GB100P @Track Air Interface Protocol

GSM/GPRS/GNSS Tracker

TRACGB100PAN008

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International Telematics Solutions Innovator

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Contents

0. Revision History

Version	Date	Author	Description of Change
1.01	2017-06-28	Wokky Lin	1. Initial.
1.02	2017-10-30	Navy Zhang	1. Modified the value range of <*Motion Threshold*> in the **AT+GTTOW** command.
	2017-11-06	Navy Zhang	1. Added Mode 6 to <*Virtual Ignition Mode*> in the **AT+GTVMS** command. 2. Added Type 6 to <*Report Type*> in **+RESP:GTVGN** / **+RESP:GTVGF** report.
	2017-12-09	Navy Zhang	1. Added the **AT+GTBTS** command. 2. Added the **AT+GTBMS** command. 3. Added the **AT+GTDAT** command and the **+RESP:GTDAT** message. 4. Added Sub Command 14 to the **AT+GTRTO** command. 5. Added **BTI**, **BSC** and **BAU** Bluetooth Commands in the **AT+GTRTO** command. 6. Added **+RESP:GTBTI**, **+RESP:GTBSC** and **+RESP:GTBAU** messages related to execution of sub command 14 of **AT+GTRTO**.
	2017-12-14	Navy Zhang	1. Added the parameter <*Acceleration Direction Control*> to the **AT+GTCRA** command.
2.01	2018-11-16	Arthur Li	1. Added the parameter <*Smart Voltage Adjustment*> in the **AT+GTVVS** command. 2. Add Mode 7 in the **AT+GTVMS** command. 3. Added the parameter <*Ignition Off Debounce*> in the **AT+GTVVS** command. 4. Added the parameter <*Add GNSS Data*>, <*GNSS Time Before Crash*> and <*GNSS Time After Crash*> in the **AT+GTCRA** command. 5. Added the **+RESP:GTPGR** message. 6. Added the command **AT+GTFVR**. 7. Added the <*Virtual Ignition On Logic*> parameter in **AT+GTVMS** command. 8. Added the parameters <*Extended Status Report*>, <*Identifier Number*> and <*Update Status Mask*> in the command **AT+GTUPC**. 9. Added the report message **+RESP:GTEUC**. 10. Added the parameter <*GNSS Working Mode*> in the command **AT+GTCFG**. 11. Added Bit 42 (for FVR) to <*Configuration Mask*>

			in **AT+GTRTO**.
2.02	2018-12-18	Arthur Li	1. Changed the default value of the parameters <*Virtual Ignition On Mask*>, <*Virtual Ignition Off Mask*>, <*Virtual Ignition On Logic*> in the command **AT+GTVMS**. 2. Changed the default value of the <*Motion Validity*> in the command **AT+GTAVS**.
2.03	2019-01-17	Arthur Li	1. Added HEX report for **+RESP:GTBCS**, **+RESP:GTBDS**, **+RESP:GTBDR**, **+RESP:GTBTI**, **+RESP:GTBSC** and **+RESP:GTBAU**.
3.00	2019-04-16	Bart Yuan	1. Added the command **AT+GTASC** and the message **+RESP:GTASC**. 2. Extended the value range of <*Mode*> to [0 - 2] in **AT+GTCRA**. 3. Added the sub command 25 (SCS) to <*Sub Command*> in **AT+GTRTO** and the message **+RESP:GTSCS**.
4.00	2019-08-05	Berry Xu	1. Deleted two reserved fields between <*External Power Voltage*> and <*Motion Status*> in the message **+RESP:GTGEO**.
5.00	2019-12-13	Linus Li	1. Added support for WTS300 and WKF300 Bluetooth accessories.
5.01	2020-02-11	Linus Li	1. Added the command **AT+GTUDT** and the message **+RESP:GTUDT.**
5.02	2020-05-26	Ryan Gao	1. Added support for WTH300 Bluetooth accessories.
6.00	2021-05-31	Ryan Gao	1. Added mode 4 to <*GNSS Working Mode*> in the **AT+GTCFG** command.
7.00	2022-03-03	Harry Wu	1. Added mode 5 to <*Buffer Mode*> in the command **AT+GTSRI**. 2. Added mode 5 to <*Buffer Mode*> in the command **AT+GTQSS**. 3. Added the parameter <*High Priority Report Mask*> to the command **AT+GTSRI**.
8.00	2023-02-28	Bennett Cui	1. Added the value 2 to <*Compressed Report*> in the command **AT+GTFRI**. 2. Added the parameter <*+CRI Mask*> to the command **AT+GTHRM**. 3. Added the HEX format **+CRI** message.

1. Overview

1.1.Scope of This Document

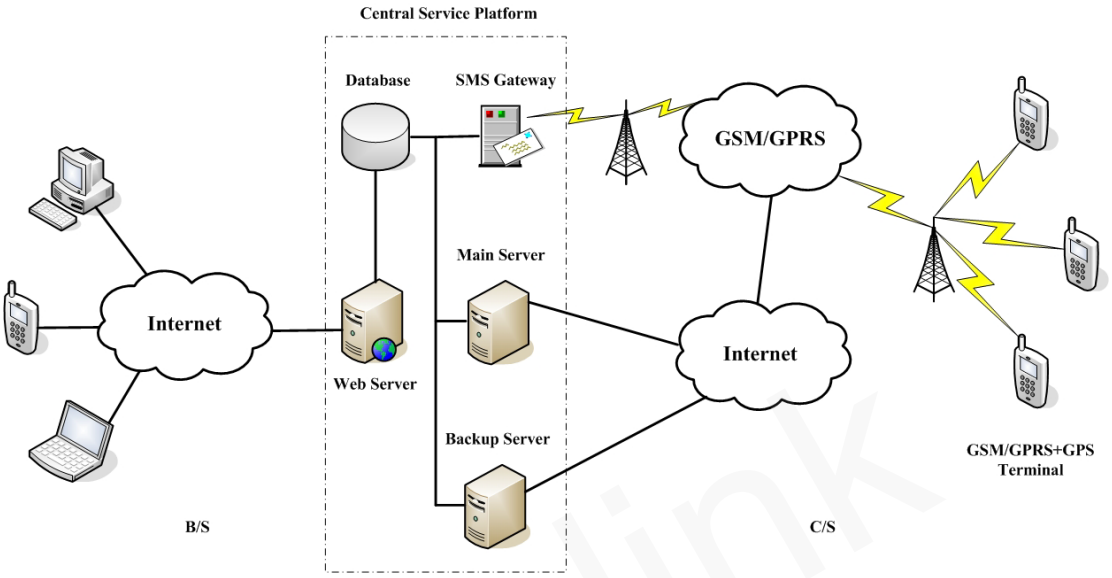
The @Track Air Interface Protocol is a digital communication interface based on printable ASCII characters over SMS or GPRS, which is used for all communications between the backend server and the terminal. The backend server sends a command to the terminal and then the terminal confirms the receipt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

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

1.2.Terms and Abbreviations

Abbreviation	Description
APN	Access Point Network
ASCII	American National Standard Code for Information Interchange
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communications
HDOP	Horizontal Dilution of Precision
ICCID	Integrated Circuit Card Identity
IP	Internet Protocol
SMS	Short Message Service
TCP	Transmission Control Protocol
UDP	User Datagram Protocol
UTC	Coordinated Universal Time

2. System Architecture



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

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

3. Message Description

3.1.Message Format

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

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

The entire message string ends with the character '$'.

The characters "XXX" allow the identification of the difference between messages.

The "<parameter1>,<parameter2>,…" carry the message's parameters. The number of parameters is different in different messages. The ASCII character ',' is used to separate the neighbouring parameter characters. The parameter string may contain the following ASCII characters: '0'–'9', 'a'–'z', and 'A'–'Z'.

Detailed descriptions of each message format are available in the corresponding message sections.

By sending Commands to the terminal, the backend server can either configure and query the parameters of the terminal or control the terminal when it performs specific actions. When the terminal receives Commands over the air, it will reply with a corresponding Acknowledgement message.

According to the configuration of the parameters, the terminal can send Report messages to the backend server. Please see the following figure:

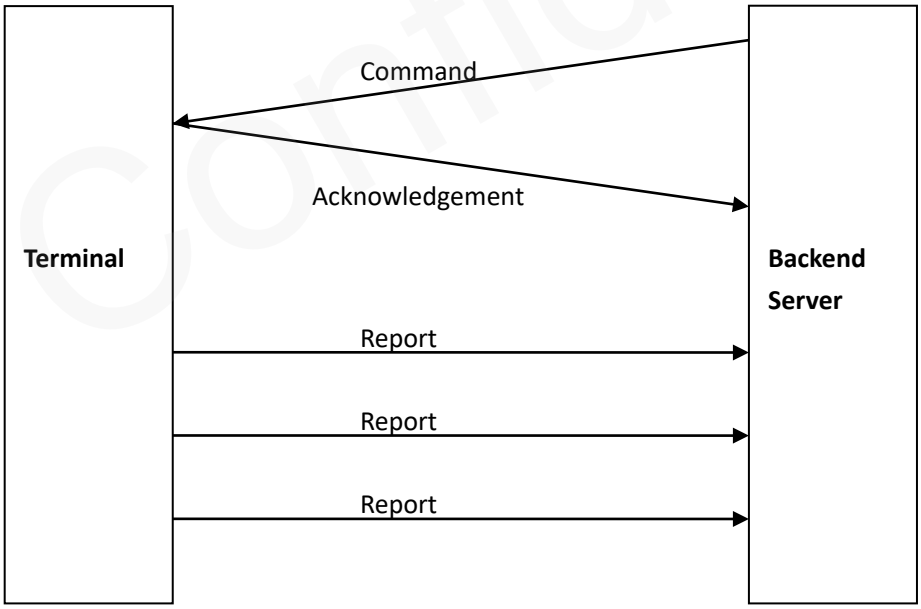


Figure 1: @Track Protocol Message Flow

3.2.Command and Acknowledgement

3.2.1.Server Connection

3.2.1.1.Bearer Setting Information

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

➢ **AT+GTBSI=**

Example: **AT+GTBSI=gb100p,cmnet,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
APN	<=40		
APN User Name	<=30		
APN Password	<=30		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Password*>: The valid characters for the password include '0'– 9', 'a' – 'z', and 'A' – 'Z'. The default value is "gb100p".

✧ <*APN*>: Access point name (APN).

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

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

✧ <*Reserved*>: Not used at present. Please keep it empty.

✧ <*Serial Number*>: The serial number for 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,4C0203,865084030960726,gb100p,0017,20190411102115,02EE$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Protocol Version*>: The protocol version that the terminal conforms to. The first two characters indicate the device type. As shown in the example above, **4C** means **GB100P**. The middle two characters indicate the major version number of the protocol and the last two characters indicate the minor version number of the protocol. Both version numbers are hex digits. For example, **0101** means version **1.01**.
- <*Unique ID*>: The IMEI of the terminal.
- <*Device Name*>: The specified name of the device.
- <*Serial Number*>: A serial number which is the same as the <*Serial Number*> in the corresponding command. It distinguishes which command the ACK message is for.
- <*Send Time*>: The local time to send the ACK message.
- <*Count Number*>: A self-increasing count number in each acknowledgment message and report message. It begins from 0000 and increases by 1 for each message. It rolls 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. If the terminal is configured correctly, it should be able to report data to the backend server.

- **AT+GTSRI=**

Example:
AT+GTSRI=gb100p,4,,2,60.174.225.171,10083,60.174.225.171,10085,13855621247,15,1,0,1,,

,FFFF$ AT+GTSRI=gb100p,4,,2,www.qlinkhf.f3322.org,10083,60.174.225.171,10085,13855621247,15,1,0,1,,,FFFF$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Report Mode	1	0 – 6	0
Reserved	0		
Buffer Mode	1	0|1|2|5	1
Main Server IP / Domain Name	<=60		
Main Server Port	<=5	0 – 65535	
Backup Server IP / Domain Name	<=60		
Backup Server Port	<=5	0 – 65535	
SMS Gateway	<=20		
Heartbeat Interval	<=3	0|2 – 360 min	0
SACK Enable	1	0|1	0
Protocol Format	1	0|1	0
SMS ACK Enable	1	0|1	0
High Priority Report Mask	<=4	0 – FF	0
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Report Mode*>: This parameter 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. When 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 terminals.
- 4: UDP mode. The terminal will send data to the backend server by UDP protocol. Receiving protocol commands via UDP is supported if the GPRS network allows it. It is recommended to enable heartbeat sending and **+RESP:GTPDP** report in the case of receiving commands via UDP.
- 5: Forced SMS mode. Only SMS is used for data transmission.

Note: The messages **+RESP:GTGSM**, **+RESP:GTALM** and **+DAT** are sent via TCP short connection when the report mode is forced SMS mode.

- 6: UDP with fixed local port mode. Like the UDP mode, the 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.

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

- 0: Disable the buffer report function.
- 1: Low priority - Enable the buffer report function. In this mode, the device will send the buffered messages after sending real-time messages.
- 2: High priority - Enable the buffer report function. In this mode, the device will send all the buffered messages before sending real-time messages, except **+RESP:GTPFA**, **+RESP:GTPDP** and **+RESP:GTUPD**.
- 5: Timestamp priority. In this mode, all messages will be saved and sent in the order they are generated, but the messages which are configured in <*High Priority Report Mask*> will be reported first. In this mode, the message header won't be changed to the string **+BUFF:**.

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

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

✧ <*Backup Server IP*>: The IP address of the backup server.

✧ <*Backup Server Port*>: The port of the backup server.

✧ <*SMS Gateway*>: A maximum of 20 characters including the optional national code starting with "+" for sending SMS messages. Short code (for example, 10086) is also supported.

✧ <*Heartbeat Interval*>: The 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 should respond to the terminal with the SACK message when it receives a message from the terminal.

- 0: The backend server does not reply with the SACK message after receiving a message from the terminal.
- 1: The backend server replies with the SACK message when it receives a message from the terminal.

✧ <*Protocol Format*>: This parameter defines the format of the report message sent from the device to the backend server. 0 means "ASCII format", and 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 setting of <*Report Mode*>.
- 1: The device will send the acknowledgement message to the original number via SMS if the command is received via SMS.

✧ <*High Priority Report Mask*>: Bitwise mask to configure the messages which should be sent at high priority when the <*Buffer Mode*> is 5.

- Bit 0 for **+RESP:GTPDP**
- Bit 1 for **+ACK:GTHBD**
- Bit 2 for **+RESP:GTUPD**

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

➢ **+ACK:GTSRI,**

Example: **+ACK:GTSRI,4C0203,865084030960726,gb100p,001D,20190411102446,02F6$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

3.2.1.3.Quick Start Setting

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

AT+GTBSI and **AT+GTSRI** will be used to configure the settings.

➢ **AT+GTQSS=**

Example: **AT+GTQSS=gb100p,cmnet,,,4,,2,www.qlinkhf.f3322.org,10083,60.174.225.171,10085,13855621247,15,1,0,1,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
APN	<=40		
APN User Name	<=30		
APN Password	<=30		
Report Mode	1	0 – 6	0
Reserved	0		
Buffer Mode	1	0|1|2|5	1
Main Server IP / Domain Name	<=60		
Main Server Port	<=5	0 – 65535	
Backup Server IP / Domain Name	<=60		
Backup Server Port	<=5	0 – 65535	
SMS Gateway	<=20		
Heartbeat Interval	<=3	0|2 – 360 min	0
SACK Enable	1	0|1	0
Protocol Format	1	0|1	0
SMS ACK Enable	1	0|1	0
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

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

➢ **+ACK:GTQSS,**

Example: **+ACK:GTQSS,4C0203,865084030960726,gb100p-0726,0013,20190411101945,02EA$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' –	

		'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.2.Device Configuration

3.2.2.1.Global Configuration

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

➢ **AT+GTCFG=**

Example:
AT+GTCFG=gb100p,gb100p,gb100p,,,,,,,,,,,,,,,,,0,FFFF$
AT+GTCFG=gb100p,gb100p,gb100p,1,0,,,7F,2,,3DEF,,1,1,300,0,1,0,1,F,1,0,FFFF$

Parameter	Length (byte)	Range/Format	Default
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
New Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	gb100p
ODO Enable	1	0|1	0
ODO Initial Mileage	<=9	0.0 – 4294967.0Km	0.0
Reserved	0		
Reserved	0		
Report Composition Mask	<=4	0 – FFFF	003F
Power Saving Mode	1	0 – 2	1
Reserved	0		
Event Mask	<=4	0000 – FFFF	3FFF
Reserved	0		
LED On	1	0|1	0
Info Report Enable	1	0|1	0

Info Report Interval	<=5	30 – 86400 sec	300
Location by Call	1	0|1|2|3	0
Backup Battery Supply	1	0|1	1
Backup Battery Charge Mode	1	0|1	0
AGPS Mode	1	0|1	0
Cell Info Report	4	0000 – FFFF	000F
GNSS Lost Time	2	0 – 30 min	0
GNSS Working Mode	1	0 – 4	0
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*New Password*>: It is set 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 report messages, especially the composition of GNSS information.
  - Bit 0 for <*Speed*>
  - Bit 1 for <*Azimuth*>
  - Bit 2 for <*Altitude*>
  - Bit 3 for GSM tower data, including <*MCC*>, <*MNC*>, <*LAC*>, <*Cell ID*> and the <*Reserved*> parameter value “00”
  - Bit 4 for <*Mileage*>
  - Bit 5 for <*Send Time*>, 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 set it to 0 to disable the corresponding component in the report. This mask is valid for all report messages.
- <*Power Saving Mode*>: The mode of the power saving function. If <*Power Saving Mode*> is set to 0, the GNSS will be always on. If <*Power Saving Mode*> is set to 1, the fixed report, geo-fence and speed alarm report functions are suspended when the device is stationary or the engine is turned off. If <*Power Saving Mode*> is set to 2, it is mostly like Mode 1 and the difference is that the fixed report function will not be suspended and the fix and send interval of it will be set to <*IGF Report Interval*> in **AT+GTFRI** when the engine is off.
  - 0: Disable the power saving function.
  - 1: Mode 1 of the power saving function.
  - 2: Mode 2 of the power saving function.
- <*Event Mask*>: Bitwise mask to configure which event report should 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 Reserved
- 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:GTVGN** and **+RESP:GTVGF**
- Bit 13 for the ignition on/off location report **+RESP:GTVGL**

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

✧ <*LED On*>: It configures the working mode of power LED and GPS LED.

- 0: Each time the device powers on, both LED's will work 30 minutes and then turn off.
- 1: Power LED and GPS LED turn on as configured.

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

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

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

✧ <*Location by Call*>: It configures how to handle the incoming call.

- 0: Just hang up the call.
- 1: Hang up the call and report the current position via **+RESP:GTLBC**.
- 2: Hang up the call and report the current position with a Google Maps link through SMS to the phone number of the incoming call.
- 3: Hang up the call and report the current position via **+RESP:GTLBC**, and simultaneously send a Google Maps link through SMS to the phone number of the incoming call.

✧ <*Backup Battery Supply*>: It configures the working mode of backup battery supply.

- 0: Disable backup battery power supply.
- 1: Enable backup battery power supply.

✧ <*Backup Battery Charge Mode*>: It controls the charging 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 is only charged after ignition on is detected. The charge process will begin 3 minutes after the

ignition is turned on and stop when the ignition is turned off.

✧ <*AGPS Mode*>: A numeral to indicate whether to enable AGPS. AGPS helps increase the chances of getting GNSS position successfully and reduce the time needed to get GNSS position.

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

✧ <*Cell Info Report*>: A hexadecimal numeral to indicate how to report cell information (**+RESP:GTGSM**).

The 2 high bits represent the GSM working mode.

- 0b00: Do not allow the cell information report.
- 0b01: Allow the cell information report after failing to get GNSS position if cell information is available.
- 0b10: Report the message **+RESP:GTGSM** after getting GNSS position successfully every time if cell information is available.
- 0b11: Report the message **+RESP:GTGSM** no matter whether it is successful to get GNSS position if cell information is available.

The other bits control whether the following events will trigger the report **+RESP:GTGSM**.

- Bit 0 for **+RESP:GTRTL**
- Bit 1 for **+RESP:GTLBC**
- Bit 2 for **+RESP:GTFRI**
- Bit 3 Reserved
- Bit 4 for **+RESP:GTTOW**
- Bit 5 – 13 Reserved

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

✧ <*GNSS Lost Time*>: A time parameter to monitor the GNSS signal. If there is no GNSS signal or no successful GNSS fix for consecutive <*GNSS Lost Time*>, 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 feature".

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.

✧ <*GNSS Working Mode*>: The working mode of GNSS chip.

- 0: GPS and GLONASS positioning systems. In this mode, the device gets position(s) with GPS and GLONASS systems. **Note:** If the current GNSS chip does not support GPS and GLONASS combined mode, the device will get position by GPS only.
- 1: GPS positioning system. In this mode, the device gets position(s) only with GPS system.
- 2: GLONASS positioning system. In this mode, the device gets position(s) only with GLONASS system.
- 3: Reserved.
- 4: GPS and Beidou positioning system. In this mode, the device fixes position(s) with GPS and Beidou systems. **Note:** If the current GNSS chip does not support GPS and Beidou combination mode, the device will get position by GPS only.

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

- **+ACK:GTCFG,**

Example: **+ACK:GTCFG,4C0203,865084030960726,gb100p,0015,20190411102034,02EB$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.2.2.Auto-unlock PIN

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

- **AT+GTPIN=**

Example: **AT+GTPIN=gb100p,1,1234,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Enable Auto-unlock PIN	1	0|1	1
PIN	4 – 8	'0' – '9'	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- ✧ <*Enable Auto-unlock PIN*>: Set it to 1 to enable the "Auto-unlock PIN" function, and 0 to disable the "Auto-unlock PIN" function.
- ✧ <*PIN*>: The PIN code used to unlock the SIM PIN.

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

➢ **+ACK:GTPIN,**

Example: **+ACK:GTPIN,4C0203,865084030960726,gb100p,001F,20190411102749,02F7$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.2.3.Time Adjustment

The command **AT+GTTMA** is used to adjust the local time of 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 settings. 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=gb100p,+,8,30,1,20190411102856,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Sign	1	+|–	+
Hour Offset	<=2	0 – 23	0

Minute Offset	<=2	0 – 59	0
Daylight Saving	1	0|1	0
UTC Time	14	YYYYMMDDHHMMSS	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character			

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

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

- ➢ **+ACK:GTTMA,**

Example: **+ACK:GTTMA,4C0203,865084030960726,gb100p,0022,20190411102909,02FB$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.2.4.Outside Working Hours

To protect the privacy of the driver when he is off duty, the device could 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: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=gb100p,3,1F,0900,1200,1300,1800,,,,,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Mode	1	0|3	0
Day of Work	<=2	0 – 7F	1F
Working Hours Start1	4	HHMM	0900
Working Hours End1	4	HHMM	1200
Working Hours Start2	4	HHMM	1300
Working Hours End2	4	HHMM	1800
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

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

- 0: Disable this function.
- 3: Automatic mode. The device will automatically check the current time against the working hours range. If it is outside the working hours, the device will hide the location information. Otherwise the location information will be reported normally.

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

- Bit 0 for Monday
- Bit 1 for Tuesday
- Bit 2 for Wednesday
- Bit 3 for Thursday
- Bit 4 for Friday
- Bit 5 for Saturday
- Bit 6 for Sunday

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

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

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

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

➢ **+ACK:GTOWH,**

Example: **+ACK:GTOWH,4C0203,865084030960726,gb100p,0024,20190411102958,02FC$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.2.5.Protocol Watchdog

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

➢ **AT+GTDOG=**

Example:

AT+GTDOG=gb100p,1,60,30,0200,,1,,,60,60,,FFFF$ AT+GTDOG=gb100p,2,60,30,0200,,1,,,60,60,,FFFF$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Mode	1	0|1|2	0
Ignition Frequency	<=3	10 – 120 min	60
Interval	<=2	1 – 30 day	30
Time	4	HHMM	0200
Reserved	0		
Report Before Reboot	1	0|1	1
Reserved	0		
Reserved	0		
GSM Interval	4	0|5 – 1440 min	60
PDP Interval	4	0|5 – 1440 min	60
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Mode*>: The working mode of this function.
  - 0: Disable this function.
  - 1: Reboot periodically according to the <*Interval*> and <*Time*> settings.
  - 2: Reboot upon ignition on.
- <*Ignition Frequency*>: If the working mode is 2, and the time interval between two adjacent ignition-on is greater than the value specified by this parameter, the device will automatically reboot upon ignition on.
- <*Interval*>: The interval for rebooting the device. It is measured in days.
- <*Time*>: The time at which the reboot operation is performed when the <*Interval*> condition is met.
- <*Report Before Reboot*>: It specifies whether to report the **+RESP:GTDOG** message before reboot. 0 means "Do not report the **+RESP:GTDOG** message", and 1 means "Report the **+RESP:GTDOG** message". If this parameter is enabled, the device will initiate a real-time location fix before sending the message with the current location information.
- <*GSM Interval*>: The time interval (measured in minutes) for rebooting the device when the device loses GSM signal. 0 means "Do not reboot the device".
- <*PDP Interval*>: The interval for rebooting the device when the device is unable to be registered to GPRS network successfully. 0 means "Do not reboot the device".

