes downloading the package successfully.
  - 202: The device fails to download the package.
  - 300: The device starts to update the device configuration.
  - 301: The device finishes updating the device configuration successfully.
  - 302: The device fails to update the device configuration.
  - 303: Reserved.
  - 304: Reserved.
  - 305: The update process is interrupted by abnormal reboot.
  - 306: The update process is interrupted by MD5 verification error.
- <*Download URL*>: The complete URL to download the configuration. It includes the file name and ends by 0x00.

The event report message **+RESP:GTBCS** and **+RESP:GTBDS** uses the format below.

- **+EVT,**

Example:
2B 45 56 54 34 00 FE 17 BF 00 7B 84 03 08 03 1A 56 54 57 00 2B 47 62 05 2F 5C 80 00 21 0F 0D 03 47 56 35 37 4D 47 5F 42 54 2D 31 00 60 A4 23 51 41 C0 00 00 57 6F 07 39 DD 98 01 00 00 00 00 00 B7 00 34 07 3B A1 26 01 DB 83 9F 07 E6 07 0C 09 28 29 04 60 00 00 18 05 00 00 47 32 00 00 00 01 00 00 00 00 01 01 3B 28 00 00 00 01 3B 28 07 E6

07 0C 09 28 2A 0C F3 E6 1F 0D 0A			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+EVT	+EVT
Message Type	1	(HEX)	
Report Mask	4	00000000 – FFFFFFFF	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device Name	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in Use	1	0 – 15	
Bluetooth Report Mask	2	0000 – FFFF	
Bluetooth Name	<=20	(ASCII)	
Bluetooth MAC Address	6	000000000000 – FFFFFFFFFFFF	
Peer Role	1	0|1	
Reserved	1	00	00
Peer MAC Address	6	000000000000 – FFFFFFFFFFFF	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9 km/h	
Azimuth	2	0 – 359	

Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	4	00000000 – FFFFFFFF	
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	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

✧ *<Bluetooth Name>*: The name of the device for Bluetooth identification. It ends with 0x00.

The event report message **+RESP:GTCRA** uses the format as follows.

➢ **+EVT,**

Example:
2B 45 56 54 19 00 FE 17 BF 00 62 84 03 08 03 1A 56 54 57 00 2B 47 62 05 2F 6C 80 00 22 0A 4C 00 01 01 00 00 00 00 00 B7 00 34 07 3B A1 26 01 DB 83 9F 07 E6 07 0C 09 2E 39 04 60 00 00 18 05 00 00 47 32 00 00 00 01 00 00 00 00 01 02 05 37 00 00 00 02 05 37 07 E6 07 0C 09 2E 39 0C FB 95 81 0D 0A

Parameter	**Length (byte)**	**Range/Format**	**Default**

Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Digital Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Device Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Crash Counter	1	0x00 – 0xFF	
Trigger Degrees	1	0 - 180	
Engine Status	1	0 - 1	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
Reserved	1	00	00

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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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	Send Time
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

- <*Crash Counter*>: The parameter that indicates the crash sequence. It combines the report of **+RESP:GTCRA** and **+RESP:GTCRD** into one crash event. It rolls from 0x00 to 0xFF.
- <*Trigger Degrees*>: The parameter that indicates the degrees before and after a crash event.
- <*Engine Status*>: “0” means engine is turn off, “1” means engine is turn on.

The event report message **+RESP:GTASC** uses the format as follows.

- **+EVT,**

Example:
2B 45 56 54 2F 06 FE 1F FF 00 CA 84

03 08 03 1A 56 54 57 00 2B 47 62 05 2F 6C 80 00 22 0A 59 02 D5 02 57 0A 26 F6 4E 01 00 00 00 00 00 A6 00 27 07 3C 8D 8B 01 DB B2 40 07 E4 07 1B 08 0B 36 00 01 00 01 00 01 01 A2 D0 01 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 01 20 7F FF FF 4C 53 56 4E 59 34 31 5A 30 42 32 35 32 31 38 39 34 02 00 00 00 00 00 00 00 32 38 06 A9 00 28 00 37 FE 1E B3 00 00 00 57 28 00 00 00 43 14 00 00 0F 78 00 20 00 00 03 5C 40 00 00 02 F3 2B 00 00 00 84 15 00 00 1D 0C 2D 11 0D 00 23 86 4A 3F 1F 00 00 00 06 26 00 00 00 15 3D 07 E4 07 1B 08 0B 38 01 8F BA 91 0D 0A

Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	

Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Digital Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Device Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
X_Forward	1	-100 - 100	
Y_Forward	1	-100 - 100	
Z_Forward	1	-100 - 100	
X_Side	1	-100 - 100	
Y_Side	1	-100 - 100	
Z_Side	1	-100 - 100	
X_Vertical	1	-100 - 100	
Y_Vertical	1	-100 - 100	
Z_Vertical	1	-100 - 100	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	

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Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

The event report message **+RESP:GTBKS** uses the format as follows.

- **+EVT,**

Example:
2B 45 56 54 4F 00 FE 17 FF 00 5F 84 02 00 01 08 56 30 38 00 00 00 00 00 2F 9C 80 00 41 0B 01 11 22 33 44 55 66 01 00 00 00 00 01 0B 00 0D 07 3C 8C F8 01 DB B2 4D 07 E4 0B 18 07 3B 01 04 60 00 02 18 77 00 00 87 90 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 07 E4 0B 18 07 3B 02 00 82 3F 9D 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	

Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 - 15	
Keyfob(s) Detecting Status	1	0 - 2	0
Registered Accessory MAC	6	(HEX)	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 - 999.9(km/h)	
Azimuth	2	0 - 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	
MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	

Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

- **+EVT,**

Example:
2B 45 56 54 12 00 FC 1F BF 00 75 84 03 08 03 1A 56 54 57 00 2B 47 62 05 2F 6C 80 00 22 0A 00 17 64 61 74 61 74 6F 74 68 65 62 61 63 6B 65 6E 64 20 73 65 72 76 65 72 01 00 00 00 00 01 58 00 5C 06 FB 40 A5 01 E5 D3 D1 07 E3 04 0B 06 16 26 04 60 00 00 55 0B B9 84 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 07 E3 04 0B 0E 16 28 05 2C 86 12 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 – 15	
Data Length	2	(HEX)	
Data	<=245	(HEX)	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9(km/h)	

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Azimuth	2	0 – 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 – 0FFF	
MNC	2	0000 – 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

✧ <*Data Length*>: The parameter that indicates the length of the <*Data*> parameter.

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

➢ **+EVT,**

Example:
2B 45 56 54 49 00 FE 17 BF 00 73 84 03 08 03 1A 56 34 54 04 3A 2C 5B 01 10 CA 80 00 41 07 01 38 43 46 36 38 31 0B 70 00 00 00 00 00 00 00 00 00 00 00 01 00 00 00 01 00 2C 00 3C 07 3B A1 A6 01 DB 83 ED 07 E6 07 0C 0C 18 13 04 60 00 00 18 05 00 00 91 63 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 07 E6 07 0C 0C 21 2E 00 0B F7 F5 0D 0A

Parameter	Length	Range/Format	Default

	(byte)		
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 – 15	
SVR Working State	1	0|1|2	
Ghost Device MAC Broadcast	6	(HEX)	
SVR Appending Length	1	(HEX)	
SVR Appending Information	<=15	(HEX)	
Reserved	1	00	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9 (km/h)	
Azimuth	2	0 – 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 - 0FFF	

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MNC	2	0000 - 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(HEX)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

✧ <*SVR Working State*>: The parameter that indicates the status in which the **+RESP:GTSVR** alert message is generated.
- 0: GV57MG loses connection with the Ghost device.
- 1: GV57MG regains connection with the Ghost device normally.
- 2: GV57MG fails to match the Ghost device during installation phase.

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

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

➢ **+EVT,**

Example:
2B 45 56 54 41 00 FC 1F BF 00 75 84 03 08 03 1A 56 54 57 00 2B 47 62 05 2F 6C 80 00 22 0A 00 17 64 61 74 61 74 6F 74 68 65 62 61 63 6B 65 6E 64 20 73 65 72 76 65 72 01 00 00 00 00 01 58 00 5C 06 FB 40 A5 01 E5 D3 D1 07 E3 04 0B 06 16 26 04 60 00 00 55 0B B9 84 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 07 E3 04 0B 0E 16 28 05 2C 86 12 0D 0A

Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	

Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 – 15	
Index	1	0 - 9	
Accessory Type	1	0|6|13	
Accessory Model / Beacon ID Model	1	0|4	
Alarm Type	1	(HEX)	
Append Mask	2	0000 – FFFF	
Accessory Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Accessory MAC	6	(HEX)	
Accessory Status	1	0 | 1	
Accessory Battery Level	2	0 - 5000(mV)	
Accessory Temperature	1	-40 - 80(℃)	
Accessory Humidity	1	0-100%(rh)	
Relay Config Result	1	0-4	
Relay State	1	0-1	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9(km/h)	

Azimuth	2	0 – 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 – 0FFF	
MNC	2	0000 – 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

- **+EVT,**

Example:
2B 45 56 54 43 00 FC 1F BF 00 75 84 02 00 03 1A 56 54 57 00 2B 47 62 05 2F 6C 80 00 22 0A 00 17 64 61 74 61 74 6F 74 68 65 62 61 63 6B 65 6E 64 20 73 65 72 76 65 72 01 00 00 00 00 01 58 00 5C 06 FB 40 A5 01 E5 D3 D1 07 E3 04 0B 06 16 26 04 60 00 00 55 0B B9 69 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 07 E3 04 0B 0E 16 28 05 2C 86 12 0D 0A

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

Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 – 15	
Beacon Number	1	0 – 15	
Beacon ID Model	1	0|3|4	
Accessory Append Mask	2	(HEX)	
Accessory MAC	6	'0' – '9' 'A' – 'F'	
Accessory Battery Level	2	0 – 5000(mV)	
Accessory Signal Strength	1	-120 - 0	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9(km/h)	
Azimuth	2	0 – 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 – 0FFF	
MNC	2	0000 – 0FFF	

LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

- <*Accessory Model*>: The model of the Bluetooth beacon accessory which is defined in the **AT+GTBID** command.
- <*Accessory Append Mask*>: Bitwise mask defined in the **AT+GTBID** command to indicate the reported Bluetooth beacon accessory data fields.
  - Bit 0: Reserved.
  - Bit 1: <*Accessory Mac*>
  - Bit 2: Reserved
  - Bit 3: <*Accessory Battery Level*>
  - Bit 4: Reserved
  - Bit 5: Reserved
  - Bit 6: <*Accessory Signal Strength*>.
- <*Accessory MAC*>: Bluetooth beacon accessory MAC address.
- <*Accessory Battery Level*>: The voltage of Bluetooth beacon accessory.
- <*Accessory Signal Strength*>: The signal strength of the Bluetooth beacon accessory. If the value of the signal strength is negative, it is represented in 2's complement format.