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

➢ **+ACK:GTDOG,**

Example: **+ACK:GTDOG,4C0203,865084030960726,gb100p,0025,20190411103017,02FD$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.2.6.Settings for Preserving Device's Specified Logic States

The command **AT+GTPDS** is used to preserve logic states of the device. The logic states of the device which vary depending on the value of <*Mask*> will be preserved or reset according to the <*Mode*> setting.

➢ **AT+GTPDS=**

Example: **AT+GTPDS=gb100p,1,399,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Mode	1	0|1|2	0
Mask	4	0000 – FFFF	0
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Serial Number	4	0000 – FFFF	

Tail Character	1	$	$

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

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

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

➢ **+ACK:GTPDS,**

Example: **+ACK:GTPDS,4C0203,865084030960726,gb100p,0027,20190411103110,02FE$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.3.Position Related Report

3.2.3.1.Fixed Report Information

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

➢ **AT+GTFRI=**

Example:
AT+GTFRI=gb100p,0,,,,,,,,,,,,,,,FFFF$
AT+GTFRI=gb100p,1,1,0,1,1235,1235,5,30,1000,1000,,60,600,,,,,FFFF$
AT+GTFRI=gb100p,2,1,0,1,1235,1235,5,30,1000,1000,,60,600,,,,,FFFF$
AT+GTFRI=gb100p,3,1,0,1,1235,1235,5,30,1000,1000,,60,600,,,,,FFFF$
AT+GTFRI=gb100p,4,1,0,1,1235,1235,5,30,1000,1000,,60,600,,,,,FFFF$

Parameter	Length (byte)	Range/Format	Default
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Mode	1	0 – 5	0
Discard No Fix	<=2	0|1	1
Compressed Report	1	0|1|2	0
Period Enable	1	0|1	1
Start Time	4	HHMM	0000
End Time	4	HHMM	0000
Check Interval	<=5	0 – 86400 sec	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	00000000-FFFFFFFF	00000000
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

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

- 0: Disable this function.
- 1: Fixed Time Report. The position report message is sent to the backend server periodically according to the parameter <*Send Interval*>.

- 2: Fixed Distance Report. The position report message is sent to the backend server when the straight-line distance between the current GNSS position and the last sent GNSS position is greater than or equal to the distance specified by the parameter <*Distance*>. Virtual ignition detection must be enabled 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*>. Virtual ignition detection must be enabled for this mode.
- 4: Optimum Report. The device simultaneously checks both time interval and path length between two adjacent position reports. The device position will be reported if the calculated time interval between the current time and the 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*>. Virtual ignition detection must be enabled for this mode.
- 5: Fixed Time or Mileage Report. The device checks either time interval or path length between two adjacent position reports. The device position will be reported if the calculated time interval between the current time and the 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*>. Virtual ignition detection must be enabled for this mode.

✧ <*Discard No Fix*>: Enable/disable report when there is no GNSS fix.

- 0: Enable report.
- 1: Disable report.

✧ <*Compressed Report*>: Enable/disable report compression.

- 0: Do not compress GNSS location report.
- 1: Compress GNSS location report: It is valid only when <*Check Interval*> is 1 second and the protocol format is HEX.

Note: <*Check Interval*> MUST be set to 1, <*Send Interval*> MUST be no more than 270, and protocol format MUST be HEX if this parameter field is enabled.

- 2: Compress information report (**+CRI**): It is valid only when the <*Mode*> of **AT+GTFRI** command is 1 and the protocol format is HEX. If the <*Mode*> of **AT+GTCRA** command is enabled, the **+CRI** message will contain 1HZ acceleration data.

Note: Due to the limitation of the maximum report message length, please make sure the <*Send Interval*> / <*Check Interval*> ratio is less than or equal to 60 when <*Compressed Report*> is 2.

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

✧ <*Start Time*>: The start time of the scheduled 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 same as those of <*Start Time*>.

✧ <*Check Interval*>: The time interval for updating GNSS position. Its range is 0 – 86400 and the unit is second. If its value is 0, the device will update GNSS position according to the value of <*Send Interval*>.

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

Note: Due to the limitation of the maximum report message length, make sure the <*Send Interval*> / <*Check Interval*> ratio is less than or equal to 15 when <*Compressed Report*> is 0.

- <*Distance*>: The specified distance for sending the position information when <*Mode*> is 2. Unit: meter.
- <*Mileage*>: The specified length for sending the position information when <*Mode*> is 3 and 4. Unit: meter.
- <*Corner Report*>: The threshold to determine whether the device is turning around a corner. 0 means "Disable the corner report". For other values, the device will compare the current azimuth with that around the last known corner. If the difference is greater than or equal to this specific non-zero value, the device will send the corner report with **+RESP:GTFRI**.

  Note: If FRI multi-point report occurs at the same time as corner report, the corner point will be included in multi-point report message, and the <*Report Type*> of the **+RESP:GTFRI** message will be 0.
- <*IGF Report Interval*>: The time interval for acquiring 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 <*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*>: If the serial port is connected with a peripheral, and the corresponding bit for the peripheral is set to 1, the device will report **+RESP:GTERI** instead of **+RESP:GTFRI**. This mask is used to configure whether to report the data from peripherals via **+RESP:GTERI**.
  - Bit 0 – Bit 7: Reserved
  - Bit 8: For the <*Bluetooth Accessory Data*> field in the message **+RESP:GTERI**

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

➢ **+ACK:GTFRI,**

Example: **+ACK:GTFRI,4C0203,865084030960726,gb100p,0031,20190411103501,0304$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	

Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.3.2.Frequency Change of Fixed Report Information

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

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

➢ **AT+GTFFC=**

Example: **AT+GTFFC=gb100p,0,1,2,,,,,,,30,500,500,300,,0,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Priority	1	0 – 4	0
Mode	1	0 – 4	0
FRI Mode	1	0 – 5	0
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
FRI IGN Report Interval	<=5	5 – 86400s	30
FRI Report Distance	<=5	50 – 65535m	500
FRI Report Mileage	<=5	50 – 65535m	500
FRI IGF Report Interval	<=5	0|5 – 86400s	300
Reserved	0		
Corner Report	<=3	0 – 180	0
Reserved			
Reserved			

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

- <*Priority*>: The priority of the event which triggers the parameter change for fixed report. 0 indicates the highest priority.
- <*Mode*>: It specifies the trigger event for changing the fixed report parameters.
  - 0: Disable the parameters of the specified priority.
  - 1: Change the fixed report parameters when the device enters into any of the defined Geo-Fence.
  - 2: Change the fixed report parameters when the device enters into known GSM roaming state (Please refer to **AT+GTRMD**).
  - 3: Change the fixed report parameters when the device enters into unknown GSM roaming state.
  - 4: Change the fixed report parameters when the device enters Start status (after the reporting of **+RESP:GTSTR**).
- <*FRI Mode*>: If the specified event occurs, the working mode of the fixed report will be changed according to the value for 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 the ignition is on. The value range is 5 – 86400. Unit: 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 interval for acquiring 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 around the last known corner. If the difference is greater than or equal to the non-zero value specified by this parameter, the device will send the corner report with **+RESP:GTFRI**.

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

- **+ACK:GTFFC,**

Example: +ACK:GTFFC,4C0203,865084030960726,gb100p,0037,20190411103557,0306$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.4.Alarm Settings

3.2.4.1.Tow Alarm Configuration

The **AT+GTTOW** command is used to configure the tow alarm parameters.

➢ **AT+GTTOW=**

Example: AT+GTTOW=gb100p,1,10,1,300,,,,,2,3,2,,,,,,,,,FFFF$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
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
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Rest Duration	<=3	1 – 255 (×15 sec)	2
Motion Duration	<=2	1 – 10 (×100 ms)	3

Motion Threshold	1	1 – 9	2
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Tow Enable*>: Enable/disable the tow alarm function.
  - 0: Disable the tow alarm function.
  - 1: Enable the tow alarm function.
- <*Engine Off to Tow*>: A time parameter to measure whether the device is considered being towed after the engine is turned off. If the motion sensor does not detect non-movement within the time specified by this parameter after the engine is turned off, the device is being towed.
- <*Fake Tow Delay*>: If the motion sensor detects movement after engine off and non-movement are detected, the device goes into a state called fake tow. If the device stays in fake tow after a period of time specified by the parameter <*Fake Tow Delay*>, it is considered being towed.
- <*Tow Interval*>: The time interval for sending the tow alarm message.
- <*Rest Duration*>: A time parameter to measure whether the device enters into stationary state. The status of the device will be changed to rest if the motion sensor detects stationary state and the stationary state is maintained for a period of time specified by the parameter <*Rest Duration*>.
- <*Motion Duration*>: A time parameter to measure whether the device enters into moving state. The status of the device will be changed to motion if the motion sensor detects motion and the moving state is maintained for a 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,4C0203,865084030960726,gb100p,0039,20190411103649,0308$

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

3.2.4.2.Geo-Fence Information

The command **AT+GTGEO** is used to configure the Geo-Fence parameters. (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 can be sent to the backend server.)

➢ **AT+GTGEO=**

Example: **AT+GTGEO=gb100p,0,3,117.129435,31.839280,500,5,,,,,0,0,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
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
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	0

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

- <*GEO ID*>: The ID of the Geo-Fence. A total 20 zones (0 – 19) are supported.
- <*Mode*>: The working mode of reporting the Geo-Fence message **+RESP:GTGEO** to the backend server.
  - 0: Disable the zone's Geo-Fence function.
  - 1: Entering the zone. The report will be generated only when the terminal enters the Geo-Fence.
  - 2: Exiting the zone. The report will be generated only when the terminal exits from the Geo-Fence.
  - 3: Both entering and exiting the zone.
- <*Longitude*>: The longitude of a point which is defined as the center of the circular Geo-Fence region. The 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 centre 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 for the GNSS checking position information against the Geo-Fence alarm.
- <*Trigger Mode*>: It controls the trigger mode of the function.
  - 0: Disable auto trigger mode.
  - 21: Automatically set up a Geo Fence after ignition 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 turned off. This device will only report alarm when exiting the Geo-Fence zone. The Geo-Fence will be cancelled after the device exits the zone.
  - 22: Manually enable Geo-Fence after ignition 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 turned off. The device will only report alarm when exiting the Geo-Fence zone. When the device exits the 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*>: It defines 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,4C0203,865084030960726,gb100p,0,003F,20190411103812,030A$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
GEO ID	1	0 – 19	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.4.3.Roaming Detection Configuration

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

➢ **AT+GTRMD=**

Example: **AT+GTRMD=gb100p,0,,,,,1,2,46001,46000,,,1,1,,,,1,1,,,,3DEF,,,3DEF,,,,,,,,,,FFFF$** **AT+GTRMD=gb100p,0,,,,,1,3,46001,46000,46003,,,3,4,5a43gh,64sa44,,,1,1,468555,,,3DEF,,,3DEF,,,,,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Mode	1	0|1	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

Home Operator Start	1	1 – 10	
Home Operator End	1	1 – 10	
Home Operator List	<=6*10		
Reserved	0		
Reserved	0		
Roaming Operator Start	1	1 – 100	
Roaming Operator End	1	1 – 100	
Roaming Operator List	<=6*100		
Reserved	0		
Reserved	0		
Blacklist Operator Start	1	1 – 20	
Blacklist Operator End	1	1 – 20	
Black List Operator	<=6*20		
Reserved	0		
Reserved	0		
Known Roaming Event Mask	<=6	000000 – FFFFFF	3DEF
Reserved	0		
Reserved	0		
Unknown Roaming Event Mask	<=6	000000 – FFFFFF	3DEF
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	

Tail Character	1	$	$

- <*Mode*>: The working mode of the roaming detection function.
  - 0: Disable this function.
  - 1: Enable this function.
- <*Operator Start*>: A numeral to indicate the first index of the whitelist operator numbers to be input. For example, if it is **1**, the device will update the whitelist operators from the **1**st one. If it is empty, there should be no whitelist number.
- <*Operator End*>: A numeral to indicate the last index of the whitelist operator numbers to be input. For example, if it is **2**, the device will update the whitelist operators until the **2**nd one. If it is empty, there should be no whitelist number.
- <*Home Operator List*>: A white list of PLMN codes for network operators. The numbers are composed 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. 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 mobile network operators all across China.
- <*Roaming Operator List*>: It is mostly like the <*Home Operator List*>, and the difference is that the operators in this list will be considered as in "Known Roaming" state.
- <*Black List Operator*>: It is mostly like the <*Home Operator List*>, and the difference is that the operators in this list will be considered as in "Blocking Report" state. In this state, the device works normally but all reports will be buffered instead of being sent.
  Operators that are not in <*Home Operator List*>, <*Roaming Operator List*> or <*Black List Operator*> will be considered as in "Unknown Roaming" state.
- <*Known Roaming Event Mask*>: Bitwise mask to configure which event report should be sent to the backend server when GSM roaming state is detected. If the roaming state indicates "Known Roaming", the <*Known Roaming Event Mask*> will be valid. Otherwise, the <*Unknown Roaming Event Mask*> will be valid.
  - Bit 0 for **+RESP:GTPNA**
  - Bit 1 for **+RESP:GTPFA**
  - Bit 2 for **+RESP:GTMPN**
  - Bit 3 for **+RESP:GTMPF**
  - Bit 4 Reserved
  - 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:GTVGN** and **+RESP:GVIGF**
- Bit 13 for ignition on/off location report **+RESP:GTVGL**
- Others Reserved

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

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

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

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

➢ **+ACK:GTRMD,**

Example: **+ACK:GTRMD,4C0203,865084030960726,gb100p,0041,20190411104003,030E$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=10	'0' – '9' 'a' – 'z' 'A' – 'Z'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

Note: Only an AT command string of no more than 180 bytes could be accepted by the device in case of sending the command string via Manage Tool (There is no such limit for sending the command via GPRS).

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

3.2.4.4.Speed Alarm

This command is used to set a speed-alarm range for the terminal. According to the working mode, the device 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=gb100p,1,10,30,60,300,,,,,,,,,,,,,,FFFF$** **AT+GTSPD=gb100p,3,10,30,60,300,,,,,,,,,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Mode	1	0|1|2|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
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

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

- 0: Disable speed alarm.
- 1: Report speed alarm if the current speed is within the speed range defined by

<*Min Speed*> and <*Max Speed*>.

- 2: Report speed alarm if the current speed is outside the speed range defined by <*Min Speed*> and <*Max Speed*>.
- 3: Report speed alarm only one time if the current speed is within or outside the speed range defined by <*Min Speed*> and <*Max Speed*>. In this mode, <*Send Interval*> will be ignored.

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

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

✧ <*Validity*>: If the speed meets the alarm condition and the status is maintained for a period of time defined by <*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,4C0203,865084030960726,gb100p,0042,20190411104051,030F$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.4.5.Excessive Idling Detection

The command **AT+GTIDL** is used to detect the engine excessive idling (the vehicle stays stationary while the ignition is on). To use this command, virtual ignition detection must be enabled. When the device detects that the vehicle is entering into the idle status, it will report the event message **+RESP:GTIDN** to the backend server. When the vehicle leaves the idle status, the device will report the event message **+RESP:GTIDF** to the backend server.

➢ **AT+GTIDL=**

Example: **AT+GTIDL=gb100p,1,2,1,100,,,,,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**

Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Mode	1	0|1	0
Time to Idling	<=2	1 – 30 min	2
Time to Movement	1	1 – 5 min	1
Debounce Distance	<=4	0|100 – 9999m	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Mode*>: The working mode of the 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, the vehicle is considered to be in idling status.
- <*Time to Movement*>: If the vehicle moves again and the moving state is maintained for the length of time specified by this parameter after it enters into idling status, it is considered to leave idling status. If ignition off is detected, the vehicle is considered to leave idling status regardless of the <*Time to Movement*> setting.
- <*Debounce Distance*>: If the vehicle moves more than <*Debounce Distance*> after it enters into idling status, the vehicle will be considered to leave idling status.

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

- **+ACK:GTIDL,**

Example:
+ACK:GTIDL,4C0203,865084030960726,gb100p,0043,20190411104144,0310$

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

3.2.4.6.Start/Stop Report

The command **AT+GTSSR** is used to detect the status of vehicle (Start/Stop status). If the device detects that the vehicle is entering into Start status, it will report the event message **+RESP:GTSTR** to the backend server. If 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=gb100p,1,2,1,5,1,0,0,,FFFF$** **AT+GTSSR=gb100p,2,2,1,5,1,0,0,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Mode	1	0|1|2	0
Time to Stop	<=4	(0– 30 min)|(0 – 1800 Sec)	2min
Time to Start	<=3	(0 – 5 min)|(0 – 300 Sec)	1min
Start Speed	2	1 – 10 Km/h	5
Long Stop	<=5	0 – 43200 min	0
Time Unit	1	0|1	0
Location Switch	1	0 – 1	0
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Mode*>: The working mode of the Start/Stop status report function.
  - 0: Disable this function.
  - 1: Enable this function. In this mode, virtual ignition settings must be configured for the device.
  - 2: Enable this function. In this mode, the device will ignore the ignition status.

    Note: The GNSS chip works in "always on" mode when the device status is Sensor Rest (41) and Sensor Motion (42). If the GNSS chip does not work in "always on" mode, the Start/Stop status of the vehicle will be judged only based on the state of built-in sensor.
- <*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*>: The vehicle needs to stay in moving with ignition on state (if <*Mode*> is set to 1) or moving state (if <*Mode*> is set to 2) for the duration specified by <*Time to Start*> before it is deemed to enter Start status.
- <*Start Speed*>: The start speed threshold to determine whether the vehicle is started or not. If the built-in sensor detects that the device is moving, the device will start to check the speed from GNSS. If the time the vehicle speed stays greater than <*Start Speed*> is longer than <*Time to Start*>, the vehicle is considered to be in Start status, and the event message **+RESP:GTSTR** will be reported. If the device speed stays less than or equal with <*Start Speed*> for a period of time longer than <*Time to Stop*>, the vehicle is considered to quit Start status, and the event message **+RESP:GTSTP** will be reported. If GNSS signal is abnormal for more than 1 minute, the device will only use the built-in motion sensor to detect the Start/Stop status and does not check the vehicle speed.
- <*Long Stop*>: After the vehicle enters into Stop status and stays in the Stop status for a period of time longer than the time specified by this parameter, the message **+RESP:GTLSP** will be reported. 0 means "Disable this parameter".
- <*Time Unit*>: It specifies the time unit of <*Time to Stop*> and <*Time to Start*> parameters.
  - 0: Minute
  - 1: Second
- <*Location Switch*>: It determines the position information (the last known GNSS position or real time GNSS position) to be included in the **+RESP:GTSTR** and **+RESP:GTSTP** report messages.
  - 0: Last known GNSS position
  - 1: Real time GNSS position

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

- **+ACK:GTSSR,**

Example: **+ACK:GTSSR,4C0203,865084030960726,gb100p,0044,20190411104241,0311$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	

Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.4.7.Harsh Behavior Monitoring

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

➢ **AT+GTHBM=**

Example: **AT+GTHBM=gb100p,3,,,100,1,1,,60,3,4,,,6,8,,,,,,30,50,20,65,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Mode	1	0 – 4	0
Reserved	0		
Reserved	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		

Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Cornering and Braking Threshold	<=3	30 – 70	30
Cornering and Braking Duration	<=3	40 – 100(*8ms)	50
Acceleration Threshold	<=3	15 – 50	20
Acceleration Duration	<=3	50 – 250(*8ms)	65
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of the harsh behavior monitoring function.

- 0: Disable this function.
- 1: Enable this function: Detection by GNSS only. 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 always on to collect all the information needed.
- 3: Enable this function: Detection by motion sensor or GNSS. This mode works the way as both Mode 1 and Mode 2 are 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.

✧ <*High Speed*>, <*Medium Speed*>: If the last known speed of the device read from GNSS is greater or equal to <*High Speed*>, the vehicle the device is attached to is considered to be at high speed. If the last known speed is less than <*High Speed*> but greater than or equal to <*Medium Speed*>, the vehicle is considered to be at medium speed. If the last known speed is less than <*Medium Speed*>, the vehicle is considered to be at low speed.

✧ <*ΔVhb*>: The threshold for harsh braking at high speed level. If the current speed is less than the last known speed and the change of the speed is greater than or equal to this value within 5 seconds, harsh braking is detected at high speed level. If it is set to 0, it means “Do

not monitor harsh braking behavior at high speed level".

- ✧ <*ΔVha*>: The threshold for harsh acceleration at high speed level. If the current speed is greater than the last known speed and the change of the speed is greater than or equal to this value within 5 seconds, harsh acceleration is detected at high speed level. If it is set to 0, it means "Do not monitor harsh acceleration behavior at high speed level".
- ✧ <*ΔVmb*>: The threshold for harsh braking at medium speed level. If the current speed is less than the last known speed and the change of the speed is greater than or equal to this value within 5 seconds, harsh braking is detected at medium speed level. If it is set to 0, it means "Do not monitor harsh braking behavior at medium speed level".
- ✧ <*ΔVma*>: The threshold for harsh acceleration at medium speed level. If the current speed is greater than the last known speed and the change of the speed is greater than or equal to this value within 5 seconds, harsh acceleration is detected at medium speed level. If it is set to 0, it means "Do not monitor harsh acceleration behavior at medium speed level".
- ✧ <*ΔVlb*>: The threshold for harsh braking at low speed level. If the current speed is less than the last known speed and the change of the speed is greater than or equal to this value within 5 seconds, harsh braking is detected at low speed level. If it is set to 0, it means "Do not monitor harsh braking behavior at low speed level".
- ✧ <*ΔVla*>: The threshold for harsh acceleration at low speed level. If the current speed is greater than the last known speed and the change of the 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".
- ✧ <*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 (harsh cornering / harsh braking) are maintained for a period of time longer than <*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 (harsh acceleration) is maintained for a period of time longer than the time specified by <*Acceleration Duration*>, harsh acceleration event will be triggered.

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

- ➢ **+ACK:GTHBM,**

Example: **+ACK:GTHBM,4C0203,865084030960726,gb100p,0045,20190411104316,0312$**			
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	$	$

3.2.4.8.Jamming Detection

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

➢ **AT+GTJDC=**

Example: **AT+GTJDC=gb100p,2,25,,5,10,10,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Mode	1	0|1|2	0
Signal Threshold	<=3	0 – 31	25
Reserved	0		
Jamming Cell Number Threshold	<=2	0 – 99	5
Enter Jamming Timer Threshold	<=3	0 – 300 sec	10
Quit Jamming Timer Threshold	<=4	0 – 3600 sec	10
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

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

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

➢ **+ACK:GTJDC,**

Example: **+ACK:GTJDC,4C0203,865084030960726,gb100p,0047,20190411104402,0314$**			
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	$	$

3.2.4.9.Crash Detection

The command **AT+GTCRA** is used to configure the parameters for CRASH detection. If the detection condition is matched (i.e. the current acceleration in a direction is beyond the configured threshold), the device will report the **+RESP:GTCRA** event message and data packets **+RESP:GTCRD** to the backend server.

➢ **AT+GTCRA=**

Example: **AT+GTCRA=gb100p,1,50,50,50,0,500,500,2,0,0,0,30,30,FFFF$**

Parameter	Length (byte)	Range/Format	Default
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Mode	1	0 – 2	0
Threshold_X	<=3	0 – 160	50
Threshold_Y	<=3	0 – 160	50
Threshold_Z	<=3	0 – 160	50
Sampling Start	1	0|1	0
Samples Before Crash	4	1 – 3200	500
Samples After Crash	4	1 – 3200	500
Sampling Frequency Mode	1	0 – 6	2
Report Gyro Data	1	0|1	0
Acceleration Direction Control	1	0|1	0
Add GNSS Data	1	0|1	0
GNSS Time Before Crash	3	0 – 120(x1s)	30
GNSS Time After Crash	3	0 – 120(x1s)	30
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 is the opposite direction of gravity.

  Note: The device will keep monitoring crash event based on the original three axis data from sensor until it detects the first **+RESP:GTASC** event.