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

- **+EVT,**

Example: **2B 45 56 54 4D 00 FC 1F BF 00 75 84 02 00 03 1A 56 54 57 00 2B 47 62 05 2F 6C 80 00 22 0A 00 17 64 61 74 61 74 6F 74 68 65 62 61 63 6B 65 6E 64 20 73 65 72 76 65 72 01 00 00 00 00 01 58 00 5C 06 FB 40 A5 01 E5 D3 D1 07 E3 04 0B 06 16 26 04 60 00 00 55 0B B9 69 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00 00 00 07 E3 04 0B 0E 16 28 05 2C 86 12 0D 0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	(+EVT)	+EVT
Message Type	1	(HEX)	
Report Mask	4	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Battery Level	1	(0 - 100(%)|FF)	
External Power Voltage	2	0 - 99999(mV)	
Input Status	1	00 - C3	
Digital Output Status	1	00 - 01	
Motion Status	1	11|12|21|22|41|42|16|1A	
Satellites in Use	1	0 – 15	
Detected Count	2	0 - 9999	
Total Frame	1	1 - 4	
Frame Index	1	1 - 4	
Beacon Number	1	0 – 30	
Beacon ID Model	1	0|3|4	
Accessory Append Mask	2	(HEX)	
Accessory MAC	6	'0' – '9' 'A' – 'F'	
Accessory Battery Level	2	0 – 5000(mV)	
Accessory Signal Strength	1	-120 - 0	
Number	1	1	

GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9(km/h)	
Azimuth	2	0 – 359	
Altitude	2	((-)XXXXX(m))	
Longitude	4	(-180 - 180)	
Latitude	4	(-90 - 90)	
GNSS UTC Time	7	(YYYYMMDDHHMMSS)	
MCC	2	0000 – 0FFF	
MNC	2	0000 – 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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)	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

- **+EVT,**

Example:
2B4556542900FC1FFF006B690705071147423133304D4700FF2FED4105000000C000003F003F00000008010000000000000044073BA1AB01DB835607E70C06061F05046000005B6400D0525C00000000000000000000000000000000000007E70C06062114071381C70D0A

Parameter	Length (Byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	(HEX)	
Length	2		
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	IMEI/Device Name	
Battery Level	1	0 – 100	
External Power Supply Voltage	2		
Input Status	1	00 - C3	
Digital Output Status	1	00 – 01ss	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in Use	1	0-0x0F	
Group ID	1	00 – 19	
Alarm Mask 1	4	00000000 – FFFFFFFF	
Alarm Mask 2	4	00000000 – FFFFFFFF	
Alarm Mask 3	4	00000000 – FFFFFFFF	
Number	1	1	
GNSS Accuracy	1	0|1 - 50	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		

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GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – 0FFF	
MNC	2	0000 – 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
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	
Driver ID Length	1	0 - 8	
Driver ID	<=4	(HEX)	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	(HEX)	
Checksum	2	(HEX)	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

- <*Group ID*>: The ID of CANBUS alarm group. The CANBUS alarm function supports settings of a total of 20 groups.
- <*Alarm Mask 1*>: The alarm mask is configured in a bitwise manner. The alarm mask information is based on <*Detailed Information / Indicators*> of the **+RESP:GTCAN** message.
- <*Alarm Mask 2*>: The alarm mask is configured in a bitwise manner. The alarm mask information is based on <*Lights*> and <*Doors*> of the **+RESP:GTCAN** message.
- <*Alarm Mask 3*>: The alarm mask is configured in a bitwise manner. The alarm mask information is based on <*Engine RPM*> of the **+RESP:GTCAN** message.

4.6. Heartbeat Data +HBD

➢ **+HBD,**

Example: **2B 48 42 44 FF 20 84 02 00 01 08 47 56 35 37 4D 47 00 00 07 E4 0B 17 0A 24 1C 00 5B 7A 14 0D 0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**

Message Header	4	(+HBD)	+HBD
Report Mask	1	(HEX)	
Length	1	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

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

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

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

If the mask of <*UID*> in the <*+HBD Mask*> of **AT+GTHRM** is set to 0, the heartbeat message will not report device name or IMEI information. If the mask of <*UID*> is set to 1, then the heartbeat message will report device name or IMEI information according to the mask of <*Device Name*> in <*+HBD Mask*> of **AT+GTHRM**.

4.7. Advanced Version Information +ATI

Advanced version information includes information of the fields such as <*Firmware Version*>, <*Hardware Version*>, <*Modem Firmware Version*>, <*Modem Hardware*

Version>, etc. as shown in the blue part of the following table.

➢ **+ATI,**

Example: **2B 41 54 49 00 2D 84 02 00 01 0C 56 34 54 04 07 37 3E 05 00 04 30 81 01 0C 03 01 01 01 01 02 FA 07 E3 05 06 0E 30 0F 01 AC 3E 94 0D 0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+ATI	+ATI
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	0000 - FFFF	
Firmware Version	2	0000 - FFFF	
Unique ID	8	IMEI	
ATI Mask	4	00000000 - FFFFFFFF	
Firmware Version	2	0000 - FFFF	
MCU Version	2	0000 - FFFF	
Modem Firmware *Version*	2	0000 - FFFF	
Hardware Version	2	0000 - FFFF	
Modem Hardware Version	2	0000 - FFFF	
Sensor ID	1	00 - FF	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 - FFFF	
Checksum	2	0000 - FFFF	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

✧ <*ATI Mask*>: This mask is set by the **AT+GTRTO** command. It indicates the parameter fields included in the **+ATI** message.