✧ <*Threshold_X*>: The acceleration threshold for crash in X direction. The positive X-axis direction, which is the same as the direction of the arrow as shown on the shell of the tracking unit, indicates the direction in which the vehicle travels. A crash event detected in positive X direction means a crash comes from the front of the vehicle. The smaller the parameter value, the more easily a crash event will be detected. 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. Y-axis is, as shown in the picture, the lateral one pointing to the right. In reality, it points to the left as the X-axis

points forward. A crash event detected in positive Y direction means a crash comes from the left of the vehicle. The smaller the parameter value is, the more easily a crash event will be detected. 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. Z-axis is the vertical axis (i.e. perpendicular to the horizontal XY-plane), pointing upward. A crash event detected in positive Z direction means a drop event happens or a crash comes from the top of the vehicle. The smaller the parameter value is, the more easily a crash event will be detected. If <*Threshold_Z*> is 0, the device will not monitor crash event in Z axis. The unit is 0.1g.
- <*Sampling Start*>: A numeral to indicate the time to start sampling acceleration data.
  - 0: Start acceleration sampling after the device is powered on. The device will always collect acceleration information as long as the device is powered on.
  - 1: Start acceleration sampling after ignition on is detected. The device will collect acceleration information only in ignition on state.
- <*Samples Before Crash*>: When <*Report Gyro Data*> is 0, the value for this parameter represents the number of recorded XYZ-axis acceleration samples before crash. When <*Report Gyro Data*> is 1, this parameter value represents the number of recorded XYZ-axis acceleration and gyroscope data samples before crash.
- <*Samples After Crash*>: When <*Report Gyro Data*> is 0, the value for this parameter represents the number of recorded XYZ-axis acceleration samples after crash. When <*Report Gyro Data*> is 1, this parameter value represents the number of recorded XYZ-axis acceleration and gyroscope data samples after crash.
- <*Sampling Frequency Mode*>: The mode of sampling frequency. This parameter defines the sampling frequency of the data in the message **+RESP:GTCRD**.

Sampling Frequency Mode	Frequency (Hz)
0	25
1	50
2	100
3	200
4	400
5	800
6	1600

Note: If the self-calibration is used for crash detection, sampling frequency should be at least 100Hz.

- <*Report Gyro Data*>: A numeral to indicate whether to include the sampling data of gyroscope in the message **+RESP:GTCRD**.
  - 0: Do not include gyroscope sampling data in the message **+RESP:GTCRD**.
  - 1: Include gyroscope sampling data in the message **+RESP:GTCRD**.
- <*Acceleration Direction Control*>: A numeral to indicate to use the original direction or opposite direction of the acceleration on X axis and Y axis as the direction of crash event.
  - 0: Use the opposite direction of the acceleration as the direction of the crash event.
  - 1: Use the original direction of the acceleration as the direction of the crash event.
- <*Add GNSS Data*>: It determines whether to report GNSS data message **+RESP:GTPGR**. In order to get enough GNSS data for reporting **+RESP:GTPGR**, the GNSS chip should be always

on.

- 0: Do not report the **+RESP:GTPGR** message.
- 1: Report the **+RESP:GTPGR** message when the crash accident is detected.

✧ <*GNSS Time Before Crash*>: The time during which GNSS information is recorded before crash.

✧ <*GNSS Time After Crash*>: The time during which GNSS information is recorded after crash.

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

➢ **+ACK:GTCRA,**

Example: **+ACK:GTCRA,4C0203,865084030960726,gb100p,0049,20190411104459,0315$**			
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	$	$

3.2.4.10.GNSS Jamming Status Report

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

➢ **AT+ GTGPJ=**

Example: **AT+GTGPJ=gb100p,1,15,3,,,,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0'–'9' 'a'–'z' 'A'–'Z'	gb100p
Mode	1	0|1	0
CW Threshold	<=2	0 – 31	15
BB Threshold	<=2	0 – 15	3
Reserved	0		

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

- ✧ <*Mode*>: The working mode of the GNSS jamming detection function.
  - 0: Disable this function.
  - 1: Enable this function.
- ✧ <*BB Threshold*>: Broadband jamming detection threshold (unit = dB).
- ✧ <*CW Threshold*>: Continuous wave (narrowband) jamming detection threshold (unit = dB).

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

- ➢ **+ACK:GTGPJ,**

Example: **+ACK:GTGPJ,4C0203,865084030960726,gb100p,004B,20190411104525,0316$**			
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	$	$

3.2.4.11.Three Axis Self-Calibration

The command **AT+GTASC** is used to define the condition for calibrating the directions of accelerometer. When the condition is matched and the accelerometer calibration succeeds, 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 ignition on and movement.

Note: It is strongly recommended to clear the self-calibration status of the acceleration data (via the sub command 25 (SCS) in **AT+GTRTO**) after the device is installed to avoid inaccuracy which may result from historical calibration data.

➢ **AT+GTASC=**

Example: **AT+GTASC=gb100p,50,10,5,,,,,,,,,0019$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Brake Speed Threshold	<=3	30 – 400km/h	50
Delta Speed Threshold	<=2	5 – 72km/h	10
Delta Heading Threshold	1	0 – 5	2
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Brake Speed Threshold*>: The lower threshold of the speed before braking. If the speed is above the threshold before braking, the braking event can trigger the three-axis accelerometer calibration.

✧ <*Delta Speed Threshold*>: The lower threshold of the delta speed in one second during braking. If the delta speed is above the threshold, the braking event can trigger the three-axis 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 three-axis accelerometer calibration.

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

➢ **+ACK:GTASC,**

Example: **+ACK:GTASC,4C0300,865084030960726,gb100p,0019,20190422131356,0218$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A'–'Z','0'–'9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0'–'9' 'a'–'z' 'A'–'Z''-''_'	
Serial Number	4	0000–FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000–FFFF	
Tail Character	1	$	$

3.2.5.IO Application

3.2.5.1.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 an alarm message **+RESP:GTEPS** to the backend server to notify the status of the external power supply.

To make sure this function works in all situations, please switch on the internal backup battery in case that the voltage of the external power may drop to a very low level.

➢ **AT+GTEPS=**

Example: **AT+GTEPS=gb100p,1,250,25045,1,0,,,,,1,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Mode	1	0|1|2	0
Min Threshold	<=5	250 – 28000 mV	
Max Threshold	<=5	250 – 28000 mV	
Sample Period	<=2	0|1 – 12(×2s)	0

Debounce Time	1	0 – 5 (×1s)	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Sync with FRI	1	0|1	0
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Mode*>: The working mode of the external power supply monitoring function.
  - 0: Disable the external power supply monitoring function.
  - 1: Enable the external power supply monitoring function: If the current voltage is within the range of (<*Min Threshold*>, <*Max Threshold*>), the **+RESP:GTEPS** alarm will be triggered.
  - 2: Enable the external power supply monitoring function. If the current voltage is outside the range of (<*Min Threshold*>, <*Max Threshold*>), the **+RESP:GTEPS** alarm will be triggered.
- <*Min Threshold*>: The lower limit on the voltage of the external power supply to trigger the alarm.
- <*Max Threshold*>: The upper limit on the voltage of the external power supply to trigger the alarm.
- <*Sample Period*>: The sampling period for the voltage of the external power supply.
- <*Debounce Time*>: The debounce time used to avoid false report due to excessive voltage drop within a short time.
- <*Sync with FRI*>: Besides the **+RESP:GTEPS** alarm report, the device can also send the voltage of external power supply periodically along with the fixed report message.
  - 0: Do not report external power supply voltage with the fixed report message.
  - 1: Report external power supply voltage with the fixed report message.

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

- **+ACK:GTEPS,**

Example: **+ACK:GTEPS,4C0203,865084030960726,gb100p,004C,20190411104613,0317$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' –	

		'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.6.Virtual Ignition Settings

3.2.6.1.Voltage Virtual Ignition Setting

The command **AT+GTVVS** is used to configure parameters for detecting virtual ignition status by monitoring voltage. It is enabled if <*Virtual Ignition Mode*> is set to 2 in **AT+GTVMS**.

➢ **AT+GTVVS=**

Example: **AT+GTVVS=gb100p,13500,600,10,1,10,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Ignition on Voltage	<=5	250 – 28000 mV	13500
Voltage Offset	<=4	200 – 2000 mV	600
Ignition On Debounce	<=3	5 – 255 (× 2 sec)	10
Smart Voltage Adjustment	1	0|1	1
Ignition Off Debounce	<=3	5 – 255 (× 2 sec)	10
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Ignition on Voltage*>: The external power voltage in ignition on state. Different vehicles have different voltages in ignition on state. This parameter should be set to a value very close to the original voltage of the external power supply, 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 <*Ignition On 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.

- ✧ <*Ignition On Debounce*>: The debounce time to wait before updating the virtual ignition on state according to the external power voltage.
- ✧ <*Smart Voltage Adjustment*>: Enable/disable smart voltage adjustment algorithm.
  - 0: Disable the smart voltage adjustment algorithm. The value of <*Ignition On Voltage*> and <*Voltage Offset*> will keep static.
  - 1: Enable the smart voltage adjustment algorithm. The value of <*Ignition On Voltage*> and <*Voltage Offset*> will dynamically change according to the real 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,4C0203,865084030960726,gb100p,004E,20190411104648,0319$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.6.2.Accelerometer (Motion Status) Virtual Ignition Setting

The command **AT+GTAVS** is used to configure parameters for detecting virtual ignition status based on motion status. It is enabled if <*Virtual Ignition Mode*> is set to 4 in **AT+GTVMS**.

➢ **AT+GTAVS=**

Example: **AT+GTAVS=gb100p,30,60,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**

Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Rest Validity	<=3	1 – 255 sec	30
Movement Validity	<=3	1 – 255 sec	60
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Rest Validity*>: A time parameter to determine whether the device enters virtual ignition off state. The device will be considered in virtual ignition off state after the motion sensor detects rest and the resting state is maintained for a period of time specified by the parameter <*Rest Validity*>.
- <*Movement Validity*>: A time parameter to determine whether the device enters virtual ignition on state. The device will be considered in virtual ignition on state after the motion sensor detects movement and the moving state is maintained for a period of time specified by the parameter <*Movement Validity*>.

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

- **+ACK:GTAVS,**

Example: **+ACK:GTAVS,4C0203,865084030960726,gb100p,0050,20190411104716,031A$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.6.3.Virtual Ignition Mode Selection

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

➢ **AT+GTVMS=**

Example: **AT+GTVMS=gb100p,4,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Virtual Ignition Mode	1	0|2|4|5|6|7	0
Virtual Ignition On Mask	2	00 – FF	7
Virtual Ignition Off Mask	2	00 – FF	7
Virtual Ignition On Logic	1	0 – 1	1
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Virtual Ignition Mode*>: A numeral to define the working mode of detecting virtual ignition state.

- 0: Disable the virtual ignition detection function.
- 1: Reserved.
- 2: Voltage virtual ignition detection mode. The ignition status is related to the voltage of the external power supply. Please use the command **AT+GTVVS** to configure the parameters.
- 3: Reserved.
- 4: Accelerometer virtual ignition detection mode. Ignition status can be indicated by the motion status determined by <*Sensor Rest Duration*> and <*Sensor Motion Validity*> defined in the **AT+GTAVS** command. Stationary state indicates ignition off and moving state indicates ignition on.
- 5: Enhanced Algorithm Voltage virtual ignition mode.
- 6: Accelerometer virtual ignition detection and Enhanced Algorithm Voltage virtual ignition combined mode. In this mode, both accelerometer virtual ignition detection mode (Mode 4) and Enhanced Algorithm Voltage virtual ignition mode (Mode 5) will be used at the same time. If ignition status is detected by Mode 4 before Mode 5, the device will keep using Mode 4 as the virtual ignition detection mode. If ignition status is detected by Mode 5, the device will keep using Mode 5 as the virtual ignition detection mode until the external power is disconnected.
- 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.

Bit 0 (01): Voltage virtual ignition detection

Bit 1 (02): Motion status virtual ignition detection

Bit 2 (04): Enhanced algorithm voltage virtual ignition detection

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

Bit 0 (01): Voltage virtual ignition detection

Bit 1 (02): Motion status virtual ignition detection

Bit 2 (04): Enhanced algorithm voltage virtual ignition detection

For example:

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

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

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

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

➢ **+ACK:GTVMS,**

Example: **+ACK:GTVMS,4C0203,865084030960726,gb100p,0052,20190411104743,031B$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

Note: 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=gb100p,1,,GB100P_BT,7,3,0,1D03,0003,0,123456,,,,,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Mode	1	0|1	0
Reserved	0		
Bluetooth Name	<=16	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	GB100P_BT
Bluetooth Service	<=4	0000-FFFF	07
Discoverable Mode	1	0 – 3	3
Discoverable Time	<=4	0|1 –1440 min	0
Bluetooth Report Mask	<=4	0000 – FFFF	1D03
Bluetooth Event Mask	<=4	0000 – FFFF	0003
PIN Need	1	0|1	0
PIN Code	4|6	0000-9999|000000-999999	123456
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of the Bluetooth.

- 0: Disable the Bluetooth.
- 1: Enable the 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 <*Peer Address Type*>
  - Bit 11 <*Peer MAC Address*>
  - Bit 12 <*Peer Device Name*>
  - Bit 13 … Bit 15 - Reserved

  For each bit, set it to 1 to enable the corresponding component in the report, and set it to 0 to disable the corresponding component in the report. This mask is valid for **+RESP:GTBCS**, **+RESP:GTBDS** and **+RESP:GTBDR** 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**
- <*PIN Need*>: It defines whether a PIN code for pairing is needed or not.
  - 0: No PIN code is needed.
  - 1: PIN code is needed for pairing.
- <*PIN Code*>: PIN code for pairing if needed.

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

- **+ACK:GTBTS,**

Example:

+ACK:GTBTS,4C0203,865084030960726,gb100p,0029,20190411103140,02FF$			
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	$	$

3.2.7.2.Bluetooth Manager Setting

The command **AT+GTBMS** is used to configure the peripherals which the device will connect and read the data from. Once the device connects with the peripheral, it will try to search the Service by UUID and read the data from specified Characteristic.

- **AT+GTBMS=**

Example: **AT+GTBMS=gb100p,0,1,BT_SENSOR,780562014589,3,1,2405,1,1802,0,123456,0,0,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Index	1	0 – 9	
Mode	1	0|1	0
Peripheral Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	BT_SENSOR
Peripheral MAC Address	12	000000000000 – FFFFFFFFFFFF	
Data Mask	4	0000 – FFFF	0003
Service UUID Type	1	1|2	1
Service UUID	4|32	0000 – FFFF|00000000000000000000000000000000 – FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	

Characteristic UUID Type	1	1|2	1
Characteristic UUID	4|32	0000 – FFFF|00000000000000000000000000000000 – FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	
PIN Need	1	0|1	0
PIN Code	4|6	'0' – '9'	123456
Data Format	1	0|1	0
Send Interval	<=5	0|1 – 86400(×5s)	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Index*>: The index of a specific peripheral device stored in the device.
  Note: A master device can only connect seven slave devices at a time.
- <*Mode*>: Enable/disable the function of connecting to and reading data from the peripheral specified by <*Index*>.
  - 0: Disable this function.
  - 1: Enable this function.
- <*Peripheral Name*>: The name of the peripheral device which the device will connect.
- <*Peripheral MAC Address*>: The MAC address of the peripheral device which the device will connect.
- <*Data Mask*>: Bitwise mask to configure the composition of Bluetooth data in report messages.
  - Bit 0 for Service information which includes <*Service UUID Type*> and <*Service UUID*>
  - Bit 1 for Characteristic information which includes <*Characteristic UUID Type*> and <*Characteristic UUID*>
  - Bit 2 ... Bit 7 - Reserved

  For each bit, set it to 1 to enable the corresponding component in the report, and set it to 0 to disable the corresponding component in the report. This mask is valid for all Bluetooth report messages.
- <*Service UUID Type*>: The type of Universally Unique Identifier of Service.
  - 1: 16-bit UUID.

- 2: 128-bit UUID.

✧ <*Service UUID*>: The Universally Unique Identifier for a Bluetooth Service. If the parameter field is empty, the current value for this parameter will be cleared.

✧ <*Characteristic UUID Type*>: The type of Universally Unique Identifier of Characteristic.

- 1: 16-bit UUID.
- 2: 128-bit UUID.

✧ <*Characteristic UUID*>: The Universally Unique Identifier of a Bluetooth Characteristic. If the parameter field is empty, the current value for this parameter will be cleared. The relationship between <*Service UUID*> and <*Characteristic UUID*> is shown in the figure:

Service UUID		**Characteristic UUID**	
Generic Attribute	0x1801	Service Changed	0x2A05
		Descriptors	0x2902
Generic Access	0x1800	Device Name	0x2A00
		Appearance	0x2A01
		Peripheral Preferred Connection Parameters	0x2A04
Device Information	0x180A	Manufacturer Name String	0x2A29
		Model Number String	0x2A24
		Firmware Revision String	0x2A26
		Software Revision String	0x2A28
		Serial Number String	0x2A25
Battery Service	0x180F	Battery Level	0x2A19
Virtual Serial	0x3430	Virtual Serial Port	0x3431

✧ <*PIN Need*>: It defines whether a PIN code is needed or not for pairing a peripheral Bluetooth device.

- 0: Do not need PIN code.
- 1: Need PIN code for pairing.

✧ <*PIN Code*>: PIN code for pairing if needed.

✧ <*Data Format*>: This parameter defines the format of the data in the **+RESP:GTBDR** message.

- 0: Raw data received from Bluetooth. If the data is not an ASCII code and protocol format is ASCII format, please do not use this mode.
- 1: Hexadecimal format. For example, if the data is 0x69, it will be shown as 69 in the report message.

✧ <*Send Interval*>: If this parameter is 0, the message **+RESP:GTBDR** will be sent once after the device connects with a Bluetooth peripheral. If this parameter value is not 0, the message **+RESP:GTBDR** will be sent at the interval specified by this parameter after the device connects with a peripheral device.

Note:

If <*PIN Need*> in **AT+GTBMS** and <*PIN Need*> in **AT+GTBTS** are set to 1 at the same time when <*Mode*> is enabled, the device will handle the **AT+GTBMS** command with higher priority. In other

words, the device will not be able to be connected and paired successfully when device role is slave.

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

- **+ACK:GTBMS,**

Example: **+ACK:GTBMS,4C0203,865084030960726,gb100p,002F,20190411103248,0300$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.7.3.Bluetooth Accessory Setting

The command **AT+GTBAS** is used to connect the device with Bluetooth accessories. Before using the **AT+GTBAS** function, make sure the <*Mode*> in the command **AT+GTBTS** is enabled. Maximum 8 connectable Bluetooth accessories can be supported.

- **AT+GTBAS=**

Example: **AT+GTBAS=gb100p,0,2,0,TD_100114,B339808571D9,1F,30,2400,,0,0,10,2,300,,,,,,,FFFF$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Index	1	0 – 9	0
Accessory Type	1	0 – 2|6	0
Accessory Model	1	0|2	0
Accessory Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Accessory MAC	12	000000000000 - FFFFFFFFFFFF	FFFFFFFFFFFF

Accessory Append Mask	<=4	0000 – FFFF	001F
Read Interval	<=5	10 – 86400sec	30
Low Voltage Threshold	<=4	0 – 5000mV	2400
Reserved			
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Serial Number	4	0000 – FFFF	
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
- 1: Reserved
- 2: Beacon temperature sensor. Five reserved parameters are used as follows:

Mode	1	0 – 3	0
Low Temperature	<=3	-40 – 80℃	0
High Temperature	<=3	-40 – 80℃	10
Validity	<=2	1 – 10	2
Send Interval	<=2	30 – 43200sec	300

The device will report the **+RESP:GTBAA** message to the backend server when the temperature outside or inside the range is detected.

✧ <*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, <*Send Interval*> will be ignored.

✧ <*Low Temperature*>: It specifies the lower limit temperature. When the temperature of the sensor is below this value, the device will report the message **+RESP:GTBAA** to the backend server.

✧ <*High Temperature*>: It specifies the upper limit temperature. When the temperature of the sensor is above this value, the device will report the message **+RESP:GTBAA** to the backend server.

✧ <*Validity*>: If the sensor detects the environment temperature which meets the alarm condition and the temperature keeps meeting the alarm condition for <*Validity*> times, the temperature alarm will be triggered.

- 6 : Beacon Multi-Functional 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	<=2	30 – 43200sec	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	<=2	30 – 43200sec	300

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*> time, 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*> time, the humidity alarm will be triggered.

✧ <*Accessory Model*>: The model of the Bluetooth accessory which is defined in <*Accessory Type*>. The following is supported now:

- The model for <*Accessory Type*> 2 (Beacon Temperature Sensor):
  0: WTS300
- The model for <*Accessory Type*> 6 (Beacon Multi-Functional Sensor) :
  2: WTH300

✧ <*Accessory Name*>: The name of the Bluetooth accessory.

✧ <*Accessory MAC*>: The MAC address of the Bluetooth accessory. If <*Accessory MAC*> is the default value, the device will search for the Bluetooth accessory by accessory name. The name of the Bluetooth accessory is variable and the MAC address is unique. It is recommended to use the MAC address to connect Bluetooth accessories.

✧ <*Accessory Append Mask*>: If the device is connected with the 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 whether to report the data from peripherals via **+RESP:GTERI**.

- Bit 0: <*Accessory Name*>
- Bit 1: <*Accessory MAC*>
- Bit 2: Accessory Connection Status. This bit is only effective when the Bluetooth accessory is a Bluetooth connectable accessory. It will always be 0 when the Bluetooth accessory is a Bluetooth beacon accessory.
- Bit 3: <*Accessory Battery Level*>
- Bit 4: <*Accessory Temperature*>
- Bit 5: <*Accessory Humidity*>

Note: When the <*Accessory Model*> is WTH300 and the any bits from Bit 3 to Bit 5 of

<*Accessory Append Mask*> in **AT+GTBAS** are set to 0, the Bit 3 - Bit 5 of <*Accessory Append Mask*> in hex format report messages **+RESP:GTERI** and **+RESP:GTBAA** are determined based on the detected update of temperature, humidity and voltage. If no temperature, humidity or voltage is detected within the timeout period, the corresponding bit position will be set to 0.

- ✧ <*Read Interval*>: The interval for reading data from the Bluetooth accessory. This field is only effective when the Bluetooth accessory is a Bluetooth connectable accessory.
- ✧ <*Low Voltage Threshold*>: It specifies the lower limit voltage. When the voltage of Bluetooth accessory is below this value, the device will report the message **+RESP:GTBAA** to the backend server. 0 means "Disable low voltage detection".

Note: <*Low Temperature*> must be less than <*High Temperature*>. Therefore, the value of <*Low Temperature*> cannot be set to 80, and <*High Temperature*> cannot be set to -40.

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

➢ **+ACK:GTBAS,**

Example: **+ACK:GTBAS,4C0203,135790246811220,,0005,20090214093254,11F0$**			
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	$	$

3.2.7.4.Bluetooth Beacon ID Setting

The command **AT+GTBID** is used to scan the device with Bluetooth beacon ID accessories. The parameter <*Mode*> in the command **AT+GTBTS** must be 1.

➢ **AT+GTBID=**

Example: **AT+GTBID=gb100p,,1,0,1F,5000,,1,1,,1,2,75,,,,0,0,0,0,,,FFFF$**			
Parameter	**Length(byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Reserved	0		

Enable	1	0|1	
Beacon ID Accessory Model	1	0	0
Append Mask	<=4	0000 – FFFF	000A
Low Voltage Threshold	<=4	0 – 5000mV	2400
Reserved	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		
Reserved	0		
Reserved	1		
Reserved	1		
Reserved	1		
Reserved	1		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Enable*>: Whether to support the Bluetooth beacon ID accessories.

- 0: Not support.
- 1: Support.

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

- 0: WKF300. Two reserved parameters are used as follows:

Push Button Event	1	0|1	0
Keyfob Detect mode	1	0 – 2	0
Keyfob Detect Interval	<=3	30 – 600(s)	30

Reserved	0		
Reserved	0		

- ✧ <*Push Button Event*>: If this parameter is set to 1 and push the WKF300, the device will report the message **+RESP:GTBAA** to the backend server.
- ✧ <*Keyfob Detect Mode*>: It specifies the mode of detect keyfob.
  - 0: Disable the keyfob detect mode
  - 1: After entering ignition on and moving state, the device will scan Keyfobs one time for the time period specified by <*Keyfob Detect Interval*> and then it will send the **+RESP:GTBID** message to report information of Keyfob(s). If more than 3 Keyfobs are detected, the **+RESP:GTBID** message contains information of the top 3 Keyfobs with the strongest signal.
  - 2: After entering ignition on and moving state, the device will keep scanning Keyfobs continuously. If the device detects change of available Keyfob(s) over two successive time intervals specified by <*Keyfob Detect Interval*>, it will send the **+RESP:GTBID** message to report information of Keyfob(s). If more than 3 Keyfobs are detected, the **+RESP:GTBID** message contains information of the top 3 Keyfobs with the strongest signal.
- ✧ <*Keyfob Detect Interval*>: It specifies the interval for detecting keyfob.

✧ <*Append Mask*>: Bitwise mask to configure the composition of Bluetooth accessory information. In **+RESP:GTBAA** and **+RESP:GTBID** messages, the Bluetooth accessories data items will be reported according to the mask set by this field.