4.8. Crash Data Packet +CRD

+CRD,

Example:
2B435244007D04D8840501040556545700 2B3C0A030506030104B0FFF600020046FF F5FFFF004DFFF60001004CFFF4FFFF004EFFF40002004CFFF60002004CFFF600010 046FFF5FFFF004AFFF70001004CFFF70000004AFFF50001004CFFF700030049FFF70 001004AFFF400010046FFF400030049FFF50001004AFFF700020049FFF60000004AF FD6FFFB005C00160011003800060 00B0041FFF400030049FFECFFFA0056FFE8FFFC 0057FFE6FFFA0057FFF3FFFF0044FFFB0003003EFFFF00070039FFFC0008003FFFF C0001004AFFF3FFFF004EFFF3FFFF004CFFF7000300460016FFF60057001DFFE800 560040FFD30053000CFFD7005FFFEEFFDF0057FFE8FFE8005C00D5000E00DB0073 FFDA005F0026001E0074FFF7000B003FFFEC002D004FFFD1000D004CFFD0001600 68FFFC0049FFEAFFF9FFFC003EFFE9FFFF0003FFFCFFFF004FFFF9FFFC0038FFF 8FFFB0049FFFCFFF20039FFF100000062FFE9FFFC004AFFEC0009004AFFF4FFF80 053FFF10003004EFFEC0003004AFFF40006003FFFF70009003EFFF700030043FFF80 0030046FFDB000D0063FFF000090039FFFF00070035FFFB00010039FFF3FFFC0056F FF3FFFC0056FFF3FFF80057FFECFFFF0053000800130044FFE6FFFC004CFFE60003 0049FFEEFFFB0041FFFC0001005AFFF3FFFB0057FFF8FFFC004FFFF70001004CFF FCFFFC004EFFFCFFFF0041FFF9000700460003FFEA004CFFFC0003004AFFFC000B 0045FFF7FFF3004AFFFBFFFB004CFFF70013003FFFF60001004EFFF7FFFF0053FFF 30007004CFFFC00030043FFF70003004CFFF70000004AFFF8FFFF004CFFF20003004 EFFF9FFFC004CFFFAFFFF004EFFF70003004CFFEF000C0046001FFFD9004300010 0000045FFF3FFFF004F0005000C0049FFE6FFEA004FFFFB00090045FFF900030045F FEC0028004FFFF6FFE8004FFFF00003004DFFDB002A0061FFFFFFF2004CFFE9001 6005AFFD100330045FFEC00510049FFFF0003FF6B0008001300410042003500 0A000 4000300460008FFF000610012FFFA00530004FFFC004F000E0008004E0006FFFC004 D000A0003004FFFE2FFF6002E001600090056FFFCFFFF005600120001004A0001FFF 800460001FFFF0048000AFFF8004F0001FFF60053000CFFFC004F0004FFF8004E001 3FFFF004C000A0001004C0006FFFF004E0008FFFF004C0008FFFF004C0009FFFF00 4A0008FFFC004C0008FFFC004C0009FFFC004E0008FFFF00490008FFFA004A0008F FFF004C000AFFFC004A0008FFFC004D0008FFFC004C0008FFFC004C000AFFFB004 CFE9BFFC401A2000FFFF6003F000D000300530006FFFB004E000AFFFC004D0008F FFF004C0008FFFF004C0008FFFC004C0009FFFB004C0009FFFC004C0009FFFA004 D0008FFFA004C0008FFFA004C000AFFFA004C0008FFF8004C000AFFFB004C0008F FFC004C0008FFFB004C0008FFFB004A000AFFFC004C000CFFF10045FFDA0044003 8000CFFFC0049FFFCFFEB00670008FFF40045000AFFEF0056000AFFF8004F000FFF FA00530008FFF8004E0006FFF8004F0006FFF7004D0008FFF8004A0005FFF8004E00 01FFF0004F000AFFFA004E0005FFFA0049000FFFF00046000AFFF000430012FFF000 49FFDD000E00380015FFD1003E000AFFE0004AFFBD002D001BFFD0FFB700060039 001600D40018FFCB004CFFFC004C00E9000CFFC2002E07E6070C0B19270A1F229F 0D0A

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

Report Mask	2	(HEX)	
Length	2	(Length)	
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Crash Counter	1	(HEX)	
Data Type	1	00 - 7F	
Total Frame	1	1 - 8	
Frame Number	1	1 - 8	
Data Length	2	0 - 1200	
Data	<=1200	'0'-'9' 'a'-'f'	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

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

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

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

Device Name	**G**	**V**	**5**	**0**	**0**			
HEX	**47**	**56**	**35**	**30**	**30**	**00**	**00**	**00**

- <*Data Type*>: A hexadecimal parameter to indicate the time of the data (before crash or after crash) and crash direction (+X, -X, +Y, -Y, +Z, -Z or several of them). Please

refer to the following table for the detailed syntax.

Bits	Description	Range
Bit 0	0: before crash 1: after crash	0-1
Bit 1	0: X-axis crash not detected 1: X-axis crash detected	0-1
Bit 2	0: X-axis positive direction 1: X-axis negative direction	0-1
Bit 3	0: Y-axis crash not detected 1: Y-axis crash detected	0-1
Bit 4	0: Y-axis positive direction 1: Y-axis negative direction	0-1
Bit 5	0: Z-axis crash not detected 1: Z-axis crash detected	0-1
Bit 6	0: Z-axis positive direction 1: Z-axis negative direction	0-1
Bit 7	Fixed value	0

- <*Total Frame*>: The total number of the messages that are sent to the backend server for the crash event.
- <*Frame Number*>: A numeral to indicate the sequence of the current message.
- <*Data*>: There are 1200 bytes in one frame at most which includes acceleration samples in 2 seconds at most. 6 bytes are as a group. The first 2 bytes of these 6 bytes represent X axis acceleration data, the middle 2 bytes represent Y axis acceleration data and the last 2 bytes are for Z axis acceleration data. And they are two's complement.

4.9. Acceleration Data Packet +ACC

+ACC,

Example:

2B 41 43 43 84 03 02 56 34 54 04 3A 2C 5B 01 00 51 FF FF 00 01 00 51 FF FF FF FF 00 4E FF FF FF FF 00 4E FF FD 00 01 00 51 FF FF FF FF 00 4E FF FF FF FF 00 4E FF FF FF FF 00 4E FF FF FF FF 00 4E FF FF FF FF 00 51 FF FE FF FF 00 51 FF FE FF FF 00 51 FF FC FF FF 00 51 FF FF FF FF 00 51 FF FF 00 01 00 4E FF FF FF FF 00 4E FF FC FF FF 00 4E FF FF FF FF 00 51 FF FC FF FF 00 4E FF FE FF FF 00 4E FF FC FF FF 00 51 FF FF FF FF 00 4E FF FF FF FF 00 51 FF FC FF FF 00 4E FF FF FF FF 00 4E FF FF FF FF 00 51 FF FE 00 01 00 51 FF FF FF FF 00 51 FF FF FF FF 00 4E FF FE 00 01 00 51 FF FC FF FF 00 4E FF FD FF FD 00 51 FF FF FF FF 00 4F FF FA FF FD 00 51 FF FE FF FF 00 51 FF FF FF FF 00 51 FF FC FF FF 00 51 FF FF FF FF 00 4E FF FF FF FF 00 51 FF FF FF FF 00 51 FF FC 00 01 00 51 FF FF FF FF 00 51 FF FF FF FF 00 51 FF FF FF FF 00 4E FF FE FF FF 00 51 FF FF FF FF 00 4E FF FF FF FF 00 51 FF FF FF FF 00 4E FF FC FF FF 00 51 FF FF FF FF 00 51 FF FF FF FF 00 51 FF FF FF FF 00 4E FF FF FF FD 00 51 FF FC FF FF 00 51 FF FC FF FF 00 51 FF FE 00 01 00 4E FF FB 00 01 00 4E FF FE FF FF 00 4F FF FF FF FF 00 4E FF FF 00 01 00 51 FF FC FF FF 00 51 FF FD 00 01 00 51 FF FD FF FF 00 51 FF FF 00 01 00 4E FF FF FF FF 00 51 FF FF 00 01 00 51 FF FF FF FF 00 4E FF FF FF FF 00 51 FF FC FF FF 00 4F FF FD 00 01 00 4E FF FC FF FF 00 4E FF FC FF FD 00 4E FF FF FF FF 00 51 FF FF FF FF 00 51 FF FF FF FF 00 51

FF FF 00 01 07 E6 03 18 0A 2E 21 01 FF 83 39 0D 0A			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	(+ACC)	+ACC
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Unique ID	8	(IMEI|Device Name)	
Data	6*75	'0' – '9' 'A' – 'F'	
Send Time	7	(YYYYMMDDHHMMSS)	
Count Number	2	(HEX)	
Checksum	2	(Checksum)	
Tail Characters	2	(0x0D 0x0A)	(0x0D 0x0A)

✧ <*Data*>: There are 6*75 bytes in one frame at most which includes acceleration samples in 2 seconds at most. 6 bytes are as a group. The first 2 bytes of these 6 bytes represent X axis acceleration data, the middle 2 bytes represent Y axis acceleration data and the last 2 bytes are for Z axis acceleration data. And they are two's complement.

4.10. CANBUS Device Information Report

The CANBUS device information report message **+RESP:GTCAN** uses the format below.

➢ **+CAN,**

| **Example:**
**2B43414E01000007FF009D690705071147423133304D47000000C00FFFFF000000000

Length	2		
Device Type	1	84|89	
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	IMEI	
Distance Type / Report Type	1	X(0-1)X(0-2)	
CANBUS Device State	1	0|1	
CANBUS Report Mask	4	(HEX)	
VIN	17		
Ignition Key	1	0|1|2	
Total Distance	4	0 – 99999999	
Total Fuel Used	5	0.00 – 999999.99	
Engine RPM	2	0 – 16383 rpm	
Vehicle Speed	2	0 - 455Km/h	
Engine Coolant Temperature	2	-40 – +215 ℃	
Fuel Consumption	3	L/100km(0.0–999.9)|L/H(0.0–999.9)	
Fuel Level (Liter)	5	L(0.00 – 9999.99)	
Fuel Level (Percentage)	5	P(0.00 – 100.00	
Range	4	0 – 99999999hm	
Accelerator Pedal Pressure	2	0 – 100%	
Total Engine Hours	5	0.00 – 9999999.99h	
Total Driving Time	5	0.00 – 9999999.99h	
Total Engine Idle Time	5	0.00 – 9999999.99h	
Total Idle Fuel Used	5	0.00 – 999999.99l	
Axle Weight 2nd	2	0 – 65535kg	
Tachograph Information	2	(HEX)	
Detailed Information | Indicators	2	(HEX)	

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Lights	1	(HEX)	
Doors	1	(HEX)	0
Total Vehicle Overspeed Time	5	0 – 9999999.99h	
Total Vehicle Engine Overspeed Time	5	0 – 9999999.99h	
Total Distance Impulses	4	0– 2147483648	
CANBUS Report Expansion Mask	4	(HEX)	
Ad-Blue Level	2	0-100%	
Axle Weight 1st	2	0 – 65535kg	
Axle Weight 3rd	2	0 – 65535kg	
Axle Weight 4th	2	0 – 65535kg	
Tachograph Overspeed Signal	1	0|1	
Tachograph Vehicle Motion Signal	1	0|1	
Tachograph Driving Direction	1	0|1	
Analog Input Value	4	0-99999mv	
Engine Braking Factor	4	0 – 4278190079	
Pedal Braking Factor	4	0 – 4278190079	
Total Accelerator Kick-downs	4	0-999999	
Total Effective Engine Speed Time	5	0.00 – 9999999.99h	
Total Cruise Control Time	5	0.00 – 9999999.99h	
Total Accelerator Kick-down Time	5	0.00 – 9999999.99h	
Total Brake Applications	4	0-999999	
Tachograph Driver 1 Card Number	<=40	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	

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Tachograph Driver 2 Card Number	<=40	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Tachograph Driver 1 Name	<=40	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Tachograph Driver 2 Name	<=40	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Registration Number	<=40	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Expansion Information	2	(HEX)	
Rapid Brakings	4	0-16711679	
Rapid Accelerations	4	0-16711679	
Engine Torque	1	0–100%	
GNSS Accuracy	1	0 - 50	
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – 0FFF	
MNC	2	0000 – 0FFF	
LAC	2	(HEX)	
Cell ID	4	(HEX)	
Reserved	1	00	00
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	(HEX)	
Checksum	2	(HEX)	
Tail Character	2	0x0D 0x0A	0x0D 0x0A

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

Message	**ID**
+RESP:GTCAN	1

✧ <*Report Mask*>: Please refer to <*+CAN Mask*> in **AT+GTHRM**.