- Bit 0: Reserved.
- Bit 1: Bluetooth accessory MAC.
- Bit 2: Reserved.
- Bit 3: Bluetooth accessory battery voltage.
- Bit 4: Reserved.

✧ <*Low Voltage Threshold*>: It specifies the lower limit voltage. When the voltage of Bluetooth accessory is below this value, the device will report message **+RESP:GTBAA** to back server. 0 means disable low voltage detection.

✧ <*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 amount 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 address to be updated to the MAC list. The quantity of the MAC addresses are 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 address 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 the three MAC addresses of <*MAC List*> empty.

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

- **+ACK:GTBID,**

Example: **+ACK:GTBID,4C0203,135790246811220,,0005,20090214093254,11F0$**			
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	$	$

3.2.7.5.UART Data Transfer

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

- **AT+GTUDT=**

Example: **AT+GTUDT=gb100p,0,,0,0,,1,,0008EFFF,,,,,,0000$**				
SN	**Parameter**	**Length (byte)**	**Range/Format**	**Default**
1	Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
2	Mode	1	0|2	0
3	Reserved	0		
4	IGN Send Interval	<=3	0|5 – 250	0
5	IGF Send Enable	1	0|1	0
6	Reserved	0		
7	Event Mask	8	00000000 – FFFFFFFF	1
8	Reserved	0		
11	Report Composition Mask	8	00000000 – FFFFFFFF	0008EFFF
12	Reserved	0		
13	Reserved	0		

14	Reserved	0		
15	Report BLE Output	1	0|1	
16	Report BLE Mask	16	0000000000000000 – FFFFFFFFFFFFFFFF	00000000 00000000
17	Reserved	0		
18	Serial Number	4	0000 – FFFF	
19	Tail Character	1	$	$

✧ <*Mode*>: Enable/disable data transfer to Bluetooth via the report message **+RESP:GTUDT**.

- 0: Disable data transfer.
- 1: Reserved.
- 2: Enable data transfer to Bluetooth virtual serial port.

Note: In order to ensure the execution of mode 2, it is recommended to set the parameter <*Mode*> in the **AT+GTBTS** command to 1.

✧ <*IGN Send Interval*>: The interval for sending the related information when the ignition is on. The value range is 0|5-250 and the unit is second. 0 means "Disable this parameter".

✧ <*IGF Send Enable*>: Whether or not to send the related information when the ignition is off. It works depending on the frequency of <*IGF Report Interval*> of **AT+GTFRI** and <*Mode*> of **AT+GTFRI**.

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

✧ <*Event Mask*>: Bitwise mask to configure which event triggered will send **+RESP:GTUDT** to Bluetooth.

- Bit 0 for activated GEO
- Bit 1-31 Reserved

✧ <*Report Composition Mask*>: Bitwise mask to configure which information should be sent to Bluetooth.

- Bit 0 for Protocol Version, Firmware Version
- Bit 1 for Hardware Version
- Bit 2 for Unique ID
- Bit 3 for Device Name
- Bit 4 for speed
- Bit 5 for Azimuth
- Bit 6 for altitude
- Bit 7 for MCC, MNC, LAC, Cell ID, Reserved
- Bit 8 for Mileage, Reserved
- Bit 9 for HMC, Reserved
- Bit 10 for GSV, Reserved
- Bit 11 for Circular GEO State
- Bit 12 for Reserved
- Bit 13 for Reserved ,Motion Status
- Bit 14 for External Power VCC, Backup Battery Level, Charging

- Bit 15 for Circular GEO Status Mask
- Bit 16-18 Reserved
- Bit 19 for Send Time, the time when the report message is generated.
- Bit 20-31 Reserved

✧ <*Report BLE Output*>: Enable/disable the report of the messages configured by <*Report BLE Mask*> to Bluetooth. If this parameter is enabled, all ACK messages generated after completing commands successfully will be sent to Bluetooth.

- 0: Disable the report of those messages configured by <*Report BLE Mask*>.
- 1: Enable the report of those messages configured by <*Report BLE Mask*>.

✧ <*Report BLE Mask*>: Bitwise mask to configure which report messages should be sent to Bluetooth.

Bit	Message
Bit 0	**+RESP:GTINF**
Bit 1	**+RESP:GTPNA**
Bit 2	**+RESP:GTPFA**
Bit 3	**+RESP:GTMPN**
Bit 4	**+RESP:GTMPF**
Bit 5	**+RESP:GTBPL**
Bit 6	**+RESP:GTBTC**
Bit 7	**+RESP:GTSTC**
Bit 8	**+RESP:GTSTT**
Bit 9	Reserved
Bit 10	Reserved
Bit 11	Reserved
Bit 12	Reserved
Bit 13	**+RESP:GTUPD**
Bit 14	**+RESP:GTIDN**
Bit 15	**+RESP:GTIDF**
Bit 16	**+RESP:GTJDR**
Bit 17	**+RESP:GTGSS**
Bit 18	**+RESP:GTSTR**
Bit 19	**+RESP:GTSTP**
Bit 20	**+RESP:GTCRA**
Bit 21	Reserved

Bit 22	**+RESP:GTGES**
Bit 23	**+RESP:GTLSP**
Bit 24	**+RESP:GTJDS**
Bit 25	**+RESP:GTRMD**
Bit 26	**+RESP:GTGSM**
Bit 27	Reserved
Bit 28	**+RESP:GTUPC**
Bit 29	**+RESP:GTVGN**
Bit 30	**+RESP:GTVGF**
Bit 31	**+RESP:GTASC**
Bit 32	Reserved
Bit 33	Reserved
Bit 34	**+RESP:GTTOW**
Bit 35	**+RESP:GTLBC**
Bit 36	**+RESP:GTEPS**
Bit 37	Reserved
Bit 38	Reserved
Bit 39	**+RESP:GTFRI**
Bit 40	**+RESP:GTGEO**
Bit 41	**+RESP:GTSPD**
Bit 42	Reserved
Bit 43	**+RESP:GTRTL**
Bit 44	**+RESP:GTDOG**
Bit 45	Reserved
Bit 46	**+RESP:GTHBM**
Bit 47	Reserved
Bit 48	**+RESP:GTERI**
Bit 49	Reserved
Bit 50	Reserved
Bit 51	**+RESP:GTVGL**

Bit 52	+RESP:GTCRD

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

➢ **+ACK:GTUDT,**

Example: **+ACK:GTUDT,4C0203,135790246811220,,0004,20090214093254,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.8.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=gb100p,2,EPS,,,,,FFFF$** **AT+GTRTO=gb100p,2,0000000010210000,,,,,FFFF$** **AT+GTRTO=gb100p,9,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Sub Command	2	0 – D|14|25	
AT Command| Configuration Mask| Bluetooth Command| SCS Action	3|16 – 32|3|0 – 1	"SRI"| 00000000000000000000000000000000 – FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF|"BTI"|0 – 1	

BMS Index (Optional)	1	0 – 9	
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

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

- 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:GTALS/ +RESP:GTALC/ +RESP:GTALM**.
- 3: ***REBOOT***. Reboot the terminal.
- 4: ***RESET***. Reset all parameters except those configured by **AT+GTBSI**, **AT+GTSRI**, **AT+GTCFG**, **AT+GTTMA** and **AT+GTPIN** 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 GSM signal level of the terminal via the message **+RESP:GTCSQ**.
- 8: ***VER***. Get the version information of the device via the message **+RESP:GTVER**.
- 9: ***BAT***. Get the battery level and adapter status of the terminal via the message **+RESP:GTBAT**.
- A: **Reserved**.
- B: ***TMZ***. Get the time zone settings via the message **+RESP:GTTMZ**.
- C: ***GIR***. Get cell information via the message **+RESP:GTGSM**.
- D: ***DELBUF***. Delete all the buffered reports.
- 14: ***BLE***. Commands for Bluetooth.
- 25: ***SCS***. Get the self-calibration status of the acceleration data via the message **+RESP:GTSCS** or clear the self-calibration status. It is used together with <*SCS Action*> below.

✧ <*AT Command/ Configuration Mask/ Bluetooth Command/ SCS Action*>:

- AT Command: To get single AT command configuration when <*Sub Command*> is set to 2, please follow the format in the following example. Example: To get the configuration of **AT+GTFRI**, please set AT+GTRTO=gb100p,2,FRI,,,,,0015$, and get it via **+RESP:GTALS**.
  Note: To get local time information, please use **TMZ**.
- Configuration Mask: If <*Sub Command*> is set to 2, configuration information which varies depending on the selected configuration mask can be obtained via the

message **+RESP:GTALC**. The configuration mask must be 16 bytes. If it is less than 16 bytes, **0** should be added to the high bytes of the configuration mask.

Configuration Mask Table:

Mask Bit	Item
Bit 89	BID
Bit 77 – **Bit 88**	Reserved
Bit 76	UDT
Bit 69 – **Bit 75**	Reserved
Bit 68	BAS
Bit 51 – **Bit 67**	Reserved
Bit50	UDF
Bit 49	CMD
Bit 43 – **Bit 48**	Reserved
Bit 42	FVR
Bit 41	BMS
Bit 40	BTS
Bit 39	GAM
Bit 38	VMS
Bit 37	AVS
Bit 36	VVS
Bit 35	Reserved
Bit 34	UPC
Bit 33	ASC
Bit 32	Reserved
Bit 31	Reserved
Bit 30	FFC
Bit 29	RMD
Bit 28	GPJ
Bit 27	SSR
Bit 26	Reserved
Bit 25	Reserved

Bit 24	Reserved
Bit 23	PDS
Bit 22	CRA
Bit 21	HRM
Bit 20	WLT
Bit 19	JDC
Bit 18	HBM
Bit 17	HMC
Bit 16	IDL
Bit 15	DOG
Bit 14	OWH
Bit 13	PIN
Bit 12	Reserved
Bit 11	SPD
Bit 10	GEO
Bit 9	FRI
Bit 8	TMZ
Bit 7	Reserved
Bit 6	Reserved
Bit 5	EPS
Bit 4	TOW
Bit 3	CFG
Bit 2	Reserved
Bit 1	SRI
Bit 0	BSI

Set <*Sub Command*> to 4 to specify the configuration to be reset. To specify a configuration, the last three letters of the protocol command are used. For example, to reset the configuration of the **AT+GTFRI** command, send the command "**AT+GTRTO=gb100p,4,FRI,,,,,000F$**". Also, the buffered messages can be deleted with the command "**AT+GTRTO=gb100p,4,BUF,,,,,000F$**". The configurations of the commands **AT+GTBSI**, **AT+GTSRI**, **AT+GTQSS**, **AT+GTCFG**, **AT+GTTMA** and **AT+GTPIN** cannot be reset in this way.

- Bluetooth Command: It specifies the Bluetooth command to be executed when <*Sub Command*> is set to 14.
  "**BTI**": Request the device to report the Bluetooth information and list of paired device(s) via the **+RESP:GTBTI** message.
  "**BSC**": Request the device to report the information of Bluetooth device(s) it has found via the **+RESP:GTBSC** message.
  "**BAU**": Request the device to report all the primary Service UUIDs and Characteristic UUIDs in the peer device defined in the <*BMS Index (Optional)*> via the **+RESP:GTBAU** message.
- SCS Action: It specifies whether to read or clear self-calibration status when <*Sub Command*> is set to 25.
  0: Read self-calibration status.
  1: Clear self-calibration status.

✧ <*BMS Index*>: The valid value range is 0 – 9. Please refer to the <*Index*> in **AT+GTBMS**.

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

➢ **+ACK:GTRTO,**

Example: **+ACK:GTRTO,4C0203,865084030960726,gb100p,BAT,0053,20190411104848,031C$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Sub Command	<=6	Sub Command String	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

3.2.8.2.Hour Meter Count

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

➢ **AT+GTHMC=**

Example: **AT+GTHMC=gb100p,1,142511:12:34,,,,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Hour Meter Enable	1	0|1	0
Initial Hour Meter Count	11	00000:00:00 – 99999:00:00	00000:00:00
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

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

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

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

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

➢ **+ACK:GTHMC,**

Example: **+ACK:GTHMC,4C0203,865084030960726,gb100p,0055,20190411104951,031F$**			
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	$	$

3.2.8.3.White List

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

➢ **AT+GTWLT=**

Example: **AT+GTWLT=gb100p,1,1,2,12345688996555444444,12345688996555125688,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Call Filter	1	0|1	0
Start Index	<=2	1 – 10	
End Index	<=2	1 – 10	
Phone Number List	<=20*10		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

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

- 0: Disable this function: Allow any phone number to use the location by call function.
- 1: White list for the location by call function: Only phone numbers saved in the white list can perform the location by call function.

✧ <*Start Index*>, <*End Index*>: The index range of the white list to which the phone numbers are to be updated. For example, if the <*Start Index*> is set to 1 and the <*End Index*> is set to 2, then the first two phone numbers in the white list will be updated by the numbers provided

in the parameter <*Phone Number List*>. The <*Start Index*> and <*End Index*> define the total number of phone numbers that will be updated. If either one is empty, there should be no <*Phone Number List*>.

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

Note: If more phone numbers are needed, please adjust <*Start Index*> and <*End Index*> for appropriate setup. If some operators in <*Phone Number List*> are empty, then the corresponding phone numbers will be deleted. For example, to delete the 4th, 5th and 6th phone numbers of the <*Phone Number List*>, please set <*Start Index*> to 4 and set <*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,4C0203,865084030960726,gb100p,0056,20190411105237,0320$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

Note: Make sure the total size of the command is not greater than 160 bytes if 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=gb100p,1,0,AT+GTRTO=gb100p,9,,,,,,FFFF$,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	gb100p

Mode	1	0 – 1	0
Stored Cmd ID	3	0 – 31	
Command String	200	AT command	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- ✧ <*Mode*>: The working mode of storing the command string.
  - 0: Delete the stored command.
  - 1: Add the stored command.
- ✧ <*Stored 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,4C0203,865084030960726,gb100p,005A,20190411105335,0321$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	20		
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.8.5.User Defined Function

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

➢ **AT+GTUDF=**

Example: **AT+GTUDF=gb100p,1,1,9011024,5,11,820,2020002,1,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	gb100p
Mode	1	0 – 2	0
Group ID	2	0 – 31	
Input ID Mask	16	0 – FFFFFFFFFFFFFFFF	

Debounce Time	5	0 – 86400(s)	0
Inzizo Mask	5	00000 – FFFFF	0
Outzizo Mask	5	00000 – FFFFF	0
Stocmd ID Mask	<=8	0 – FFFFFFFF	
Stocmd Ack	1	0|1	0
Reserved			
Reserved			
Reserved			
Reserved			
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Mode*>: The working mode of the user defined function.
  - 0: Disable the group.
  - 1: Enable the group.
  - 2: Delete the group.
- <*Group ID*>: A numeral to identify a specific group of input events and stored commands to be executed.
- <*Input ID Mask*>: Bitwise mask to indicate the input events included in the group.

  Bit 0 (00000001): Select ID1

  Bit 1 (00000002): Select ID2

  Bit 2 (00000004): Select ID3

  Bit 3 (00000008): Select ID4

For example:

Bit (00000003): Select ID1, and ID2

Bit (00000017): Select ID1, ID2, ID3, and ID5

ID	Mask Bit	Item
1	**Bit 0**	Power on finished
2	**Bit 1**	Ignition on
3	**Bit 2**	Ignition off
4	**Bit 3**	Attached to the GPRS network
5	**Bit 4**	Not attached to the GPRS network
6	**Bit 5**	Registered to GSM network
7	**Bit 6**	Not registered to GSM network
8	**Bit 7**	Network roaming
9	**Bit 8**	Network non-roaming
10	**Bit 9**	SIM card is locked.
11	**Bit 10**	GNSS is turned on.
12	**Bit 11**	GNSS is turned 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**	The device is charging.
18	**Bit 17**	The device is not charging.
19	**Bit 18**	Reserved
20	**Bit 19**	Reserved
21	**Bit 20**	Reserved
22	**Bit 21**	Reserved
23	**Bit 22**	SIM card is inserted.
24	**Bit 23**	SIM card is not inserted
25	**Bit 24**	Reserved
26	**Bit 25**	Reserved
27	**Bit 26**	Inside the speed range
28	**Bit 27**	Outside the speed range
29	**Bit 28**	Messages need to be sent.
30	**Bit 29**	No messages need to be sent

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

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

✧ <*Stocmd ID Mask*>: Bitwise mask of the stored commands which will be executed after the state of the group becomes TRUE (i.e. all the input events included in the group occur.).

✧ <*Stocmd Ack*>: A numeral to indicate whether to return an acknowledgement message after a stored command is executed.

- 0: Do not send an acknowledgement message when a stored command is executed.
- 1: Send an acknowledgement message when a stored command is executed.

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

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

➢ **+ACK:GTUDF,**

Example: **+ACK:GTUDF,4C0203,865084030960726,gb100p,FFFF,20190411105526,0325$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	20		
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	

Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.2.8.6.Over-the-air Configuration Update

The **AT+GTUPC** command is used to download the configuration file from the backend server over the air. The configuration file consists of AT commands; each two commands are separated by **CR** and **LF**.

➢ **AT+GTUPC=**

Example: **AT+GTUPC=gb100p,0,10,0,0,8760,http://qlinkhf.f3322.org:20414/GB100P/deltabin/0305_at.ini,1,,1,00000002,380,3,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0'-'9', 'a'-'z', 'A'-'Z'	gb100p
Max Download Retry	1	0 – 3	0
Download Timeout	<=2	5 – 30 min	10
Download Protocol	1	0	0
Report Enable	1	0|1	0
Update Interval	1	0 – 8760	0
Download URL	<=100	URL	
Mode	1	0|1	0
Reserved	0		
Extended Status Report	1	0|1	0
Identifier Number	8	00000000-FFFFFFFF	0
Reserved	0		
Update Status Mask	1	0 – 3	3
Serial Number	4	0000-FFFF	
Tail Character	1	$	$

- <*Password*>: The valid characters for the password include '0' – 9', 'a' – 'z', and 'a' – 'Z'. The default value is "gb100p".
- <*Max Download Retry*>: It specifies the maximum number of retries to download the configuration file upon download failure.
- <*Download Timeout*>: It specifies the expiration timeout of a single download. If the download expires, it is considered to be failure.

- <*Download Protocol*>: The protocol used to download the file. Only HTTP is supported now. Set it to 0.
- <*Report Enable*>: A numeral to indicate whether to report the message **+RESP:GTUPC** to indicate the configuration is updated over the air.
  - 0:Do not report the message **+RESP:GTUPC**.
  - 1:Report the message **+RESP:GTUPC**.
- <*Update Interval*>: The time interval, measured in hours, for updating the configuration over the air.
- <*Download URL*>: It specifies the URL to download the configuration file. If the URL ends with "/" which means this is just a path without any file, the <*IMEI*>.ini will be added as the default configuration file name at the end of URL.
- <*Mode*>: A numeral to indicate the mode of downloading configuration file over the air.
  - 0: Disable this function.
  - 1: Enable this function.
- <*Extended Status Report*>: A numeral to indicate the message to be reported for the configuration update status when <*Enable Report*> is 1.
  - 0: Report the message **+RESP:GTUPC**.
  - 1: Report the message **+RESP:GTEUC** to include more information.
- <*Identifier Number*>: A numeral to identify the update configuration request. This number will be included in the message **+RESP:GTEUC** to indicate the request it is related to. This parameter is only valid for the DMS server.
- <*Update Status Mask*>: Bitwise mask to configure the status in which the device could update the configuration.
  - Bit 0 for ignition off. Status 41 and 42 will be considered as ignition off.
  - Bit 1 for ignition on.

Note:

1. The maximum length of all commands in the configuration file is 8000 bytes. If the length of all commands in the configuration file is greater than 8000 bytes, the device will fail to download the configuration file.
2. The maximum length of a single command in the configuration file is 320 bytes. If there is a single command with length greater than 320 bytes in the configuration file, the device will fail to update the configuration file.
3. Make sure there is only one command per line in the configuration file and there is a "\r\n" between each two commands.
4. There should be no space before each command.
5. The configuration file should be a plain text file.

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

- **+ACK:GTUPC,**

Example: **+ACK:GTUPC,4C0203,865084030960726,gb100p,0066,20190411110020,0330$**			
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	$	$

3.2.8.7.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=gb100p,1,1,25,10,60,60,,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Mode	1	0|1	1
Speed Mode	1	0|1	1
Motion Speed Threshold	<=2	5 – 50km/h	25
Motion Cumulative Time	<=3	10 – 100s	10
Motionless Cumulative Time	<=3	10 – 250s	60
GNSS Fix Failure Timeout	<=4	5 – 1800s	60
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Mode*>: The working mode of the GNSS-assisted motion measurement 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 the feature.
- 1: Enable the 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 the time of GNSS fix is more than <*GNSS Fix Failure Timeout*>, the device will update motion status by motion sensor.

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

➢ **+ACK:GTGAM,**

Example: **+ACK:GTGAM,4C0203,865084030960726,gb100p,0068,20190411110105,0333$**			
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	$	$

3.2.8.8.Transparent Data Transmission

The command **AT+GTDAT** is used to transfer data between the backend server and the external equipment connected to the Bluetooth of the device. Data to the backend server is wrapped into the message **+RESP:GTDAT** and sent to the backend server while data to the equipment is directly output to the second serial port unrestricted by the @Track protocol. All data is transparent to the device.

Before using this command, use the **AT+GTBTS** command to set the parameters of the Bluetooth.

➢ **AT+GTDAT=**

Example: **AT+GTDAT=gb100p,0,,data to the backend server,0,,,,FFFF$** **AT+GTDAT=gb100p,2,,data to the backend server,0,,,,FFFF$** **AT+GTDAT=gb100p,4,,data to the backend server,0,,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
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	0000 – FFFF	
Tail Character	1	$	$

- ✧ <*Command Type*>: The command type 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.(Due to the transmission data contains CRLF, the max data length is 243 bytes.)
  - 5: Send the pure data directly to the Bluetooth without CRLF.
- ✧ <*Data*>: Data to be transferred between the backend server and the external equipment connected to the second serial port of the device.
- ✧ <*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,4C0203,865084030960726,gb100p,006A,20190411110219,0336$**			
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	$	$

3.2.8.9.Configuration File Version

The command **AT+GTFVR** is used to record information of the configuration file generated by Manage Tool for **AT+GTUPC**.

➢ **AT+GTFVR=**

Example:
AT+GTFVR=gb100p,gb100p-1,0316,0000000000100001,0000000000000000,0000000000000000,0000000000000000,00000000000000000000000000000000,,,,,20190411110306,FFFF$

SN	Parameter	Length (byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9''a' – 'z''A' – 'Z'	gb100p
2	Configuration Name	<=40	'0' – '9', 'a' – 'z', 'A' – 'Z', '-', '_'	
3	Configuration Version	4	0000 – 9999	
4	Command Mask	<=32	00000000000000000000000000000000 – FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	
5	GEO ID Mask	<=16	0000000000000000 – FFFFFFFFFFFFFFFF	
6	Stocmd ID Mask	<=16	0000000000000000 – FFFFFFFFFFFFFFFF	
7	Group ID Mask	<=16	0000000000000000 – FFFFFFFFFFFFFFFF	
8	Message Digest	32	'0'-9' 'a'-'z' 'A'-'Z'	
9	Reserved	0		
10	Reserved	0		
11	Reserved	0		
12	Reserved	0		
13	Generation Time	14	YYYYMMDDHHMMSS	
	Serial Number	4	0000 – FFFF	
	Tail Character	1	$	$

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

- <*Configuration Version*>: The version number of the configuration. The first two characters indicate the major version number, and the last two characters indicate the minor version number.
- <*Command Mask*>: A hex value to indicate which AT commands are included in this configuration file. Each bit corresponds to an AT command.

Mask Bit	Item
Bit 0	BSI
Bit 1	SRI
Bit 2	QSS
Bit 3	CFG
Bit 4	Reserved
~~**Bit 5**~~	TMA
Bit 6	FRI
Bit 7	GEO
Bit 8	SPD
Bit 9	Reserved
Bit 10	OWH
Bit 11	DOG
Bit 12	WLT
Bit 13	PDS
Bit 14	CMD
Bit 15	UDF
Bit 16	Reserved
Bit 17	Reserved
Bit 18	Reserved
Bit 19	Reserved
Bit 20	FVR
Bit 21	TOW
Bit 22	EPS
Bit 23	IDL
Bit 24	HMC
Bit 25	HBM

Bit 26	HRM
Bit 27	CRA
Bit 28	SSR
Bit 29	Reserved
Bit 30	Reserved
Bit 31	Reserved
Bit 32	Reserved
Bit 33	Reserved
Bit 34	Reserved
Bit 35	GPJ
Bit 36	Reserved
Bit 37	FFC
Bit 38	RMD
Bit 39	Reserved
Bit 40	JDC
Bit 41	Reserved
Bit 42	Reserved
Bit 43	Reserved
Bit 44	BTS
Bit 45	BMS
Bit 46	Reserved
Bit 47	Reserved
Bit 48	VMS
Bit 49	Reserved
Bit 50	VVS
Bit 51	AVS
Bit 52	Reserved
Bit 53	ASC
Bit 54	PIN
Bit 55	GAM

⋮	Reserved
Bit 64	UDT
⋮	Reserved
Bit 122	BAS
⋮	Reserved
Bit 126	BID
⋮	Reserved

✧ <*GEO ID Mask*>: Bitwise mask to indicate GEO fence.