✧ <*Length*>: The length of the whole message from header to the tail characters.

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

IMEI	13	57	90	24	68	11	22	0
HEX	0D	39	5A	18	44	0B	16	00

If Bit 6 of <+*CAN Mask*> is 1, the device name is used as the unique ID of the device. Please refer to <*Device Name*> in **AT+GTCFG** for the device name. Device name is an 8-byte string. If the length of <*Device Name*> is more than 8 bytes, the device will only acquire the first 8 bytes. In the Hex format message, each byte is encoded into one byte as an integer. If the device name is less than 8 bytes, the remaining bytes are set to 0.

Device Name	G	B	1	3	0	M	G	
HEX	47	42	31	33	30	4D	47	00

✧ <*Distance Type / Report Type*>: The high nibble is for <*Distance type*> and the low nibble is for <*Report Type*>.

Distance type has two meanings below.

- 0: Total distance acquired from CAN Chipset
- 1: Total distance obtained by calculation with GNSS

Report type has three meanings as follows.

- 0: Periodic report
- 1: RTO CAN report
- 2: Ignition event report

✧ <*CANBUS Device State*>: A numeral to indicate the state of communication with the external CANBUS device.

- 0: Abnormal. It fails to receive data from the external CANBUS device.
- 1: Normal. It is able to receive data from the external CANBUS device.

✧ <*CANBUS Report Mask*>: Please refer to <*CAN Report Mask*> in **AT+GTCAN**.

✧ <*VIN*>: Vehicle identification number.

✧ <*Total Distance*>: Vehicle distance. The number is always increasing. The unit is hectometer. If it is set to 0, the distance is not available.

✧ <*Total Fuel Used*>: A total of 5 bytes. The first 4 bytes are for the integer part of the total fuel used and the last byte is for the fractional part. The fractional part has 2 digits.

✧ <*Engine Coolant Temperature*>: The engine coolant temperature of the vehicle. 2 bytes in total. If this value is negative, it is represented in 2's complement format.

✧ <*Fuel Level (Liter)*>: 5 bytes in total. The first 4 bytes are for the integer part of the fuel level (liters) and the last byte is for the fractional part. The fractional part has 2 digits. This field is controlled by Bit 8 in <*CANBUS Report Mask*>.

✧ <*Fuel Level (Percentage)*>: 5 bytes in total. The first 4 bytes are for the integer part of the fuel level (percentage) and the last byte is for the fractional part. The fractional part has 2 digits. This field is controlled by Bit 8 in <*CANBUS Report Mask*>.

✧ <*Fuel Consumption*>: 3 bytes in total. The first byte indicates the unit. The unit L/100km is represented as FE, and the unit L/H is represented as FF. The other two

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bytes indicate the value. The fuel consumption value is converted to an integer with 1 implicit decimal digit by multiplying it by 10 and the integer is reported in HEX format.

Fuel Consumption Value 12.1	**121**	
HEX	**00**	**79**

- <*Total Engine Hours*>: 5 bytes in total. The first 4 bytes are for the integer part of the total engine hours and the last byte is for the fractional part. The fractional part has 2 digits.
- <*Total Driving Time*>: 5 bytes in total. The first 4 bytes are for the integer part of the total driving time and the last byte is for the fractional part. The fractional part has 2 digits.
- <*Total Engine Idle Time*>: 5 bytes in total. The first 4 bytes are for the integer part of the total engine idle time and the last byte is for the fractional part. The fractional part has 2 digits.
- <*Total Idle Fuel Used*>: 5 bytes in total. The first 4 bytes are for the integer part of the total idle fuel used and the last byte is for the fractional part. The fractional part has 2 digits.
- <*Tachograph Information*>: Two bytes. The high byte describes driver 2, and the low byte describes driver 1.

Each byte format:

V	R	W1	W0	C	T2	T1	T0

V: Validity mark (0 – valid driver data, 1 – no valid data)

R: Reserved

C: Driver card (1 – card inserted, 0 – no card inserted)

T2-T0: Driving time related states:

- 0: Normal / no limits reached.
- 1: 15min before 4½h.
- 2: 4½h reached.
- 3: 15min before 9h.
- 4: 9h reached.
- 5: 15 minutes before 16h (without 8h rest during the last 24h).
- 6: 16h reached.
- 7: Other limit.

W1-W0: Driver working states:

- 0: Rest - sleeping.
- 1: Driver available – short break.
- 2: Work – loading, unloading, working in an office.
- 3: Driver – behind the wheel.

- <*Detailed Information / Indicators*>: 2 bytes in total. Each bit contains information of one indicator.
  - Bit 0: FL – fuel low indicator (1 – indicator on, 0 – off).
  - Bit 1: DS – driver seatbelt indicator (1 – indicator on, 0 – indicator off).
  - Bit 2: AC – air conditioning (1 – on, 0 - off).
  - Bit 3: CC – cruise control (1 – active, 0 - disabled).

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- Bit 4: B – brake pedal (1 – pressed, 0 – released).
- Bit 5: C – clutch pedal (1 – pressed, 0 – released).
- Bit 6: H – handbrake (1 – pulled-up, 0 – released).
- Bit 7: CL – central lock (1 – locked, 0 – unlocked).
- Bit 8: R – reverse gear (1 – on, 0 – off).
- Bit 9: RL – running lights (1 – on, 0 – off).
- Bit 10: LB – low beams (1 – on, 0 – off).
- Bit 11: HB – high beams (1 – on, 0 – off).
- Bit 12: RFL – rear fog lights (1 – on, 0 – off).
- Bit 13: FFL – front fog lights (1 – on, 0 – off).
- Bit 14: D – doors (1 – any door opened, 0 – all doors closed).
- Bit 15: T – trunk (1 – opened, 0 – closed).