ID	Mask Bit	Item
1	**Bit 0**	Indicate the Geo 0
2	**Bit 1**	Indicate the Geo 1
3	**Bit 2**	Indicate the Geo 2
4	**Bit 3**	Indicate the Geo 3
5	**Bit 4**	Indicate the Geo 4
6	**Bit 5**	Indicate the Geo 5
7	**Bit 6**	Indicate the Geo 6
8	**Bit 7**	Indicate the Geo 7
9	**Bit 8**	Indicate the Geo 8
10	**Bit 9**	Indicate the Geo 9
11	**Bit 10**	Indicate the Geo 10
12	**Bit 11**	Indicate the Geo 11
13	**Bit 12**	Indicate the Geo 12
14	**Bit 13**	Indicate the Geo 13
15	**Bit 14**	Indicate the Geo 14
16	**Bit 15**	Indicate the Geo 15
17	**Bit 16**	Indicate the Geo 16
18	**Bit 17**	Indicate the Geo 17
19	**Bit 18**	Indicate the Geo 18
20	**Bit 19**	Indicate the Geo 19
⋮	⋮	Reserved
Reserved	**Bit 63**	Reserved

✧ <*Stocmd ID Mask*>: Please refer to the <*Stored CMD ID*> in the command **AT+GTCMD**.

Bit	Stored CMD ID
Bit 0	1
Bit 1	2
Bit 2	3

Bit 3	4
Bit 4	5
Bit 5	6
Bit 6	7
Bit 7	8
Bit 8	9
Bit 9	10
Bit 10	11
Bit 11	12
Bit 12	13
Bit 13	14
Bit 14	15
Bit 15	16
Bit 16	17
Bit 17	18
Bit 18	19
Bit 19	20
⋮	⋮
Bit 31	31

✧ <*Group ID Mask*>: Please refer to the <*Group ID*> in the command **AT+GTUDF**.

Bit	Group ID
Bit 0	1
Bit 1	2
Bit 2	3
Bit 3	4
Bit 4	5
Bit 5	6
Bit 6	7
Bit 7	8
Bit 8	9
Bit 9	10
Bit 10	11
Bit 11	12
Bit 12	13
Bit 13	14
Bit 14	15
Bit 15	16
Bit 16	17
Bit 17	18
Bit 18	19

Bit 19	20
⋮	⋮
Bit 31	31

✧ <*Message Digest*>: It supports output of fixed-length hash values through hash algorithms.

✧ <*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,4C0203,865084030960726,gb100p,FFFF,20190411110407,0339$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	14	MEID	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.3.Report

This section defines the formats of the report messages. Due to the max length 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 case of SMS transmission. Otherwise the report will be truncated to fit the length of an SMS message.

3.3.1.Position Related Report

➢ **+RESP:GTTOW,**

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

➢ **+RESP:GTSPD,**

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

➢ **+RESP:GTRTL,**

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

➢ **+RESP:GTDOG,**

The protocol watchdog reboot message.

➢ **+RESP:GTVGL,**

The location message for virtual ignition on and ignition off.

➢ **+RESP:GTHBM,**

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

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

Example:

+RESP:GTTOW,4C0203,865084030960726,gb100p,,00,1,1,0.9,52,49.7,117.129178,31.839030,20190411031602,0460,0000,550B,B969,00,0.0,20190411111603,035B$

+RESP:GTSPD,4C0203,865084030960726,gb100p,,00,1,1,0.0,0,134.6,117.129310,31.839156,20190411030820,0460,0000,550B,B969,00,0.0,20190411110820,034D$

+RESP:GTRTL,4C0203,865084030960726,gb100p,,00,1,1,0.2,0,92.2,117.129414,31.839281,20190411022406,0460,0000,550B,B969,00,0.0,20190411102407,02F4$

+RESP:GTDOG,4C0203,865084030960726,gb100p,,01,1,1,0.0,217,190.3,117.129151,31.839102,20190411030613,0460,0000,550B,B969,00,0.0,20190411110613,0340$

+RESP:GTVGL,4C0203,865084030960726,gb100p,,41,1,1,0.2,0,139.5,117.129417,31.839213,20190411030717,0460,0000,550B,B969,00,0.0,20190411110717,034C$

+RESP:GTHBM,4C0203,865084030960726,gb100p,,11,1,1,2.7,52,132.4,117.129248,31.839154,20190411030850,0460,0000,550B,B969,00,0.0,20190411110851,034F$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Reserved			
Report ID / Report Type	2	X(0-6)X(0-6)	
Number	1	1	

GNSS Accuracy	<=2	0|1 – 50	
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	-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	0		
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Report ID / Report Type*>: It is a 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 speed level at which the harsh behavior is detected in the message **+RESP:GTHBM**. 3 indicates high speed, 2 indicates medium speed, and 1 indicates low speed. If the <*Mode*> of the command **AT+GTHBM** is set to 2, the value is always 0 which indicates unknown speed.
- The type of <*Virtual Ignition Mode*> which indicates the trigger source of the message **+RESP:GTVGL**.

For other messages, it will always be 0.

Report type has different meanings in different messages below.

- In the speed alarm message **+RESP:GTSPD**
  0: Outside the predefined speed range
  1: Inside the predefined speed range
- In the protocol watchdog reboot message **+RESP:GTDOG**
  1: Reboot message for time based working mode
  2: Reboot message for ignition on working mode
  3: Reserved

4: Reboot message for GSM watchdog
5: Reboot message for GPRS 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 virtual ignition on/off location message **+RESP:GTVGL**
  0: Virtual Ignition off
  1: Virtual Ignition on

For other messages, it will always be 0.

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

➢ **+RESP:GTFRI,**

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

Example:

+RESP:GTFRI,4C0203,865084030960726,gb100p,12166,10,1,1,0.0,52,59.2,117.129257,31.838932,20190411031709,0460,0000,550B,B969,00,0.0,,,,100,220000,,,,20190411111709,0361$

+RESP:GTFRI,4C0203,865084030960726,gb100p,12166,10,6,1,0.0,52,59.2,117.129257,31.838932,20190411031733,0460,0000,550B,B969,00,1,0.0,52,59.2,117.129257,31.838932,20190411031739,0460,0000,550B,B969,00,1,0.0,52,59.2,117.129257,31.838932,20190411031745,0460,0000,550B,B969,00,1,0.0,52,59.2,117.129257,31.838932,20190411031748,0460,0000,550B,B969,00,1,0.0,52,59.2,117.129257,31.838932,20190411031754,0460,0000,550B,B969,00,1,0.0,52,59.2,117.129257,31.838932,20190411031800,0460,0000,550B,B969,00,0.0,,,,100,220000,,,,20

190411111803,0363$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
External Power Voltage	<=5	0 – 99999 mV	
Report ID / Report Type	2	X(1-5)X(0-6)	
Number	<=2	0 – 15	
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	-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	0		
Mileage	<=9	0.0 – 4294967.0 km	
Hour Meter Count	11	HHHHH:MM:SS	
Reserved	0		
Reserved	0		
Backup Battery Percentage	<=3	0 – 100	
Device Status	6	000000 – FFFFFF	
Reserved	0		
Reserved	0		
Reserved	0		

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

- <*External Power Voltage*>: The voltage of the external power supply. If 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. Otherwise, this field will be empty.
- <*Report ID / Report Type*>: It indicates the working mode of the fixed report and the type of the message.

  Report ID has several meanings below.
  - 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 several meanings below.
  - 0: Normal fixed report
  - 1: Corner report which indicates that the device just turns around a corner
  - 2: FRI report frequency change which indicates that the terminal enters into Geo-Fence or roaming status
  - 3: Corner report when FRI report frequency changes
  - 4: Mileage report when fixed report mode is 5 (Fixed Time or Mileage Report)
  - 5: Reserved
  - 6: Mileage report when fixed report mode is 5 (Fixed Time or Mileage Report) and **AT+GTFFC** works
- <*Number*>: The number of the GNSS position(s) included in the report message. In the **+RESP:GTFRI** message, it may be one or two. If there are more than one position in one **+RESP:GTFRI** message, the green part is repeated to display the information for each position.
- <*Hour Meter Count*>: If the hour meter count function is enabled by the command **AT+GTHMC**, total hours the meter has counted when the engine is on will be reported in this field. It is formatted with 5 hour digits, 2 minute digits and 2 second digits, and ranges from 00000:00:00 – 99999:00:00. If the function is disabled, this field will be empty.
- <*Backup Battery Percentage*>: The current volume of the backup battery in percentage.
- <*Device Status*>: The state of the device. From left to right, the first two digits indicate the current motion status of the device, and the remaining four bits are reserved.

  The current motion status of the device:
  - 16 (Tow): The device attached vehicle is ignition off and it is towed.
  - 1A (Fake Tow): The device attached vehicle is ignition off and it might be towed.
  - 11 (Ignition Off Rest): The device attached vehicle is ignition off and it is motionless.
  - 12 (Ignition Off Motion): The device attached vehicle is ignition off and it is moving before it is considered as being 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:GTERI,**

If the bit value in <*ERI Mask*> in the **AT+GTFRI** command is set to 1, the device will send the message **+RESP:GTERI** to the backend server instead of **+RESP:GTFRI**.

Example:
+RESP:GTERI,4C0502,865084030963548,gb100p-3548,00000100,,10,1,1,0.0,2,109.3,117.129262,31.839314,20200714071342,0460,0000,550B,B96A,00,0.0,,,,0,410000,0,1,6,6,2,,003F,WTH300,AC233FA354fb,0,,,,20200714151347,172A$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	(HEX)	
Unique ID	15	(IMEI)	
Device Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
ERI Mask	8	(HEX)	
External Power Supply	<=5	0 – 99999(mV)	
Report ID / Report Type	2	XY(X∈{1 - 5}, Y∈{0 - 6})	
Number	1	–1 - 15	
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	(HEX)	
Reserved	0		

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)	
Reserved		0		
Bluetooth Accessory Data (Optional)	Bluetooth Accessory Number	<=2	0 – 10	
	Index	1	0 – 9	
	Accessory Type	1	0 – 2|6	
	Accessory Model	1	0|2	
	Raw Data	<=5		
	Accessory Append Mask	<=4	(HEX)	
	Accessory Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', ' - ', '_'	
	Accessory MAC	12	(HEX)	
	Accessory Status	1	0|1	
	Accessory Battery Level	<=3	0 – 5000mV	
	Accessory Temperature	<=2	-40 – 80℃	
	Accessory Humidity	<=2	0 –100%(rh)	
Send Time		14	YYYYMMDDHHMMSS	
Count Number		4	(HEX)	
Tail Character		1	$	$

- <*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*>.

- WTS300: It is a four-byte hexadecimal value. The 2 higher bytes of the hexadecimal value indicate battery voltage, the unit is millivolt. And the 2 lower bytes of the hexadecimal value indicate temperature, the high byte is the integer part and the low byte is the fractional part. Temperature is equal to the low byte divided by 256 plus the high byte, the unit is Celsius. If this value is negative, it is represented in 2's complement format.
- WTH300: It is a four-byte hexadecimal value. The 2 higher bytes of the hexadecimal value indicate temperature. And the 2 lower bytes of the hexadecimal value indicate humidity. The high byte is the integer part and the low byte is the fractional part. Temperature is equal to the low byte divided by 256 plus the high byte, and the unit is Celsius. Humidity is equal to the low byte divided by 256 plus the high byte, and the unit is RH.

✧ <*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*>: It indicates the level of the remaining battery in the Bluetooth accessory.

✧ <*Accessory Temperature*>: It indicates the temperature measured by the Bluetooth accessory.

✧ <*Accessory Humidity*>: It indicates the humidity measured by the Bluetooth accessory.

Note: The item denoted with "(Optional)" indicates the item is controlled by the parameter <*ERI Mask*>.

➢ **+RESP:GTEPS,**

If the external power supply monitoring function 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 report messages above have the same format as shown below.

Example: **+RESP:GTEPS,4C0203,865084030960726,gb100p,12166,01,1,1,0.0,0,121.1,117.129333,31.838890,20190411030637,0460,0000,550B,B969,00,0.0,20190411110638,0348$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
External Power Voltage	<=5	0 – 99999mV	

Report ID / Report Type	2	X(0)X(0-1)	
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	-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	0		
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*External Power Voltage*>: The value of the external power voltage. When the voltage of the external input meets the alarm condition as set by the command **AT+GTEPS**, the device will send the current external input voltage with **+RESP:GTEPS** to the backend server.
- <*Report ID / Report Type*>: It is a one-byte hexadecimal value represented by two ASCII bytes. The first byte (4 higher bits of the hexadecimal value) indicates Report ID and the second byte (4 lower bits of the hexadecimal value) indicates Report Type.

  The meaning of Report ID is described as below.
  - The ID of the analog input port which triggers the report message **+RESP:GTEPS**. The value is 0.

  Report type has the following meanings.
  - 0: Outside the predefined range.
  - 1: Inside the predefined range.
- <*Number*>: The number of the GNSS position(s) included in the report message. Generally, it is 1.

➢ **+RESP:GTLBC,**

If the parameter <*Location by Call*> is enabled by the command **AT+GTCFG**, the device will get

and send the current position to the backend server via the message **+RESP:GTLBC** when there is an incoming call.

Example: **+RESP:GTLBC,4C0203,865084030960726,gb100p,13365694059,1,0.0,0,128.3,117.129242,31.839187,20190411032340,0460,0000,550B,B969,00,0.0,20190411112340,037A$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Call Number	<=20	phone number	
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	-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	0		
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

➢ **+RESP:GTGEO,**

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

Example:

+RESP:GTGEO,4C0203,865084030960726,gb100p,,01,1,1,0.0,0,113.1,117.129138,31.839143,20190411032858,0460,0000,550B,B969,00,0.0,20190411112859,038E$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Reserved			
Report ID / Report Type	<=3	XX(0-13)X(0-1)	
Number	1	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	-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	0		
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Report ID / Report Type*>: It is a hexadecimal value represented by three ASCII bytes. The first two bytes indicate Report ID and the last byte indicates Report Type.

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

➢ **+RESP:GTGES**

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

Example: **+RESP:GTGES,4C0203,865084030960726,gb100p,,51,21,164,5,1,1,0.0,0,113.1,117.129138,31.839143,20190411033040,0460,0000,550B,B969,00,0.0,20190411113040,0396$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Reserved			
Report ID / Report Type	<=3	X(0-13)X(0-1)	
Trigger Mode	<=3	0|21|22	
Radius	<=7	50 – 6000000 m	
Check Interval	<=5	0|5 – 86400 sec	
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	-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	0		
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	

Tail Character	1	$	$

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

- 0: The current parking-fence is inactive.
- 1: The current parking-fence is active.

3.3.2.Device Information Report

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

➢ **+RESP:GTINF,**

Example: **+RESP:GTINF,4C0203,865084030960726,gb100p,11,898600f51236f5142571,28,0,1,12196,,4.20,0,1,,,20190411032721,,,,,,+0800,0,20190411112736,0386$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Motion Status	2	11|12|21|22|41|42|1A|16	
ICCID	20		
CSQ RSSI	<=2	0 – 31|99	
CSQ BER	<=2	0 – 7|99	
External Power Supply	1	0|1	
External Power Voltage	<=5	0 – 99999mV	
Reserved	0		
Backup Battery Voltage	<=4	0.0 – 4.35V	
Charging	1	0|1	
LED On	1	0|1	
Reserved	0		
Reserved	0		
Last Fix UTC Time	14	YYYYMMDDHHMMSS	
Reserved	0		

Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Time Zone Offset	5	±HHMM	
Daylight Saving	1	0|1	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Motion Status*>: The current motion status of the device.
  - 16 (Tow): The device attached vehicle is ignition off and it is towed.
  - 1A (Fake Tow): The device attached vehicle is ignition off and it might be towed.
  - 11 (Ignition Off Rest): The device attached vehicle is ignition off and it is motionless.
  - 12 (Ignition Off Motion): The device attached vehicle is ignition off and it is moving before it is considered as being 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 signal strength level.

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

- <*CSQ BER*>: The quality of the GSM signal. The range is 0-7, and 99 is for unknown signal strength.
- <*External Power Supply*>: Whether the external power supply is connected or not.
  - 0: Disconnected
  - 1: Connected
- <*External Power Voltage*>: The voltage of the external power supply.
- <*Backup Battery Voltage*>: The voltage of the backup battery. The value of this field is only valid when the external power is not connected.
- <*Charging*>: Whether the backup battery is charging 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.

✧ <*Time Zone Offset*>: The time 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,4C0203,865084030960726,gb100p,,,,007F,,,20190411033201,20190411113213,039A$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Reserved	0		
Reserved	0		
Reserved	0		
Report Composition Mask	4	0000 – FFFF	
Reserved	0		
Reserved	0		
Last Fix UTC Time	14	YYYYMMDDHHMMSS	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Report Composition Mask*>: Please refer to <*Report Composition Mask*> of 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 **+RESP:GTALM** messages. This message is only sent via GPRS even if the report mode is forced SMS mode. If the message is too long, then it will be sub-packaged into several **+RESP:GTALM** messages. The **+RESP:GTALM** does not support the HEX report.

- **+RESP:GTALM,**

Example:

+RESP:GTALM,4C0203,865084030960726,gb100p,9,1,BSI,cmnet,,,,,,,SRI,4,,2,60.174.225.171,10083,60.174.225.171,10085,13855621247,15,1,0,1,,,CFG,gb100p,gb100p,1,0.0,,,007F,2,,3DEF,,1,1,300,3,1,0,1,000F,1,0,TOW,1,5,1,300,,,,,2,3,2,,,,,,,,,EPS,1,250,25045,1,0,,,,,1,,,,TMZ,+0800,0,,,,,FRI,1,1,0,1,1235,1235,5,30,1000,1000,,60,600,,,,,20190411113242,039D$

+RESP:GTALM,4C0203,865084030960726,gb100p,9,2,GEO,0,1,117.129535,31.838237,164,5,,,,,0,0,,,1,0,,,50,0,,,,,0,0,,,2,0,,,50,0,,,,,0,0,,,3,0,,,50,0,,,,,0,0,,,4,0,,,50,0,,,,,0,0,,,5,2,117.129138,31.839143,164,5,,,,,21,1,,,6,0,,,50,0,,,,,0,0,,,7,0,,,50,0,,,,,0,0,,,8,0,,,50,0,,,,,0,0,,,9,0,,,50,0,,,,,0,0,,,10,0,,,50,0,,,,,0,0,,,11,0,,,50,0,,,,,0,0,,,12,0,,,50,0,,,,,0,0,,,13,0,,,50,0,,,,,0,0,,,14,0,,,50,0,,,,,0,0,,,15,0,,,50,0,,,,,0,0,,,16,0,,,50,0,,,,,0,0,,,17,0,,,50,0,,,,,0,0,,,18,0,,,50,0,,,,,0,0,,,19,0,,,50,0,,,,,0,0,,,SPD,2,10,30,60,300,,,,,,,,,,,,,,PIN,0,,,,,,,OWH,0,1F,0900,1200,1300,1800,,,,,,,,,,,DOG,1,60,30,1106,,1,,,60,60,,20190411113242,039E$

+RESP:GTALM,4C0203,865084030960726,gb100p,9,3,IDL,0,2,1,100,,,,,,,,,,,HMC,0,00000:00:00,,,,,,,,,HBM,1,,,100,1,1,,60,3,4,,,1,1,,,,,,30,50,20,65,JDC,0,25,,5,10,10,,,,,,,WLT,0,12345688996555444444,12345688996555125688,,,,,,,,,,,,HRM,,,7F,FC1FBF,FC1FBF,FD7F,EF,7D,7F,,,CRA,0,50,50,50,0,500,500,2,0,0,0,30,30,PDS,0,0,,,,,,,SSR,0,2,1,5,1,0,0,,GPJ,0,15,3,,,,,,,,,,20190411113242,039F$

+RESP:GTALM,4C0300,865084030960726,gb100p,9,4,RMD,0,,3DEF,,,3DEF,,,,,,,,,,,FFC,0,0,0,,,,,,,30,500,500,300,,0,,,,,1,0,0,,,,,,,30,500,500,300,,0,,,,,2,0,0,,,,,,,30,500,500,300,,0,,,,,3,0,0,,,,,,,30,500,500,300,,0,,,,,4,0,0,,,,,,,30,500,500,300,,0,,,,,ASC,50,10,2,,,,,,,,,,UPC,0,10,0,0,0,,0,,0,00000000,,3,VVS,13500,600,10,1,10,AVS,30,60,,,,VMS,0,,,,,GAM,1,1,25,10,60,60,,,,,BTS,0,,GB100P_BT,0007,3,0,1D03,0003,0,123456,,,,,,,,,,,20190422115850,01FD$

+RESP:GTALM,4C0203,865084030960726,gb100p,9,5,BMS,0,0,BT_SENSOR,780562014589,0003,1,2405,1,1802,0,123456,0,0,,,,,,1,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,2,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,3,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,4,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,5,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,6,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,7,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,8,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,9,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,FVR,gb100p-1,0316,0000000000100001,0000000000000000,0000000000000000,0000000000020000,,,,,,20190411110315,20190411113242,03A1$

+RESP:GTALM,4C0203,865084030960726,gb100p,9,6,CMD,0,0,,,,,,0,1,,,,,,0,2,,,,,,0,3,,,,,,0,4,,,,,,0

,5,,,,,,0,6,,,,,,0,7,,,,,,0,8,,,,,,0,9,,,,,,0,10,,,,,,0,11,,,,,,0,12,,,,,,0,13,,,,,,0,14,,,,,,0,15,,,,,,20190411113242,03A2$

+RESP:GTALM,4C0203,865084030960726,gb100p,9,7,CMD,0,16,,,,,,0,17,,,,,,0,18,,,,,,0,19,,,,,,0,20,,,,,,0,21,,,,,,0,22,,,,,,0,23,,,,,,0,24,,,,,,0,25,,,,,,0,26,,,,,,0,27,,,,,,0,28,,,,,,0,29,,,,,,0,30,,,,,,0,31,,,,,,20190411113242,03A3$

+RESP:GTALM,4C0203,865084030960726,gb100p,9,8,UDF,0,0,0000000000000000,0,00000,00000,00000000,0,,,,,0,1,0000000009011024,5,00011,00820,02020002,1,,,,,0,2,0000000000000000,0,00000,00000,00000000,0,,,,,0,3,0000000000000000,0,00000,00000,00000000,0,,,,,0,4,0000000000000000,0,00000,00000,00000000,0,,,,,0,5,0000000000000000,0,00000,00000,00000000,0,,,,,0,6,0000000000000000,0,00000,00000,00000000,0,,,,,0,7,0000000000000000,0,00000,00000,00000000,0,,,,,0,8,0000000000000000,0,00000,00000,00000000,0,,,,,0,9,0000000000000000,0,00000,00000,00000000,0,,,,,0,10,0000000000000000,0,00000,00000,00000000,0,,,,,0,11,0000000000000000,0,00000,00000,00000000,0,,,,,0,12,0000000000000000,0,00000,00000,00000000,0,,,,,0,13,0000000000000000,0,00000,00000,00000000,0,,,,,0,14,0000000000000000,0,00000,00000,00000000,0,,,,,0,15,0000000000000000,0,00000,00000,00000000,0,,,,,20190411113242,03A4$

+RESP:GTALM,4C0203,865084030960726,gb100p,9,9,UDF,0,16,0000000000000000,0,00000,00000,00000000,0,,,,,0,17,0000000000000000,0,00000,00000,00000000,0,,,,,0,18,0000000000000000,0,00000,00000,00000000,0,,,,,0,19,0000000000000000,0,00000,00000,00000000,0,,,,,0,20,0000000000000000,0,00000,00000,00000000,0,,,,,0,21,0000000000000000,0,00000,00000,00000000,0,,,,,0,22,0000000000000000,0,00000,00000,00000000,0,,,,,0,23,0000000000000000,0,00000,00000,00000000,0,,,,,0,24,0000000000000000,0,00000,00000,00000000,0,,,,,0,25,0000000000000000,0,00000,00000,00000000,0,,,,,0,26,0000000000000000,0,00000,00000,00000000,0,,,,,0,27,0000000000000000,0,00000,00000,00000000,0,,,,,0,28,0000000000000000,0,00000,00000,00000000,0,,,,,0,29,0000000000000000,0,00000,00000,00000000,0,,,,,0,30,0000000000000000,0,00000,00000,00000000,0,,,,,0,31,0000000000000000,0,00000,00000,00000000,0,,,,,20190411113242,03A5$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Total Packets	2	16	
Current Packet	2	1 – 16	
Configurations	< 1500		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- *<Total Packets>*: The total number of **+RESP:GTALM**.
- *<Current Packet>*: The sequence number of the current packet.
- *<Configurations>*: The current configuration of the device. The first message contains configurations of the commands from **BSI** to **FRI**, the second message contains configurations of the commands from **GEO** to **DOG**, the third message is for the configurations of the commands from **IDL** to **GPJ**, and the last message is for the configurations of the commands from **RMD** to the end of the protocol commands.

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

3.3.3.3.+RESP:GTALC

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

- **+RESP:GTALC,**

Example:

+RESP:GTALC,4C0203,865084030960726,gb100p,38FFEF3B,1,1,BSI,cmnet,,,,,,,SRI,4,,2,60.174.225.171,10083,60.174.225.171,10085,13855621247,15,1,0,1,,,CFG,gb100p,gb100p,1,0.0,,,007F,2,,3DEF,,1,1,300,3,1,0,1,000F,1,0,TOW,1,5,1,300,,,,,2,3,2,,,,,,,,,EPS,1,250,25045,1,0,,,,,1,,,,TMZ,+0800,0,,,,,FRI,1,1,0,1,1235,1235,5,30,1000,1000,,60,600,,,,,GEO,0,1,117.129535,31.838237,164,5,,,,,0,0,,,1,0,,,50,0,,,,,0,0,,,2,0,,,50,0,,,,,0,0,,,3,0,,,50,0,,,,,0,0,,,4,0,,,50,0,,,,,0,0,,,5,2,117.129138,31.839143,164,5,,,,,21,1,,,6,0,,,50,0,,,,,0,0,,,7,0,,,50,0,,,,,0,0,,,8,0,,,50,0,,,,,0,0,,,9,0,,,50,0,,,,,0,0,,,10,0,,,50,0,,,,,0,0,,,11,0,,,50,0,,,,,0,0,,,12,0,,,50,0,,,,,0,0,,,13,0,,,50,0,,,,,0,0,,,14,0,,,50,0,,,,,0,0,,,15,0,,,50,0,,,,,0,0,,,16,0,,,50,0,,,,,0,0,,,17,0,,,50,0,,,,,0,0,,,18,0,,,50,0,,,,,0,0,,,19,0,,,50,0,,,,,0,0,,,SPD,2,10,30,60,300,,,,,,,,,,,,,,,PIN,0,,,,,,,OWH,0,1F,0900,1200,1300,1800,,,,,,,,,,,DOG,1,60,30,1106,,1,,,60,60,,IDL,0,2,1,100,,,,,,,,,,,HMC,0,00000:00:00,,,,,,,,,HBM,1,,,100,1,1,,60,3,4,,,1,1,,,,,,30,50,20,65,JDC,0,25,,5,10,10,,,,,,,WLT,0,12345688996555444444,12345688996555125688,,,,,,,,,,,,HRM,,,7F,FC1FBF,FC1FBF,FD7F,EF,7D,7F,,,CRA,0,50,50,50,0,500,500,2,0,0,0,30,30,PDS,0,0,,,,,,,SSR,0,2,1,5,1,0,0,,GPJ,0,15,3,,,,,,,,,,RMD,0,,,,,46001,46000,46003,,,,,,,,,,,5a43gh,64sa44,,468555,,,,,,,,,,,,,,,,,,,,3DEF,,,3DEF,,,,,,,,,,20190411113541,03A8$

+RESP:GTALC,4C0300,865084030960726,gb100p,7F640000000,1,2,FFC,0,0,0,,,,,,,30,500,500,300,,0,,,,,1,0,0,,,,,,,30,500,500,300,,0,,,,,2,0,0,,,,,,,30,500,500,300,,0,,,,,3,0,0,,,,,,,30,500,500,300,,0,,,,,4,0,0,,,,,,,30,500,500,300,,0,,,,,ASC,50,10,2,,,,,,,,,,UPC,0,10,0,0,0,,0,,0,00000000,,3,VVS,13500,600,10,1,10,AVS,30,60,,,,VMS,0,,,,,GAM,1,1,25,10,60,60,,,,,BTS,0,,GB100P_BT,0007,3,0,1D03,0003,0,123456,,,,,,,,,,,BMS,0,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,1,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,2,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,3,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,4,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,5,0,BT_S

ENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,6,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,7,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,8,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,9,0,BT_SENSOR,000000000000,0003,1,0000,1,0000,0,123456,0,0,,,,,,FVR,,0000,0000000000000000,0000000000000000,0000000000000000,0000000000000000,,,,,,,20190422120116,020B$

+RESP:GTALC,4C0203,865084030960726,gb100p,2000000000000,1,3,CMD,0,0,,,,,,0,1,,,,,,0,2,,,,,,0,3,,,,,,0,4,,,,,,0,5,,,,,,0,6,,,,,,0,7,,,,,,0,8,,,,,,0,9,,,,,,0,10,,,,,,0,11,,,,,,0,12,,,,,,0,13,,,,,,0,14,,,,,,0,15,,,,,,20190411113541,03AA$

+RESP:GTALC,4C0203,865084030960726,gb100p,2000000000000,1,4,CMD,0,16,,,,,,0,17,,,,,,0,18,,,,,,0,19,,,,,,0,20,,,,,,0,21,,,,,,0,22,,,,,,0,23,,,,,,0,24,,,,,,0,25,,,,,,0,26,,,,,,0,27,,,,,,0,28,,,,,,0,29,,,,,,0,30,,,,,,0,31,,,,,,20190411113541,03AB$

+RESP:GTALC,4C0203,865084030960726,gb100p,4000000000000,1,5,UDF,0,0,0000000000000000,0,00000,00000,00000000,0,,,,,0,1,0000000009011024,5,00011,00820,02020002,1,,,,,0,2,0000000000000000,0,00000,00000,00000000,0,,,,,0,3,0000000000000000,0,00000,00000,00000000,0,,,,,0,4,0000000000000000,0,00000,00000,00000000,0,,,,,0,5,0000000000000000,0,00000,00000,00000000,0,,,,,0,6,0000000000000000,0,00000,00000,00000000,0,,,,,0,7,0000000000000000,0,00000,00000,00000000,0,,,,,0,8,0000000000000000,0,00000,00000,00000000,0,,,,,0,9,0000000000000000,0,00000,00000,00000000,0,,,,,0,10,0000000000000000,0,00000,00000,00000000,0,,,,,0,11,0000000000000000,0,00000,00000,00000000,0,,,,,0,12,0000000000000000,0,00000,00000,00000000,0,,,,,0,13,0000000000000000,0,00000,00000,00000000,0,,,,,0,14,0000000000000000,0,00000,00000,00000000,0,,,,,0,15,0000000000000000,0,00000,00000,00000000,0,,,,,20190411113541,03AC$

+RESP:GTALC,4C0203,865084030960726,gb100p,4000000000000,0,6,UDF,0,16,0000000000000000,0,00000,00000,00000000,0,,,,,0,17,0000000000000000,0,00000,00000,00000000,0,,,,,0,18,0000000000000000,0,00000,00000,00000000,0,,,,,0,19,0000000000000000,0,00000,00000,00000000,0,,,,,0,20,0000000000000000,0,00000,00000,00000000,0,,,,,0,21,0000000000000000,0,00000,00000,00000000,0,,,,,0,22,0000000000000000,0,00000,00000,00000000,0,,,,,0,23,0000000000000000,0,00000,00000,00000000,0,,,,,0,24,0000000000000000,0,00000,00000,00000000,0,,,,,0,25,0000000000000000,0,00000,00000,00000000,0,,,,,0,26,0000000000000000,0,00000,00000,00000000,0,,,,,0,27,0000000000000000,0,00000,00000,00000000,0,,,,,0,28,0000000000000000,0,00000,00000,00000000,0,,,,,0,29,0000000000000000,0,00000,00000,00000000,0,,,,,0,30,0000000000000000,0,00000,00000,00000000,0,,,,,0,31,0000000000000000,0,00000,00000,00000000,0,,,,,20190411113541,03AD$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Configuration Mask	<=16	0000000000000000 – FFFFFFFFFFFFFFFF	
Next Packet	1	0 – 1	

Current Packet	<=2	1 – 20	
BSI	3	BSI	BSI
APN	<=40		
APN User Name	<=30		
APN Password	<=30		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
SRI	3	SRI	SRI
Report Mode	1	0 – 6	
Reserved	0		
Buffer Mode	1	0|1|2|5	
Main Server IP / Domain Name	<=60		
Main Server Port	<=5	0 – 65535	
Backup Server IP / Domain Name	<=60		
Backup Server Port	<=5	0 – 65535	
SMS Gateway	<=20		
Heartbeat Interval	<=3	0|2 – 360 min	
SACK Enable	1	0|1	
Protocol Format	1	0|1	0
SMS ACK Enable	1	0|1	0
High Priority Report Mask	<=4	0 – FF	0
Reserved	0		
CFG	3	CFG	CFG
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 – 4294967.0Km	

Reserved	0		
Reserved	0		
Report Composition Mask	4	0000 – FFFF	
Power Saving Mode	1	0 – 2	
Reserved	4	0000 – FFFF	0000
Event Mask	4	0000 – FFFF	
Reserved	0		
LED On	1	0|1	
Info Report Enable	1	0|1	
Info Report Interval	<=5	30 – 86400 sec	
Location by Call	1	0|1|2|3	
Backup Battery Supply	1	0|1	
Backup Battery Charge Mode	1	0|1	
AGPS Mode	1	0|1	
Cell Info Report	4	0000 – FFFF	
GNSS Lost Time	2	0 – 30 min	
GNSS Working Mode	1	0 – 2	0
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Rest Duration	<=3	1 – 255 (×15 sec)	
Motion Duration	<=2	1 – 10 (×100 ms)	
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|1|2	
Min Threshold	<=5	250 – 28000 mV	
Max Threshold	<=5	250 – 28000 mV	
Sample Period	<=2	0|1 – 12(×2s)	
Debounce Time	1	0 – 5(×1s)	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Sync with FRI	1	0|1	
Reserved	0		
Reserved	0		
Reserved	0		
TMZ	3	TMZ	TMZ
Time Zone	5	–|+HHMM	
Daylight Saving	1	0|1	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
FRI	3	FRI	FRI
Mode	1	0 – 5	

Discard No Fix	<=2	0|1	
Compressed Report	1	0|1	
Period Enable	1	0|1	
Begin Time	4	HHMM	
End Time	4	HHMM	
Check Interval	<=5	0 – 86400 sec	
Send Interval	<=5	5 – 86400 sec	
Distance	<=5	300 – 65535m	
Mileage	<=5	300 – 65535m	
Reserved	0		
Corner Report	<=3	0 – 180	
IGF Report Interval	<=5	0|5 – 86400 sec	
ERI Mask	8	00000000-FFFFFFFF	
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
Reserved	0		

Reserved	0		
GEO ID1	1	1	1
Mode	1	0 – 3	
Longitude	<=11	-180 – 180	
Latitude	<=10	-90 – 90	
Radius	<=7	50 – 6000000 m	
Check Interval	<=5	0|5 – 86400 sec	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
Reserved	0		
Reserved	0		
GEO ID3	1	3	3

Mode	1	0 – 3	
Longitude	<=11	-180 – 180	
Latitude	<=10	-90 – 90	
Radius	<=7	50 – 6000000 m	
Check Interval	<=5	0|5 – 86400 sec	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
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	
Reserved	0		

Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
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	
Reserved	0		
Reserved	0		
Reserved	0		

Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	

Trigger Report	1	0|1	
Reserved	0		
Reserved	0		
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
Reserved	0		

Reserved	0		
GEO ID16	2	16	16
Mode	1	0 – 3	
Longitude	<=11	-180 – 180	
Latitude	<=10	-90 – 90	
Radius	<=7	50 – 6000000 m	
Check Interval	<=5	0|5 – 86400 sec	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
Reserved	0		
Reserved	0		
GEO ID18	2	18	18

Mode	1	0 – 3	
Longitude	<=11	-180 – 180	
Latitude	<=10	-90 – 90	
Radius	<=7	50 – 6000000 m	
Check Interval	<=5	0|5 – 86400 sec	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Trigger Mode	<=2	0|21|22	
Trigger Report	1	0|1	
Reserved	0		
Reserved	0		
SPD	3	SPD	SPD
Mode	1	0|1|2|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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
PIN	3	PIN	PIN
Enable Auto-unlock PIN	1	0|1	
PIN	4 - 8	'0' – '9'	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
OWH	3	OWH	OWH
Mode	1	0|3	
Day of Work	<=2	0 – 7F	
Working Hours Start1	4	HHMM	

Working Hours End1	4	HHMM	
Working Hours Start2	4	HHMM	
Working Hours End2	4	HHMM	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
DOG	3	DOG	DOG
Mode	1	0|1|2	
Ignition Frequency	<=3	10 – 120 min	
Interval	<=2	1 – 30	
Time	4	HHMM	
Reserved	0		
Report Before Reboot	1	0|1	
Reserved	0		
Reserved	0		
GSM Interval	4	0|5 – 1440 min	
PDP Interval	4	0|5 – 1440 min	
Reserved	0		
IDL	3	IDL	IDL
Mode	1	0|1	
Time to Idling	2	1 – 30 min	
Time to Movement	1	1 – 5 min	

Debounce Distance	<=4	0|100 – 9999m	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
HMC	3	HMC	HMC
Hour Meter Enable	1	0|1	
Initial Hour Meter Count	11	00000:00:00-99999:00:00	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
HBM	3	HBM	HBM
HBM Enable	1	0|1|2|3|4	
Reserved	0		
Reserved	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		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Cornering and Braking Threshold	<=3	30 – 70	
Cornering and Braking Duration	<=3	40 – 100(*8ms)	
Acceleration Threshold	<=3	15 – 50	
Acceleration Duration	<=3	50 – 250(*8ms)	
JDC	3	JDC	JDC
Mode	1	0|1|2	
Signal Threshold	<=3	0 – 31	
Reserved	0		
Jamming Cell Number Threshold	<=2	0 – 99	
Enter Jamming Timer Threshold	<=3	0 – 300 sec	
Quit Jamming Timer Threshold	<=4	0 – 3600 sec	
Reserved	0		
Reserved	0		
Reserved	0		

Reserved	0		
Reserved	0		
Reserved	0		
WLT	3	WLT	WLT
Call Filter	1	0|1	
Phone Number List	<=20*10		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
HRM	3	HRM	HRM
Reserved	0		
Reserved	0		
ACK Mask	2	'0' – '9' 'a' – 'f' 'A' – 'F'	
Response Mask	8	'0' – '9' 'a' – 'f' 'A' – 'F'	
Event Mask	8	'0' – '9' 'a' – 'f' 'A' – 'F'	
Information Mask	4	'0' – '9' 'a' – 'f' 'A' – 'F'	
HBD Mask	2	'0' – '9' 'a' – 'f' 'A' – 'F'	
Crash Data Mask	4	'0' – '9' 'a' – 'f' 'A' – 'F'	
Reserved	0		
Reserved	0		
Reserved	0		
CRA	3	CRA	CRA
Mode	1	0 – 1	
Threshold_X	<=3	0 – 160	
Threshold_Y	<=3	0 – 160	
Threshold_Z	<=3	0 – 160	
Sampling Start	1	0|1	
Samples Before Crash	4	1 – 3200	
Samples After Crash	4	1 – 3200	

Sampling Frequency Mode	1	0 – 6	
Report Gyro Data	1	0|1	
Acceleration Direction Control	1	0 – 1	
Add GNSS Data	1	0|1	
GNSS Time Before Crash	3	0 – 120(x1s)	
GNSS Time After Crash	3	0 – 120(x1s)	
PDS	3	PDS	PDS
Mode	1	0|1|2	
Mask	4	0000 – FFFF	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
SSR	3	SSR	SSR
Mode	1	0|1|2	
Time to Stop	<=4	(0– 30 min)|(0 – 1800 Sec)	
Time to Start	<=3	(0 – 5 min)|(0 – 300 Sec)	
Start Speed	2	1 – 10 Km/h	
Long Stop	6	0 – 43200 min	
Time Unit	1	0|1	
Location Switch	1	0-1	
Reserved	0		
GPJ	3	GPJ	GPJ
Mode	1	0|1	
CW Threshold	<=2	0 – 31	
BB Threshold	<=2	0 – 15	
Reserved	0		

Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
RMD	3	RMD	RMD
Mode	1	0|1	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Home Operator List	<=6*10		
Reserved	0		
Reserved	0		
Roaming Operator list	<=6*100		
Reserved	0		
Reserved	0		
Black List Operator	<=6*20		
Reserved	0		
Reserved	0		
Known Roaming Event Mask	<=6	000000 – FFFFFF	
Reserved	0		
Reserved	0		
Unknown Roaming Event Mask	<=6	000000 – FFFFFF	
Reserved	0		
Reserved	0		

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

FRI Mode	1	0 – 5	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
FRI IGN Report Interval	<=5	5 – 86400s	
FRI Report Distance	<=5	50 – 65535m	
FRI Report Mileage	<=5	50 – 65535m	
FRI IGF Report Interval	<=5	0|5 – 86400s	
Reserved	0		
Corner Report	<=3	0 – 180	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Priority	1	2	2
Mode	1	0 – 4	
FRI Mode	1	0 – 5	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
FRI IGN Report Interval	<=5	5 – 86400s	
FRI Report Distance	<=5	50 – 65535m	
FRI Report Mileage	<=5	50 – 65535m	
FRI IGF Report Interval	<=5	0|5 – 86400s	

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

Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
FRI IGN Report Interval	<=5	5 – 86400s	
FRI Report Distance	<=5	50 – 65535m	
FRI Report Mileage	<=5	50 – 65535m	
FRI IGF Report Interval	<=5	0|5 – 86400s	
Reserved	0		
Corner Report	<=3	0 – 180	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
ASC	3	ASC	ASC
Brake Speed Threshold	<=3	30 – 400km/h	50
Delta Speed Threshold	<=2	5 – 72km/h	10
Delta Heading Threshold	1	0 – 5	2
Reserved	0		
Reserved	0		
Reserved	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	
Download Timeout	<=2	5 – 30 min	

Download Protocol	1	0	
Report Enable	1	0|1	
Update Interval	1	0 – 8760	
Download URL	<=100	URL	
Mode	1	0|1	
Reserved	0		
Extended Status Report	1	0|1	
Identifier Number	8	00000000 – FFFFFFFF	
Reserved	0		
Update Status Mask	1	0 – 3	
VVS	3	VVS	VVS
Ignition on Voltage	<=5	250 – 28000 mV	
Voltage Offset	<=4	200 – 2000 mV	
Ignition On Debounce	<=3	5 – 255 (× 2 sec)	
Smart Voltage Adjustment	1	0|1	
Ignition Off Debounce	<=3	5 – 255 (× 2 sec)	
AVS	3	AVS	AVS
Sensor Rest Duration	<=3	1 – 255 sec	
Sensor Motion Validity	<=3	1 – 255 sec	
Reserved	0		
Reserved	0		
Reserved	0		
VMS	3	VMS	VMS
Virtual Ignition Mode	1	0|2|4|5|6|7	
Virtual Ignition On Mask	2	00 – 07	
Virtual Ignition Off Mask	2	00 – 07	
Virtual Ignition On Logic	1	0 – 1	
Reserved	0		
Reserved	0		
GAM	3	GAM	GAM

Mode	1	0|1	
Speed Mode	1	0|1	
Motion Speed Threshold	<=2	5 – 50km/h	
Motion Cumulative Time	<=3	10 – 100s	
Motionless Cumulative Time	<=3	10 – 250s	
GNSS Fix Failure Timeout	<=4	5 – 1800s	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
BTS	3	BTS	BTS
Mode	1	0|1	
Reserved	0		
Bluetooth Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Bluetooth Service	<=2	00 – FF	
Discoverable Mode	1	0 – 3	
Discoverable Time	<=4	0|1 –1440 min	
Bluetooth Report Mask	<=4	0000 – FFFF	
Bluetooth Event Mask	<=4	0000 – FFFF	
PIN Need	1	0|1	
PIN Code	4|6	0000-9999|000000-999999	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

Reserved	0		
Reserved	0		
BMS	3	BMS	BMS
Index	1	0 – 9	
Mode	1	0|1	
Peripheral Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Peripheral MAC Address	12	000000000000 – FFFFFFFFFFFF	
Data Mask	4	0000 – 0003	
Service UUID Type	1	1|2	
Service UUID	4|32	0000 – FFFF|00000000000000000000000000000000 – FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	
Characteristic UUID Type	1	1|2	
Characteristic UUID	4|32	0000 – FFFF|00000000000000000000000000000000 – FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	
PIN Need	1	0|1	
PIN Code	4|6	'0' – '9'	
Data Format	1	0|1	
Send Interval	<=5	0|1 – 86400(×5s)	
Reserved	0		
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	
Command Mask	<=16	0000000000000000-FFFFFF FFFFFFFFFF	
GEO ID Mask	<=16	0000000000000000 – FFFFFFFFFFFFFFFF	
Stocmd ID Mask	<=16	0000000000000000 – FFFFFFFFFFFFFFFF	
Group ID Mask	<=16	0000000000000000 – FFFFFFFFFFFFFFFF	
Message Digest	32	'0'-9'a'-'z' 'A'-'Z'	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Generation Time	14	YYYYMMDDHHMMSS	
CMD	3	CMD	CMD
Mode	1	0 – 1	0
Stored Cmd ID	3	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	0 – FFFFFFFFFFFFFFFF	
Debounce Time	5	0 – 86400(s)	0
Inzizo Mask	5	00000 – FFFFF	0
Outzizo Mask	5	00000 – FFFFF	0
Stocmd ID Mask	<=8	0 – FFFFFFFF	
Stocmd Ack	1	0|1	0

Reserved			
Reserved			
Reserved			
Reserved			
BAS	3	BAS	BAS
Index	2	0 – 9	0
Accessory Type	1	0 – 2	0
Accessory Model	1	0	0
Accessory Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Accessory MAC	12	(HEX)	FFFFFFFFFFFF
Append Mask	<=4	(HEX)	001F
Read Interval	<=5	10 – 86400sec	30
Low Voltage Threshold	<=4	0 – 5000(mV)	2400
Reserved	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
UDT	3	UDT	
Mode	1	0|2	
Reserved	0		
IGN Send Interval	<=3	0|5 – 250	
IGF Send Enable	1	0|1	
Reserved	0		

Event Mask	8	00000000-FFFFFFFF	
Reserved	0		
Report Composition Mask	8	00000000-FFFFFFFF	
Reserved	0		
Reserved	0		
Reserved	0		
Report BLE Output	1	0|1	
Report BLE Mask	16	0000000000000000-001FFF FFFFFFFFFF	
Reserved	0		
BID	3	BID	
Reserved	0		
Enable	1	0|1	
Accessory Model	1	0	0
Append Mask	<=4	(HEX)	000A
Low Voltage Threshold	<=4	0 – 5000(mV)	2400
Reserved	0		
Start Index	<=3	0 – 299	
End Index	<=3	0 – 299	
MAC List	<=12*15	(HEX)	
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved (Optional)	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

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

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

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

3.3.3.4.+RESP:GTALS

After the device receives the command **AT+GTRTO** to get sub AT command configuration information, it will send the configuration information to the backend server via the message **+RESP:GTALS**. Configuration information varies with different AT commands. For example, to get FRI configuration, set **AT+GTRTO=gb100p,2,FRI,,,,,0015$**.

➢ **+RESP:GTALS,**

Example: **+RESP:GTALS,4C0203,865084030960726,gb100p,SPD,2,10,30,60,300,,,,,,,,,,,,,,2019041111382 1,03B1$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Sub AT Command	3	'a' – 'z' 'A' – 'Z' '	
Mode	1	0 – 5	
Discard No Fix	<=2	0|1	
Compressed Report	1	0|1	
Period Enable	1	0|1	
Start Time	4	HHMM	
End Time	4	HHMM	
Check Interval	<=5	0 – 86400 sec	
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	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.3.3.5.+RESP:GTCID

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

- **+RESP:GTCID,**

Example: **+RESP:GTCID,4C0203,865084030960726,gb100p,898600f51236f5142571,20190411113841,03B3$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
ICCID	20		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.3.3.6.+RESP:GTCSQ

After the device receives the command **AT+GTRTO** to read the GSM signal level, it will send the

GSM signal level to the backend server via the message **+RESP:GTCSQ**.