✧ <*Lights*>: A hexadecimal number. Each bit contains information of one light.

- Bit 0: Running Lights (1 – on, 0 – off).
- Bit 1: Low Beam (1 – on, 0 – off).
- Bit 2: High Beam (1 – on, 0 – off).
- Bit 3: Front Fog Light (1 – on, 0 – off).
- Bit 4: Rear Fog Light (1 – on, 0 – off).
- Bit 5: Hazard Lights (1 – on, 0 – off).
- Bit 6: Reserved.
- Bit 7: Reserved.

✧ <*Doors*>: A hexadecimal number. Each bit contains information of one door.

- Bit 0: Driver Door (1 – opened, 0 – closed).
- Bit 1: Passenger Door (1 – opened, 0 – closed).
- Bit 2: Rear Left Door (1 – opened, 0 – closed)
- Bit 3: Rear Right Door (1 – opened, 0 – closed).
- Bit 4: Trunk (1 – opened, 0 – closed).
- Bit 5: Hood (1 – opened, 0 – closed).
- Bit 6: Reserved.
- Bit 7: Reserved.

✧ <*Total Vehicle Overspeed Time*>: 5 bytes in total. The first 4 bytes are for the integer part of the total vehicle overspeed time and the last byte is for the fractional part. The fractional part has 2 digits.

✧ <*Total Vehicle Engine Overspeed Time*>: 5 bytes in total. The first 4 bytes are for the integer part of the total vehicle engine overspeed time and the last byte is for the fractional part. The fractional part has 2 digits.

✧ <*Total Distance Impulses*>: Vehicle distance in impulses. The number is always increasing. The unit is imp. If it is set to 0, the distance in imp is not available.

✧ <*Ad-Blue Level*>: The level of Ad-Blue. 2 bytes in total.

✧ <*Axle Weight 1st*>: Vehicle first axle weight. The unit is Kg.

✧ <*Axle Weight 3rd*>: Vehicle third axle weight. The unit is Kg.

✧ <*Axle Weight 4th*>: Vehicle fourth axle weight. The unit is Kg.

✧ <*Tachograph Overspeed Signal*>: Vehicle overspeed signal from the tachograph.

- 0: Overspeed is not detected.

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- 1: Overspeed is detected.

✧ <*Tachograph Vehicle Motion Signal*>: The vehicle motion signal in the tachograph.
- 0: Motion is not detected
- 1: Motion is detected.

✧ <*Tachograph Driving Direction*>: Vehicle driving direction from the tachograph.
- 0: Driving forward.
- 1: Driving backward.

✧ <*Analog Input Value*>: The value of analog input. The unit is mv.

✧ <*Engine Braking Factor*>: It measures how often driver brakes with brake pedal or with engine and stores both counts (which are always increasing). Decreasing speed with no pedal pressed causes an increase of the engine braking factor.

✧ <*Pedal Braking Factor*>: It measures how often driver brakes with brake pedal or with engine and stores both counts (which are always increasing). Decreasing speed with brake pedal pressed causes an increase of pedal braking factor.

✧ <*Total Accelerator Kick-downs*>: The count of accelerator pedal kick-downs (with the pedal pressed over 90%).

✧ <*Total Effective Engine Speed Time*>: Total time when the vehicle engine speed is effective. The unit is hour. The first 4 bytes are for the integer part of the total engine idle time and the last byte is for the fractional part. The fractional part has 2 digits.

✧ <*Total Cruise Control Time*>: Total time when vehicle speed is controlled by cruise-control module. The unit is hour. The first 4 bytes are for the integer part of the total engine idle time and the last byte is for the fractional part. The fractional part has 2 digits.

✧ <*Total Accelerator Kick-down Time*>: Total time when accelerator pedal is pressed over 90%. The unit is hour. The first 4 bytes are for the integer part of the total engine idle time and the last byte is for the fractional part. The fractional part has 2 digits.

✧ <*Total Brake Applications*>: The count of braking processes initiated by brake pedal.

✧ <*Tachograph Driver 1 Card Number*>: The card number of tachograph driver 1. The value is a numeric string and ends by 0x00.

✧ <*Tachograph Driver 2 Card Number*>: The card number of tachograph driver 2. The value is a numeric string and ends by 0x00.

✧ <*Tachograph Driver 1 Name*>: The name of tachograph driver 1. The value is a name string and ends by 0x00.

✧ <*Tachograph Driver 2 Name*>: The name of tachograph driver 2. The value is a name string and ends by 0x00.

✧ <*Registration Number*>: The vehicle registration number. The value is a numeric string and ends by 0x00.

✧ <*Expansion Information*>: A hexadecimal number. Each bit contains information of one indicator.
- Bit 0: W – webasto (1 – on, 0 – off or not available).
- Bit 1: BFL – brake fluid low indicator (1 – on, 0 – off or not available)
- Bit 2: CLL – coolant level low indicator (1 – on, 0 – off or not available)
- Bit 3: BAT – battery indicator (1 – on, 0 – off or not available)
- Bit 4: BF – brake system failure indicator (1 – on, 0 – off or not available)

- Bit 5: OP – oil pressure indicator (1 – on, 0 – off or not available)
- Bit 6: EH – engine hot indicator (1 – on, 0 – off or not available)
- Bit 7: ABS – ABS failure indicator (1 – on, 0 – off or not available)
- Bit 8: Reserved.
- Bit 9: CHK – “check engine” indicator (1 – on, 0 – off or not available)
- Bit 10: AIR – airbags indicator (1 – on, 0 – off or not available)
- Bit 11: SC – service call indicator (1 – on, 0 – off or not available)
- Bit 12: OLL – oil level low indicator (1 – on, 0 – off or not available)

✧ <*Rapid Brakings*>: The number of total rapid brakings since installation (calculation based on CAN 100 settings of speed decrease time and value).