➢ **+RESP:GTCSQ,**

Example: **+RESP:GTCSQ,4C0203,865084030960726,gb100p,31,0,20190411113859,03B5$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
CSQ RSSI	<=2	0 – 31|99	
CSQ BER	<=2	0 – 7|99	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

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

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

3.3.3.7.+RESP:GTVER

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

➢ **+RESP:GTVER,**

Example: **+RESP:GTVER,4C0203,865084030960726,gb100p,GB100P,0310,0205,20190411113915,03B7$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' –	

		'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Device Type	10	'0' – '9' 'a' – 'z' 'A' – 'Z'	
Software Version	4	0000 – FFFF	
Hardware Version	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Device Type*>: The type of the device.
- <*Software Version*>: The software version of the device. The first two characters indicate the major version and the last two characters indicate the minor version. For example, **010A** means the version **1.10**.
- <*Hardware Version*>: The hardware version of the device. The first two characters indicate the major version and the last two characters indicate the minor version. For example, **010A** means the version **1.10**.

3.3.3.8.+RESP:GTBAT

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

➢ **+RESP:GTBAT,**

Example: **+RESP:GTBAT,4C0203,865084030960726,gb100p,1,12196,,4.20,0,1,20190411113929,03B9$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
External Power Supply	1	0|1	
External Power Voltage	<=5	0 – 99999mV	
Reserved	0		
Backup Battery Voltage	<=4	0.0 – 4.35 V	

Charging	1	0|1	
LED On	1	0|1	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.3.3.9.+RESP:GTTMZ

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

➢ **+RESP:GTTMZ,**

Example: +RESP:GTTMZ,4C0203,865084030960726,gb100p,+0800,0,20190411113934,03BC$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Time Zone Offset	5	±HHMM	
Daylight Saving	1	0|1	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

3.3.3.10.+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,4C0203,865084030960726,gb100p,GB100P_BT,78054100B5DE,0,0,,,,,,,,,2019041 1114040,03C0$			
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' '-' '_'	
Bluetooth Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Bluetooth MAC Address	12	000000000000 – FFFFFFFFFFFF	
Bluetooth State	1	0|1	
Connected Device Number	2	0 – 11	
Connected Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Connected Device MAC	12	000000000000 – FFFFFFFFFFFF	
Role	1	0|1	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*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

3.3.3.11.+RESP:GTBSC

The device reports the information of nearby Bluetooth devices via the **+RESP:GTBSC** message.

➢ **+RESP:GTBSC,**

Example:
+RESP:GTBSC,4C0203,865084030960726,gb100p,GB100P_BT,78054100B5DE,0,24,L,0,3AA01B6A3B12,-84,0,F5FE,0,21A01B6A3B12,-85,0,L,1,C31DFF63A371,-57,0,L,1,8D6443A12563,-83,0,L,1,45C6D761C846,-79,0,L,0,2BA01B6A3B12,-87,0,L,0,2FA01B6A3B12,-86,0,L,1,C3D8D04AAB6A,-58,0,F5FE,0,34A01B6A3B12,-82,0,L,0,38A01B6A3B12,-82,0,160F0101,1,B339808571D9,-68,0,L,0,2AA01B6A3B12,-85,0,L,0,E6A01B6A3B12,-82,0,L,0,A4A01B6A3B12,-81,0,5701,1,A9C8D51EF3C4,-74,0,160F0101,1,04D7E63D6DFD,-68,0,L,0,E5A01B6A3B12,-82,0,L,1,195658E75451,-79,0,L,0,1FA01B6A3B12,-82,0,L,0,D9A01B6A3B12,-80,0,F5FE,0,9CA01B6A3B12,-80,0,L,1,B7569314A44A,-91,0,TD_100129,1,E194CD6B81E7,-61,0,F5FE,0,41A01B6A3B12,-83,0,,,,,,,,201904111141 55,03C4$

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' '-' '_'	
Bluetooth Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Bluetooth MAC Address	12	000000000000 – FFFFFFFFFFFF	
Bluetooth State	1	0|1	
Nearby Device Number	2	0-30	
Nearby Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Nearby MAC Address Type	1	0|1	
Nearby Device MAC	12	000000000000 – FFFFFFFFFFFF	
Nearby Device RSSI	<=4	-120 – 0	
Nearby Device Status	1	0|1|2	
Reserved	0		

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

- <*Bluetooth State*>: The connection status of the Bluetooth when device role is slave.
  - 0: Bluetooth is not connected.
  - 1: Bluetooth is connected.
- <*Nearby Device Number*>: The number of the peripheral devices which the GB100P Bluetooth has found nearby.
- <*Nearby Device Name*>: The name of the nearby Bluetooth device which is found. Only ASCII characters are displayed.
- <*Nearby MAC Address Type*>: The address type of peripheral device.
  - 0: Public Device Address or Public Identity Address
  - 1: Random Device Address or Random (static) Identity
- <*Nearby Device MAC*>: The MAC address of the nearby Bluetooth device which is found.
- <*Nearby Device RSSI*>: The Received Signal Strength Indication of the nearby Bluetooth device which is found.
- <*Nearby Device Status*>: The pairing status of the nearby Bluetooth device which is found.
  - 0: Unpaired.
  - 1: The nearby device is paired.
  - 2: The nearby device is paired and connected.

3.3.3.12.+RESP:GTBAU

The device reports the Service UUIDs and Characteristic UUIDs of the Bluetooth peripherals connected to it via the **+RESP:GTBAU** message.

- **+RESP:GTBAU,**

Example:
+RESP:GTBAU,4C0102,865084030095655,,GB100P_master,780541005655,0,slave,780541005465,1,5,1,1801,1,1,2A05,20,1,1800,3,1,2A00,4E,1,2A01,4E,1,2A04,02,1,180A,5,1,2A29,02,1,2A2

4,02,1,2A26,02,1,2A28,02,1,2A25,02,1,180F,1,1,2A19,02,1,3430,1,1,3431,16,,,,,,,,2018011208 1927,0062$			
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' '-' '_'	
Bluetooth Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Bluetooth MAC Address	12	000000000000 – FFFFFFFFFFFF	
Bluetooth State	1	0|1	
Peer Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Peer Device MAC	12	000000000000 – FFFFFFFFFFFF	
Peer Device State	1	0|1	
Service UUID Number	<=2	0 – 30	
Service UUID Type	1	1|2	
Service UUID	4|32	0000 – FFFF|00000000000000000000000000000000 – FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	
Characteristic UUID Number	<=2	0 – 30	
Characteristic UUID Type	1	1|2	
Characteristic UUID	4|32	0000 – FFFF|00000000000000000000000000000000 – FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	
Characteristic Properties	<=2	00 – FF	
Reserved	0		
Reserved	0		
Reserved	0		

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

- <*Service UUID Number*>: The number of Services GB100P Bluetooth has detected.
- <*Characteristic UUID Number*>: The number of Characteristic UUIDs in one Service which GB100P Bluetooth has detected.
- <*Characteristic Properties*>: It indicates how the Characteristic Value can be used, or how the characteristic descriptors can be accessed. The Characteristic Properties bit field is briefly described as follows:
  Bit 0 (0x01): CHAR_PROP_BROADCAST (Broadcast)
  Bit 1 (0x02): CHAR_PROP_READ (Read)
  Bit 2 (0x04): CHAR_PROP_WRITE_WITHOUT_RESP (Write w/o resp)
  Bit 3 (0x08): CHAR_PROP_WRITE (Write)
  Bit 4 (0x10): CHAR_PROP_NOTIFY (Notify)
  Bit 5 (0x20): CHAR_PROP_INDICATE (Indicate)
  Bit 6 (0x40): CHAR_PROP_SIGNED_WRITE (Authenticated Signed Writes)
  Bit 7 (0x80): CHAR_PROP_EXT (Extended Properties)
  For details, please see Section 3.3.1.1 Characteristic Properties in Bluetooth Specification PDF Core v4.1, Vol. 3, Part G.

3.3.3.13.+RESP:GTSCS

After the device receives the command **AT+GTRTO** to get the calibration data, it will send the calibration data via the message **+RESP:GTSCS** to the backend server.

- **+RESP:GTSCS,**

Example: **+RESP:GTSCS,4C0204,865084030191819,gb100,2,-0.05,-0.03,1.00,0.32,0.95,0.05,-0.95,0.32,-0.04,20181226164957,15CD$**			
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''-''_'	
Self Calibration Status	1	0|1|2	
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	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Self Calibration Status*>: The status of the self-calibration for <*Acceleration Data*>.
  - 0: Self-calibration is disabled.
  - 1: Self-calibration is not done.
  - 2: Self-calibration is successful.
- <*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.

Note: When <*Self Calibration Status*> is 0 or 1, no calibration factor of the acceleration data will be included in the **+RESP:GTSCS** message. When <*Self Calibration Status*> is 2, the calibration factors of the acceleration data will be included in the **+RESP:GTSCS** message.

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: Device motion status indication when the motion status changes
+RESP:GTPDP: GPRS connection establishment report
+RESP:GTVGN: Virtual ignition on report
+RESP:GTVGF: Virtual ignition off report
+RESP:GTIDN: Enter into idling status
+RESP:GTIDF: Leave idling status
+RESP:GTJDR: Jamming indication
+RESP:GTGSM: The report for the information of the serving cell and the neighbor cells
+RESP:GTGSS: GNSS signal status
+RESP:GTCRA: Crash incident report
+RESP:GTSTR: Vehicle enters into start status.
+RESP:GTSTP: Vehicle enters into stop status.
+RESP:GTLSP: Vehicle enters into long stop status.
+RESP:GTGPJ: GNSS jamming status report
+RESP:GTRMD: The report for entering or leaving GSM roaming state
+RESP:GTJDS: Jamming detection status
+RESP:GTBCS: The report for Bluetooth connection
+RESP:GTBDS: The report for Bluetooth disconnection
+RESP:GTUPC: Over-the-air configuration update status
+RESP:GTEUC: Extended status report for configuration update
+RESP:GTBAA: Temperature alarm or button event for Bluetooth accessory.
+RESP:GTBID: The number of Beacon ID accessories detected by device.

In **+RESP:GTMPN**, **+RESP:GTMPF**, **+RESP:GTBTC**, **+RESP:GTSTC**, **+RESP:GTBPL**, **+RESP:GTSTT**, **+RESP:GTVGN**, **+RESP:GTVGF**, **+RESP:GTIDN**, **+RESP:GTIDF**, **+RESP:GTSTR**, **+RESP:GTSTP**, **+RESP:GTLSP**, **+RESP:GTGPJ** and **+RESP:GTGSS** event reports, the last known GNSS information and the current GSM network information are included.

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

Example: **+RESP:GTPNA,4C0203,865084030960726,gb100p,20190411110628,0343$** **+RESP:GTPFA,4C0203,865084030960726,gb100p,20190411110615,0342$** **+RESP:GTPDP,4C0203,865084030960726,gb100p,20190411114557,03CA$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**

Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

Example:
+RESP:GTMPN,4C0203,865084030960726,gb100p,0,0.0,52,131.8,117.129228,31.839157,20190411031019,0460,0000,550B,B969,00,20190411111348,0356$

+RESP:GTMPF,4C0203,865084030960726,gb100p,0,0.0,0,133.6,117.129233,31.839155,20190411030847,0460,0000,550B,B969,00,20190411110849,034E$

+RESP:GTBTC,4C0203,865084030960726,gb100p,0,0.0,52,131.8,117.129228,31.839157,20190411031019,0460,0000,550B,B969,00,20190411111348,0357$

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' '-' '_'	
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	
MNC	4	0XXX	
LAC	4	XXXX	

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

➢ **+RESP:GTSTC,**

Example: **+RESP:GTSTC,4C0203,865084030960726,gb100p,,0,0.0,0,66.6,117.129158,31.839537,20190411111711,0460,0000,550B,B969,00,20190411191719,099E$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Reserved	0		
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	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

➢ **+RESP:GTBPL,**

Example: **+RESP:GTBPL,4C0203,865084030960726,gb100p,3.66,0,0.0,0,63.2,117.129362,31.839027,20190411081713,0460,0000,550B,B969,00,20190411161720,0926$**			
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' '-' '_'	
Backup Battery Voltage	<=4	0.0 – 4.35 V	
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	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

➢ **+RESP:GTSTT,**

Example: **+RESP:GTSTT,4C0203,865084030960726,gb100p,22,0,0.0,0,85.5,117.128944,31.839090,20190411035000,0460,0000,550B,B969,00,20190411115009,03D4$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	

Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Motion Status	2	11|12|21|22|41|42|16	
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	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

- 16 (Tow): The device attached vehicle is ignition off and it is towed.
- 11 (Ignition Off Rest): The device attached vehicle is ignition off and it is motionless.
- 12 (Ignition Off Motion): The device attached vehicle is ignition off and it is moving before it is considered as being 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:GTVGN,**

Example: **+RESP:GTVGN,4C0203,865084030960726,gb100p,00,4,1264,0,0.0,0,85.5,117.128944,31.839090,20190411035000,0460,0000,550B,B969,00,,0.0,20190411115009,03D3$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**

Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Reserved	2	00	
Report Type	1	2|4|5|6|7	
Duration of Ignition Off	<=6	0 – 999999 sec	
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	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	
Hour Meter Count	11	HHHHH:MM:SS	
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Report Type*>: This parameter indicates which mode triggers the virtual ignition event.

- 0: Reserved
- 1: Reserved
- 2: Voltage virtual ignition detection mode
- 3: Reserved
- 4: Accelerometer virtual ignition detection mode
- 5: Voltage virtual ignition detection by hardware mode
- 6: Accelerometer virtual ignition detection and Enhanced Algorithm Voltage virtual ignition combined mode.

- 7: Combined detection mode

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

➢ **+RESP:GTVGF,**

Example: **+RESP:GTVGF,4C0203,865084030960726,gb100p,00,4,62,0,0.0,0,115.6,117.129009,31.839204,20190411035108,0460,0000,550B,B969,00,,0.0,20190411115111,03D8$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Reserved	2	00	
Report Type	1	2|4|5|6	
Duration of Ignition On	<=6	0 – 999999 sec	
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	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	
Hour Meter Count	11	HHHHH:MM:SS	
Mileage	<=9	0.0 – 4294967.0 km	

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

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

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

Example:
+RESP:GTIDN,4C0203,865084030960726,gb100p,,,0,0.0,0,66.6,117.129012,31.839195,20190411035336,0460,0000,550B,B969,00,0.0,20190411115338,03F3$

+RESP:GTSTR,4C0203,865084030960726,gb100p,,,0,7.0,215,77.8,117.129361,31.839360,20190411035939,0460,0000,550B,B969,00,0.0,20190411115941,0408$

+RESP:GTSTP,4C0203,865084030960726,gb100p,,,0,1.6,215,77.7,117.129391,31.839372,20190411035942,0460,0000,550B,B969,00,0.0,20190411115944,040A$

+RESP:GTLSP,4C0203,865084030960726,gb100p,,,0,0.0,221,73.4,117.129486,31.839373,20190411040042,0460,0000,550B,B969,00,0.0,20190411120044,040F$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Reserved	0		
Reserved	0		
GNSS Accuracy	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	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Mileage	<=9	0.0 – 4294967.0 km	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

➢ **+RESP:GTIDF,**

Example:
+RESP:GTIDF,4C0203,865084030960726,gb100p,22,372,0,0.4,221,73.4,117.129486,31.839373,20190411035948,0460,0000,550B,B969,00,0.0,20190411115950,040D$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Motion Status	2	11|12|16|1A|22	
Duration of Idling Status	<=6	0 – 999999 sec	
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	

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

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

➢ **+RESP:GTGSM,**

Example:
+RESP:GTGSM,4C0203,865084030960726,FRI,0460,0000,550b,b96a,37,,0460,0000,550b,9b89,22,,0460,0000,550b,3c6c,19,,,,,,,,,,,,,,,,,,0460,0000,550b,b969,31,00,20190411115412,03FC$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X∈{'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Fix Type	3	RTL|LBC|FRI|TOW|GIR	
MCC1	4	0XXX	
MNC1	4	0XXX	
LAC1	4		
Cell ID1	4		
RX Level1	2	0 – 63	
Reserved	1		
MCC2	4	0XXX	
MNC2	4	0XXX	
LAC2	4		
Cell ID2	4		
RX Level2	2	0 – 63	

Reserved	1		
MCC3	4	0XXX	
MNC3	4	0XXX	
LAC3	4		
Cell ID3	4		
RX Level3	2	0 – 63	
Reserved	1		
MCC4	4	0XXX	
MNC4	4	0XXX	
LAC4	4		
Cell ID4	4		
RX Level4	2	0 – 63	
Reserved	1		
MCC5	4	0XXX	
MNC5	4	0XXX	
LAC5	4		
Cell ID5	4		
RX Level5	2	0 – 63	
Reserved	1		
MCC6	4	0XXX	
MNC6	4	0XXX	
LAC6	4		
Cell ID6	4		
RX Level6	2	0 – 63	
Reserved	1		
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4		
Cell ID	4		
RX Level	2	0 – 63	

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

- <*Fix Type*>: A string to indicate what kind of GNSS fix this cell information is for.
  "RTL": This cell information is for RTL request.
  "LBC": This cell information is for LBC request.
  "FRI": This cell information is for FRI request.
  "TOW": This cell information is for TOW request.
  "GIR": This cell information is for the sub command "**C**" in the **AT+GTRTO** command.
- <*MCC(i)*>: MCC of the neighbor cell *i* (*i* is the index of the neighbor cell).
- <*MNC(i)*>: MNC of the neighbor cell *i*.
- <*LAC(i)*> : LAC (in hex format) of the neighbor cell *i*.
- <*Cell ID(i)*> : Cell ID (in hex format) of the neighbor cell *i*.
- <*RX Level(i)*> : The signal strength of the neighbor cell *i*. This parameter is a 6-bit value coded in 1 dB steps:
  0: -110 dBm
  1 to 62: -109 to -48 dBm
  63: -47 dBm
- <*MCC*>: MCC of the servicng cell.
- <*MNC*>: MNC of the serving cell.
- <*LAC*>: LAC (in hex format) of the serving cell.
- <*Cell ID*>: Cell ID (in hex format) of the serving cell.
- <*RX Level*>: The signal strength of the serving cell.

Note:

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

➢ **+RESP:GTGSS,**

Example: **+RESP:GTGSS,4C0203,865084030960726,gb100p,0,,21,,0,0.0,357,72.2,117.129504,31.839450,20190411044017,0460,0000,550B,B969,00,20190411124118,043C$**			
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' '-' '_'	
GNSS Signal Status	1	0|1	
Satellites in Use	2	0 - 15	
Motion Status	2	11|12|21|22|41|42|1A|16	
Reserved	0		
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	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*GNSS Signal Status*>: 0 means "GNSS signal lost or no successful GNSS fix", and 1 means "GNSS signal recovered and successful GNSS fix".
- <*Satellites in Use*>: 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.
  - 16 (Tow): The device attached vehicle is ignition off and it is towed.
  - 11 (Ignition Off Rest): The device attached vehicle is ignition off and it is motionless.
  - 12 (Ignition Off Motion): The device attached vehicle is ignition off and it is moving before it is considered as being 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:GTGPJ,**

Example: **+RESP:GTGPJ,4C0203,865084030960726,gb100p,20,2,0,0.0,0,103.2,117.129426,31.839380,20190411040303,0460,0000,550B,B969,00,20190411120306,0423$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A'–'Z','0'–'9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z''-''_'	
CW Jamming Value	<=3	0-255	
GNSS Jamming State	2	0|1|2|3	
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	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*CW Jamming Value*>: The current continuous wave jamming value.

✧ <*GNSS Jamming State*>: The current jamming state.

- 0: Unknown or feature disabled
- 1: (OK) No significant jamming
- 2: (Warning) Interference visible but fix OK

- 3: (Critical) Interference visible and no fix

Note: The **+RESP:GTGPJ** message will not be reported until the first successful fix.

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

➢ **+RESP:GTRMD,**

Example: **+RESP:GTRMD,4C0203,865084030960726,gb100p,2,0,0.0,0,66.6,117.129012,31.839195,20190411035324,0460,0000,550B,B969,00,20190411115325,03EF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=10	'0' – '9' 'a' – 'z' 'A' – 'Z'	
Roaming State	1	0-3	
GNSS Accuracy	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	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

- 0: Home
- 1: Known roaming

- 2: Unknown roaming
- 3: Blocking report

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,4C0203,865084030960726,gb100p,0,0.0,287,98.0,117.129349,31.837807,20190411070316,0460,0000,550B,6393,00,20190411150417,05FF$**			
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' '-' '_' '?'	
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	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

➢ **+RESP:GTJDS,**

Example: **+RESP:GTJDS,4C0203,865084030960726,gb100p,1,0,0.0,287,98.0,117.129349,31.837807,2019**

0411070316,0460,0000,550B,6C6C,00,20190411150331,05FD$			
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' '-' '_' '?'	
Jamming Status	1	1|2	
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	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

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

➢ **+RESP:GTCRA,**

Example: **+RESP:GTCRA,4C0203,865084030960726,gb100p,00,0,0.0,8,61.4,117.129415,31.839140,20190411054506,0460,0000,550B,B969,00,20190411134507,046D$**			
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' '-' '_'	
Crash Counter	2	00-FF	
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	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Crash Counter*>: A parameter to indicate the crash sequence. The two report messages **+RESP:GTCRA** and **+RESP:GTCRD** are combined into one crash event. It rolls from 0x00 to 0xFF.

➢ **+RESP:GTUPC,**

Example:
+RESP:GTUPC,4C0203,865084030960726,gb100p,0,200,http://qlinkhf.f3322.org:20414/GB100P/deltabin/0305_at.ini,20190411145341,05C3$

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' '-' '_'	

Command ID	1		
Result	3	100|101|102|103|200|201|202|300|301|302|304|305|306	
Download URL	<=100	Complete URL	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000-FFFF	
Tail Character	1	$	$

- <*Command ID*>: The command ID in the update configuration file. It is always 0 before the device starts to update device configuration. It indicates the total number of the commands when the response result code is 301. It indicates wrong format of command ID when the response result code is 302.
- <*Result*>: A numeral to indicate whether the configuration is updated successfully.
  - 100: The update command is starting.
  - 101: The update command is confirmed by the device.
  - 102: The update command is refused by the device.
  - 103: The update process is refused because the battery is low.
  - 200: The device starts to download the package.
  - 201: The device finishes downloading the package successfully.
  - 202: The device fails to download the package.
  - 300: The device starts to update the device configuration.
  - 301: The device finishes updating the device configuration successfully.
  - 302: The device fails to update the device configuration.
  - 304: <*Command Mask*>, <*GEO ID Mask*>, <*Stocmd ID Mask*> or <*Group ID Mask*> check fails.
  - 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,4C0203,865084030960726,gb100p,0,200,http://qlinkhf.f3322.org:20414/GB100P/deltabin/0305_at.ini,00000002,,,,,20190411145731,05D9$**			
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'	
Command ID	<=3		

Result	3	100|101|102|103|200|201|202|300|301|302|304|305|306	
Download URL	<=100	Complete URL	
Identifier Number	8	000000000-FFFFFFFF	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000-FFFF	
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 wrong format of command ID when the response code is 302.
- <*Result*>: A numeral to indicate whether the configuration is updated successfully.
  - 100: The update command is starting.
  - 101: The update command is confirmed by the device.
  - 102: The update command is refused by the device.
  - 103: The update process is refused because the battery is low.
  - 200: The device starts to download the package.
  - 201: The device finishes downloading the package successfully.
  - 202: The device fails to download the package.
  - 300: The device starts to update the device configuration.
  - 301: The device finishes updating the device configuration successfully.
  - 302: The device fails to update the device configuration.
  - 303: Reserved
  - 304: <*Command Mask*>, <*GEO ID Mask*>, <*Stocmd ID Mask*> or <*Group ID Mask*> check fails.
  - 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,4C0203,865084030960726,gb100p,,0,0.0,0,113.1,117.129138,31.839143,20190411034415,0460,0000,550B,B969,00,0D03,GB100P_BT,78054100B5DE,0,1,067DA3C26E54,,,,,20190411114418,03C7$

+RESP:GTBDS,4C0203,865084030960726,gb100p,,0,0.0,221,73.4,117.129486,31.839373,20190411040124,0460,0000,550B,B969,00,0D03,GB100P_BT,78054100B5DE,0,1,067DA3C26E54,,,,,20190411120125,0414$			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Reserved	0		
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	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Bluetooth Report Mask	4	0000 – FFFF	
Bluetooth Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Bluetooth Mac Address	12	000000000000 – FFFFFFFFFFFF	
Peer Role	1	0|1	
Peer Address Type	1	0|1	
Peer MAC Address	12	000000000000 – FFFFFFFFFFFF	
Reserved	0		
Reserved	0		
Reserved	0		

Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
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

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

Example:
+RESP:GTBAA,4C0502,865084030963274,gb100p,1,2,0,02,001F,WTS300,78054101E652,1,3086,28,0,0.0,0,77.2,117.129462,31.839141,20200804152947,0460,0000,550B,B7B1,00,20200804232949,00F6$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15/12	IMEI/MUID	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Index	2	0 – 9|0xFF	
Accessory Type	1	0 – 3|6	
Accessory Model | Beacon ID Accessory Model	1	0|2	
Alarm Type	2	00 – FF	
Append Mask	4	0000 – FFFF	
Accessory Name (Optional)	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Accessory MAC(Optional)	12	'0' – '9' 'A' – 'F'	
Accessory Status (Optional)	1	0 - 1	
Accessory Voltage (Optional)	<=4	0 – 5000mV	

Accessory Temperature (Optional)	<=3	-40 – 80℃	
Accessory Humidity (Optional)	<=3	0 – 100%(rh)	
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	0|4	0XXX	
MNC	0|4	0XXX	
LAC	0|4	XXXX	
Cell ID	0|4|8	XXXXXXXX	
Reserved	0|2	00	00
Send Time	0|14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Index*>: There are two meaning for <*Index*>.
  - The index of Bluetooth accessory defined in **AT+GTBAS** which triggers the **+RESP:GTBAA** message.
  - 0xFF for WKF300.
- <*Accessory Type*>: The type of the Bluetooth accessory which is defined in the <*Index*>. The following is supported now:
  - 0: No Bluetooth accessory
  - 1: Reserved
  - 2: Beacon temperature sensor
  - 3: Bluetooth beacon accessory
  - 6: Beacon Multi-Functional Sensor
- <*Accessory Model / Beacon ID Accessory Model*>: The model of the Bluetooth accessory which is defined in **AT+GTBAS** or the model of the Bluetooth Beacon ID accessory which is defined in **AT+GTBID.**
- <*Alarm Type*>: The type of alarm which generated according to <*Sensor Type*> and <*Sensor Model*> specified in the **AT+GTBAS** command.
  - 0: The voltage of the Bluetooth accessory is low.