✧ <*Rapid Accelerations*>: The number of total rapid accelerations since installation (calculation based on CAN 100 settings of speed increase time and value).

✧ <*Send Time*>: The local time to send the acknowledgement message. 7 bytes in total. The first 2 bytes are for year, and the other 5 bytes are for month, day, hour, minute and second respectively.

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

4.11. Buffer Report in HEX Format

When HEX format messages go into the local buffer, the device will replace the second byte of the report messages with ‘B’. Thus, **+BSP** is the buffered report for **+RSP**, **+BNF** is the buffered report for **+INF** and **+BVT** is the buffered report for **+EVT**. The rest part of the report messages remains the same.

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Appendix A: Two's Complement

For a positive value, the two's complement is itself. Take 17 as an example. Its HEX format is 0x11 and the two's complement for it is 0x11. For a negative value, the following gives detailed calculations.

-X is a negative value.
Firstly, get to know the number of bits for the negative value N, then the two's complement for it is:

2^N - X

For example, to use 16 bits to represent -100, the two's complements for it should be:

2^16 – 100 = 65436 = 0xFF9C

Above is two's complement for -100 in HEX format.

On the contrary, the two's complement can also be converted to the HEX value that it represents similarly.

1. Get to know the number of bits for the two's complement.
2. Get the sign of the value, positive or negative. If the highest bit is 1, it is a negative value. If the highest bit is 0, it is a positive value.
3. If it is a positive value, there is no need for conversion. It is the value.
4. If it is a negative value, get the real value through the following calculation:

   -(2^N – X)

   Where:

   N is the number of bits for the two's complement.

   X is the value that is converted from the two's complement directly.

For example, if the number of bits for the two's complement is 16 and the two's complement is 0xFF9C, then it is a negative value as the highest bit is 1, and the detailed calculation for it is:

-(2^16 – 0XFF9C) = -100

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Appendix B: Message Index

- **Command and ACK**

AT+GTBSI
+ACK:GTBSI
AT+GTSRI
+ACK:GTSRI
AT+GTQSS
+ACK:GTQSS
AT+GTCFG
+ACK:GTCFG
AT+GTOUT
+ACK:GTOUT
AT+GTDIS
+ACK:GTDIS
AT+GTIOB
+ACK:GTIOB
AT+GTEPS
+ACK:GTEPS
AT+GTFRI
+ACK:GTFRI
AT+GTGEO
+ACK:GTGEO
AT+GTTOW
+ACK:GTTOW
AT+GTSPD
+ACK:GTSPD
AT+GTSOS
+ACK:GTSOS
AT+GTIDL
+ACK:GTIDL
AT+GTHBM
+ACK:GTHBM
AT+GTJDC
+ACK:GTJDC
AT+GTJBS
+ACK:GTJBS
AT+GTCRA
+ACK:GTCRA
AT+GTASC
+ACK:GTASC
AT+GTTMA
+ACK:GTTMA
AT+GTOWH

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+ACK:GTOWH
AT+GTDOG
+ACK:GTDOG
AT+GTPIN
+ACK:GTPIN
AT+GTRTO
+ACK:GTRTO
AT+GTHMC
+ACK:GTHMC
AT+GTWLT
+ACK:GTWLT
AT+GTPDS
+ACK:GTPDS
AT+GTSSR
+ACK:GTSSR
AT+GTRMD
+ACK:GTRMD
AT+GTFFC
+ACK:GTFFC
AT+GTCMD
+ACK:GTCMD
AT+GTUDF
+ACK:GTUDF
AT+GTVVS
+ACK:GTVVS
AT+GTAVS
+ACK:GTAVS
AT+GTHRM
+ACK:GTHRM
AT+GTVMS
+ACK:GTVMS
AT+GTGDO
+ACK:GTGDO
AT+GTIGM
+ACK:GTIGM
AT+GTGAM
+ACK:GTGAM
AT+GTBTS
+ACK:GTBTS
AT+GTSVR
+ACK:GTSVR

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- **Position Related Report**
  - +RESP:GTTOW
  - +RESP:GTEPS
  - +RESP:GTDIS
  - +RESP:GTIOB
  - +RESP:GTFRI
  - +RESP:GTERI
  - +RESP:GTGEO
  - +RESP:GTSPD
  - +RESP:GTSOS
  - +RESP:GTRTL
  - +RESP:GTLBC
  - +RESP:GTDOG
  - +RESP:GTIGL
  - +RESP:GTVGL
  - +RESP:GTHBM
  - +RESP:GTDOS
  - +RESP:GTGES

- **Device Information Report**
  - +RESP:GTINF

- **Report for Querying**
  - +RESP:GTGPS
  - +RESP:GTCID
  - +RESP:GTCSQ
  - +RESP:GTVER
  - +RESP:GTBAT
  - +RESP:GTIOS
  - +RESP:GTTMZ
  - +RESP:GTALM
  - +RESP:GTGSV
  - +RESP:GTRSV
  - +RESP:GTATI

- **Event Report**
  - +RESP:GTPNA
  - +RESP:GTPFA
  - +RESP:GTSTT
  - +RESP:GTPDP
  - +RESP:GTIGN
  - +RESP:GTIGF
  - +RESP:GTIDN
  - +RESP:GTVGN

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+RESP:GTIDF
+RESP:GTVGF
+RESP:GTGSS
+RESP:GTCRA
+RESP:GTASC
+RESP:GTSTR
+RESP:GTSTP
+RESP:GTLSP
+RESP:GTRMD
+RESP:GTDRM
+RESP:GTJDR
+RESP:GTJDS
+RESP:GTBCS
+RESP:GTBDS

✧ **Crash Data Packet**
+RESP:GTCRD

✧ **Acceleration Data Packet**
+RESP:GTACC

✧ **Heartbeat**
+ACK:GTHBD
+SACK:GTHBD

✧ **Server Acknowledgement**
+SACK

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