- 1: The temperature alarm: current temperature value is below <*Low Temperature*> set in the **AT+GTBAS** command.
- 2: The temperature alarm: current temperature value is upper <*High Temperature*> set in the **AT+GTBAS** command.
- 3: The temperature alarm: current temperature value is within the range defined by <*Low Temperature*> and <*High Temperature*> set in the **AT+GTBAS** command.
- 4: Push Button Event on WKF300 is detected.
- 7: Humidity alarm: The current humidity value is below <*Low Humidity*> set in the **AT+GTBAS** command.
- 8: Humidity alarm: The current humidity value is above <*High Humidity*> set in the **AT+GTBAS** command.
- 9: Humidity alarm: The current temperature value is within the range defined by <*Low Humidity*> and <*High Humidity*> set in the **AT+GTBAS** command.

✧ <*Append Mask*>: Bitwise mask defined in **AT+GTBAS** and **AT+GTBID** commands to configure which data item is reported.

- Bit 0: <*Accessory Name*>
- Bit 1: <*Accessory MAC*>
- Bit 2: <*Accessory Connection Status*>
- Bit 3: <*Accessory Voltage*>
- Bit 4: <*Accessory Temperature*>
- Bit 5: <*Accessory Humidity*>

✧ <*Accessory Name*>: Bluetooth accessory name ended with '\0'(0x00). If the Accessory name is empty, this filed will be filled with one byte: 0x00.

✧ <*Accessory MAC*>: Bluetooth accessory MAC address.

✧ <*Accessory Voltage*>: The voltage of Bluetooth accessory.

✧ <*Accessory Temperature*>: Temperature data of Bluetooth accessory.

✧ <*Accessory Humidity*>: Humidity data for the Bluetooth accessory.

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

Example:
+RESP:GTBID,4C0502,865084030963274,gb100p-3274,1,0,000A,78054101F4C3,2964,0,0.0,358,123.1,117.129428,31.838851,20200714032646,0460,0000,550B,B96A,00,20200714112649,0A2E$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15/12	IMEI/MUID	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Number	1	0 – 3	
Beacon ID Accessory Model	1	0	

Append Mask	4	0000 – FFFF	
Accessory MAC	12	'0' – '9' 'A' – 'F'	
Accessory Voltage	<=4	0 – 5000mV	
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	0|4	0XXX	
MNC	0|4	0XXX	
LAC	0|4	XXXX	
Cell ID	0|4|8	XXXXXXXX	
Reserved	0|2	00	00
Send Time	0|14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Number*>: The number of the Bluetooth beacon ID accessories**.**
- <*Beacon ID Accessory Model*>: The model of the Bluetooth beacon ID accessory which is defined in **AT+GTBID.**
- <*Append Mask*>: Bitwise mask defined in the **AT+GTBID** command to configure which data item is reported.
  - Bit 0: Reserved.
  - Bit 1: <*Accessory MAC*>
  - Bit 2: Reserved
  - Bit 3: <*Accessory Voltage*>
  - Bit 4: Reserved
- <*Accessory MAC*>: Bluetooth beacon ID accessory MAC address.
- <*Accessory Voltage*>: The voltage of Bluetooth beacon ID accessory.

➢ **+RESP:GTASC,**

Example:
+RESP:GTASC,450204,865084030191819,gb100,1.00,-0.09,-0.02,0.09,1.00,0.03,0.02,-0.03,1.00,0,27.7,270,61.2,117.125591,31.842422,20181225023714,0460,0000,550B,3C6C,00,201812251

03720,11C1$			
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''-''_'	
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	<=2	0	
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	XXXX	
Cell ID	4	XXXX	
Reserved	2	00	00
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
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.

3.3.5.Buffer Report

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

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

The buffered messages will be sent to the backend server when the connection to the server is recovered. The buffered messages are saved to the built-in non-volatile memory in case the device is reset. The terminal can buffer up to 10,000 messages.

Detailed information about buffer report is given below.

- Only **+RESP** messages except **+RESP:GTPDP**, **+RESP:GTALM** and **+RESP:GTALC** are buffered.
- In the buffer report, the original header string **+RESP** is replaced by **+BUFF** while the other content including the original sending time and count number is kept unchanged.
- Buffered messages will be sent only via GPRS by TCP or UDP protocol. They cannot be sent via SMS. If the current report mode is forced SMS mode, the buffered message will not be sent until the report mode is changed to TCP or UDP.
- The buffered messages will be sent after real-time messages if <*Buffer Mode*> in **AT+GTSRI** is set to 1.
- The buffered messages will be sent before real-time messages if <*Buffer Mode*> in **AT+GTSRI** is set to 2.

Example:

The following is an example of the buffered message:

+BUFF:GTFRI,450101,868034001000579,gb100p,0,10,1,1,0.4,60,56.6,117.201309,31.833082,20130107182151,0460,0000,5678,2079,00,21188.6,,,,100,210100,,,,20130107182154,01B8$

3.3.6.Report with Google Maps Hyperlink

If <*Location by Call*> in the command **AT+GTCFG** is set to 2 or 3, the device will send its current location to the call number of incoming call via SMS with a Google Maps hyperlink.

➢ **Google Maps Hyperlink**

Example: **gb100p:** **<http://maps.google.com/maps?q=31.839187,117.129242** **F1 D2019/04/11T03:23:40 B100 I0 S0.0>**			
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=	
Latitude	<=10	-90 – 90	
Longitude	<=11	-180 – 180	
GNSS Fix	<=3	F0|F1 – F50	
GNSS UTC Time	20	DYYYY/MM/DDTHH:MM:SS	
Battery Percent	<=4	B0-B100	
Ignition State	<=2	I0-I1	
Speed	<=6	S0.0-S999.9 km/h	

✧ <*GNSS Fix*>: The accuracy of the location information. F0 means “No GNSS fix”.

✧ <*Ignition Status*>: The current ignition state (on/off) of the device.

- 0: The device is currently ignition off.
- 1: The device is currently ignition on.

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 in several frames. And the device will continue to record tri-axial data after crash and report the data to backend server in several frames.

➢ **+RESP:GTCRD,**

Example:

+RESP:GTCRD,4C0203,865084030960726,gb100p,00,03,5,5,FFFEFFFC005B0000FFF800530000FFF6005A0000FFF80055FFFEFFF90052FFFFFFF700510000FFF800520000FFFA0054FFFEFFF80052FFFFFFF800520000FFF900530000FFFA00530000FFF900530000FFF900530000FFF900530000FFF900530000FFF900530000FFF900530000FFF900530000FFF900520000FFF900530000FFF900530000FFF900530000FFF900530000FFF900520000FFF900530000FFF900530000FFF900520000FFF900520000FFF900520000FFF900530000FFF900530000FFF900520000FFF900520000FFF900530000FFF900530000FFF900530000FFF900530000FFF800520000FFF800520000FFF900530000FFF900530000FFF900530000FFF80058FFFFFFF70062FFFEFFFF008DFFF9FFF0003

**E000EFFF40000FFFA00060098FFFD00040034FFF5FFF6002DFFFFFFE8004BFFFFFFFB006BFFFFFF
FF0053FFFAFFFA004EFFFEFFF70053FFFDFFF80051FFFCFFFA0050FFFEFFF80054FFFCFFF90052FF
FCFFF90052FFFEFFF90053FFFCFFF90051FFFDFFF90053FFFDFFF90053FFFDFFF90052FFFDFFF900
52FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDF
FF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052
FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF
90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FF
FDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90052FFFDFFF90
052FFFDFFF90052FFFDFFF80052FFFDFFF90052FFFDFFF90052FFFDFFF90052,20190411134512,
0477$**

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'	
Crash Counter	<=2	00-FF	
Data Type	2	00-FF	
Total Frame	3	1-64	
Frame Number	3	1-64	
Data	<=1200	'0'-'9' 'a'-'f'	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Crash Counter*>: A hexadecimal value to indicate the sequence number of the crash event which combines the reports of **+RESP:GTCRA** and **+RESP:GTCRD** into one crash event. It rolls from 00 to FF.
- <*Data Type*>: A hexadecimal value to indicate the time of the data (recorded 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 details.

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: Positive X-axis direction	1: Negative X-axis direction	0-1
Bit 3	0: Y-axis crash not detected	1: Y-axis crash detected	0-1
Bit 4	0: Positive Y-axis direction	1: Negative Y-axis direction	0-1
Bit 5	0: Z-axis crash not detected	1: Z-axis crash detected	0-1
Bit 6	0: Positive Z-axis direction	1: Negative Z-axis direction	0-1

Bit 7	0: Acceleration data	1: Acceleration data and gyroscope data	0-1

- <*Total Frame*>: The total number of 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*>: If Bit 7 of <*Data Type*> is 0: There are maximum 1200 ASCII characters (with 12 characters in a group) in one message which contains acceleration samples within at most 1 second. 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 respresent 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. And they are two's complement.

  If Bit 7 of <*Data Type*> is 1: There are maximum 1200 ASCII characters (with 24 characters in a group) in one message which contains acceleration samples within at most 1 second. The first 4 characters of these 24 characters represent X-axis acceleration data, the characters from 5 to 8 represent Y-axis acceleration data, the characters from 9 to 12 respresent Z-axis acceleration data, the characters from 13 to 16 represent X axis gyroscope data, the characters from 17 to 20 respresent Y axis gyroscope data and the characters from 21 to 24 respresent Z axis gyroscope data. The ASCII "0001" is equal to 0x0001 in hex format, and the ASCII "afff" is equal to 0xAFFF in hex format. And they are two's complement.

Example:

+RESP:GTCRD,4C0101,359231038715676,,00,0,3,1,000100010055…,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,4C0101,359231038715676,,1,3,3,...fffffff10052,20120330115736,005A$

This is the last 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;

+RESP:GTCRD,4C0101,359231038715676,,01,A0,3,1,000100010055000200020066…,20120330120443,005C$

This is the oldest XYZ-axis acceleration and gyroscope data:

Conversion to hex format: X (axis acceleration data) = 0x0001; Y = 0x0001; Z = 0x0055;

Conversion to hex format: X (axis gyroscope data) = 0x0002; Y = 0x0002; Z = 0x0066;

Decimal format: X (axis acceleration data) = 1; Y = 1; Z = 85;

Decimal format: X (axis gyroscope data) = 2; Y = 2; Z = 102;

+RESP:GTCRD,4C0101,359231038715676,,02,A1,3,3,...fffffff10052fffffff10052,20120330115736,005A$

This is the last XYZ-axis acceleration and gyroscope 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;

Conversion to hex format: X (axis gyroscope data) = 0xFFFF; Y = 0xFFF1; Z = 0x0052;

Decimal format: X (axis gyroscope 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.Data Report

The following report is triggered when certain data needs to be sent.

+RESP:GTPGR: The message contains GNSS data before crash and after crash and it is triggered by crash incident.

- **+RESP:GTPGR,**

Example:
+RESP:GTPGR,4C0203,865084030960726,gb100p,1,01,1,2,2,10,,1,1,0.0,359,49.7,117.129416,31.839089,20190411054822,2,1,0.0,359,49.7,117.129416,31.839089,20190411054823,3,1,0.0,359,49.7,117.129416,31.839089,20190411054824,4,1,0.0,359,49.7,117.129416,31.839089,20190411054825,5,1,0.0,359,49.7,117.129416,31.839089,20190411054826,6,1,0.0,359,49.7,117.129416,31.839089,20190411054827,7,1,0.0,359,49.7,117.129416,31.839089,20190411054828,8,1,0.0,359,49.7,117.129416,31.839089,20190411054829,9,1,0.0,359,49.7,117.129416,31.839089,20190411054830,10,1,0.0,359,49.7,117.129416,31.839089,20190411054831,20190411134832,048E$

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'	
Trigger Type	1	1	
Crash Counter	<=3	00 – FF	
Data Type	1	0|1	
Total Frame	2	1 – 6	
Frame Number	2	1 – 6	
GNSS Validity Number	2	0 – 20	
Reserved	0		
GNSS Point Index	<=2	1	
GNSS Accuracy	<=2	1 – 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	
…			
GNSS Point Index	<=2	20	
GNSS Accuracy	<=2	1 – 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	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Trigger Type*>: It indicates which incident triggers the report message.
  - 1: Crash incident.
- <*Total Frame*>: The total number of **+RESP:GTPGR** messages that are sent to the backend server for the crash event.
- <*Frame Number*>: A numeral to indicate the sequence of the current message.
- <*Crash Counter*>: A value to indicate the crash sequence. The three report messages **+RESP:GTCRA**, **+RESP:GTCRD** and **+RESP:GTPGR** are combined into one crash event. It rolls from 0x00 to 0xFF.
- <*Data Type*>: It indicates whether the data reported to the backend server is recorded before crash or after crash.
  - 0: Before crash.
  - 1: After crash.
- <*GNSS Validity Number*>: The number of the successfully fixed GNSS positions included in the report message.
- <*GNSS Point Index*>: The index of GNSS point.

3.3.9.Transparent Data Transmission

The device supports transparent data transfer between the backend server and the peripheral

device connected to its Bluetooth. GB100P supports bi-directional data transmission. In both directions, the data is transparent to the device.

a) Data transfer from the peripheral device to the backend server
If the peripheral device supports the **AT+GTDAT** command, it can transfer data via this command. The peripheral device can send the command **AT+GTDAT** with the data to the Bluetooth. According to the <*Command Type*> of **AT+GTDAT**, the device wraps the corresponding data into the backend server with the **+RESP:GTDAT** message either in short format or in long format.

b) Data transfer from the backend server to the peripheral device
If the backend server needs to send data to the peripheral device, it can send the command **AT+GTDAT** with the data to GB100P and GB100P will pick out the pure data and send it to the Bluetooth. The peripheral device can thus get the data from the Bluetooth.

Data to the Backend Server

- **+RESP:GTDAT (Short Format),**

Example: **+RESP:GTDAT,4C0203,865084030960726,gb100p,datatothebackend server,20190411135049,0497$**			
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 to the Backend Server	<=245	ASCII Code	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- **+RESP:GTDAT (Long Format),**

Example: **+RESP:GTDAT,4C0203,865084030960726,gb100p,1,,,datatothebackend server,0,0.0,359,49.7,117.129416,31.839089,20190411055030,0460,0000,550B,B969,00,,,,,20190411135034,0495$**			
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' '-' '_'	
Report Type	1	0|1|2|3|4	
Reserved	0		
Reserved	0		
Data to the Backend Server	<=245	ASCII Code	
GNSS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km /h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	-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
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Report Type*>: It 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**.

Data to the Bluetooth starts with a new line and is terminated with '\r\n'.

Example:
data to the Bluetooth

3.3.10.Bluetooth Data Report

The device reports the data from peripheral Bluetooth devices connected to it via the **+RESP:GTBDR** message.

- **+RESP:GTBDR,**

Example:
+RESP:GTBDR,4C0203,865084030963423,gb100p-3423,,0,0.0,11,50.9,117.129457,31.839376,20190408091251,0460,0000,550B,B969,00,1D03,3423-GB100P,78054100B6EC,1,0,78054100B5DE,0726-GB100P,0003,1,180A,1,2A29,0,Queclink,,,,,,,,20190408171253,02AE$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Reserved	0		
GNSS Accuracy	<=2	0	0, Last known
Speed	<=5	0.0 – 999.9 km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	(–)xxxxx.x m	
Longitude	<=11	-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	0		

Bluetooth Report Mask	4	0000 – FFFF	
Bluetooth Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Bluetooth MAC Address	12	000000000000 – FFFFFFFFFFFF	
Peer Role	1	0|1	
Peer Address Type	1	0|1	
Peer MAC Address	12	000000000000 – FFFFFFFFFFFF	
Peer Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Data Mask	4	0000-0003	
Service UUID Type	1	1|2	
Service UUID	4|32	0000 – FFFF|00000000000000000000000000000000 – FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	
Characteristic UUID Type	1	1|2	
Characteristic UUID	4|32	0000 – FFFF|00000000000000000000000000000000 – FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	
Data Format	1	0|1	
Data	<=245		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	

Count Number	4	0000 – FFFF	
Tail Character	1	$	$

✧ <*Data*>: There are maximum 245 ASCII characters in one message which contains values from Peer Bluetooth device Characteristic. If <*Data Format*> is 0, it will be raw data from Bluetooth. If <*Data Format*> is 1, it means the values will be in Hexadecimal format. For example, if the data is 0x69, it will be shown as 69 in the report message.

3.3.11.UART Data Transfer

If the parameter <*Mode*> in **AT+GTUDT** is enabled, the device will send the message **+RESP:GTUDT** to Bluetooth according to send interval. If the GEO-Fence event occurs, the device will also send the message **+RESP:GTUDT** to Bluetooth.

➢ **+RESP:GTUDT,**

Example: **+RESP:GTUDT,4C0501,0508,0205,,865084030961724,gb100p,0,,1,0,2.7,339,83.4,117.129347,31.839138,20200224090701,0460,0000,550B,B7B1,00,0.0,,,,,8,,,,,,42,12084,0.00,0,00000,,,,20200224090702,0003$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Firmware Version			
Hardware Version			
Reserved			
Unique ID	15	IMEI	
Device Name			
Report Type	1	0|1	
Report ID	<=2	0 – FF	
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	-180 – 180	

Latitude	<=10	-90 – 90	
GNSS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	<=8	XXXX	
Reserved	2	00	
Mileage	<=9	0.0 – 4294967.0 km	
Reserved	0		
HMC	11	HHHHH:MM:SS	
Reserved	0		
Reserved	0		
GSV Number	<=2	00 – FF	
Circular GEO State	1	0|1	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Motion Status	1	0x11|0x12|0x16|0x1A|0x41|0x42|0x21|0x22	
External Power VCC	<=5	0 – 32000 mV	
Backup Battery Level	<=4	0.00 – 4.50 V	
Charging	1	0|1	
Circular GEO Status Mask	5	00000 – FFFFF	
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

- <*Report Type*>: A numeral to indicate the type of the report.
  - 0: Timer event triggered.
  - 1: GEO-Fence event triggered.
- <*Report ID*>: GEO-Fence event triggered report ID. It is in HEX format.
- <*Circular GEO State*>: The activated GEO-Fence state. 0 means “Outside the GEO-Fence”, and 1 means “Inside the GEO-Fence”.
- <*Circular GEO Status Mask*>: Bit 0 - Bit 19 represent the status of GEO 0 - 19 respectively. 0 means “Outside the GEO fence” or “The status is unknown”, and 1 means “Inside the GEO fence”.

3.4.Heartbeat

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

➢ **+ACK:GTHBD,**

Example: **+ACK:GTHBD,4C0203,865084030960726,gb100p,20190411134700,047A$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

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

➢ **+SACK:GTHBD,**

Example: **+SACK:GTHBD,4C0203,11F0$** **+SACK:GTHBD,,11F0$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	
Count Number	4	0000 – FFFF	

Tail Character	1	$	$

✧ <*Protocol Version*>: The device type and the protocol version that the backend server supports. This field is optional. The backend server could just send an empty field to decrease the length of the heartbeat data acknowledgement.

✧ <*Count Number*>: The backend server uses the <*Count Number*> extracted from the heartbeat package from the device as the <*Count Number*> in the server acknowledgement of the heartbeat.

3.5.Server Acknowledgement

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

➢ **+SACK:**

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

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

4. HEX Format Report Message

From this version, the @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 the mask settings in **AT+GTHRM**.

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

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

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

4.1.Hex Report Mask

The **AT+GTHRM** command consists of <*+ACK Mask*>, <*+RSP Mask*>, <*+EVT Mask*>, <*+INF Mask*>, <*+HBD Mask*> and <*+CRD Mask*> which 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=gb100p,,,7F,FC1FBF,FC1FBF,FD7F,EF,7D,7F,,,FFFF$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	gb100p
Reserved	0		
Reserved	0		

+ACK Mask	2	00 – FF	7F
+RSP Mask	8	00000000 – FFFFFFFF	FC1FBF
+EVT Mask	8	00000000 – FFFFFFFF	FC1FBF
+INF Mask	<=8	00000000 – FFFFFFFF	FD7F
+HBD Mask	2	00 – FF	EF
+CRD Mask	4	0000–FFFF	7D
+DAT Mask	<=8	00000000 – FFFFFFFF	7F
Reserved	0		
+CRI Mask	8	00000000 – FFFFFFFF	10418F7
Serial Number	4	0000 – FFFF	
Tail Character	1	$	$

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

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

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

Mask Bit	Item
Bit 31	Reserved
Bit 30	Reserved
Bit 29	Reserved
Bit 28	Reserved
Bit 27	Reserved
Bit 26	Reserved

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

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

Mask Bit	**Item**
Bit 31	Reserved
Bit 30	Reserved

Bit 29	Reserved
Bit 28	Reserved
Bit 27	Reserved
Bit 26	Reserved
Bit 25	Reserved
Bit 24	Reserved
Bit 23	*<Total Hour Meter Count>*
Bit 22	*<Current Hour Meter Count>*
Bit 21	*<Total Mileage>*
Bit 20	*<Current Mileage>*
Bit 19	*<Satellite Information>*
Bit 18	*<Motion Status>*
Bit 17	Reserved
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>*

✧ <*+INF Mask*>: Component mask of the information report message. Bit 8 – Bit 15 indicate which groups of information items are included when the device reports the message **+RESP:GTINF**.

Mask Bit	Item
Bit 15	**+RESP:GTGIR**
Bit 14	**+RESP:GTTMZ**
Bit 13	**+RESP:GTCSQ**
Bit 12	**+RESP:GTCID**
Bit 11	**+RESP:GTBAT**
Bit 10	**+RESP:GTGPS**
Bit 9	Reserved
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 - Bit 15 indicate which groups of information items are included when the device reports the message **+RESP:GTINF**.

Mask Bit	Item
Bit 15	Reserved
Bit 14	Reserved
Bit 13	Reserved
Bit 12	**+RESP:GTSCS**
Bit 11	**+RESP:GTBAU**
Bit 10	**+RESP:GTBSC**
Bit 9	**+RESP:GTBTI**
Bit 8	Reserved

Bit 7	Reserved
Bit 6	Reserved
Bit 5	Reserved
Bit 4	Reserved
Bit 3	Reserved
Bit 2	Reserved
Bit 1	Reserved
Bit 0	Reserved

✧ <*+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
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>*

✧ *<+DAT Mask>*: Component mask of the data report message.

Mask Bit	Item
Bit 31	Reserved
⋮	Reserved
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>*

✧ *<+CRI Mask>*: Component mask of the compressed report message.

Mask Bit	Item
Bit 31	Reserved
Bit 30	Reserved
Bit 29	Reserved
Bit 28	Reserved
Bit 27	Reserved
Bit 26	Reserved
Bit 25	Reserved
Bit 24	*<Compression ACC Length>, <Compressed ACC Info>*

Bit 23	*<Total Hour Meter Count>*
Bit 22	*<Current Hour Meter Count>*
Bit 21	*<Total Mileage>*
Bit 20	*<Current Mileage>*
Bit 19	*<Satellite Information>*
Bit 18	*<Motion Status>*
Bit 17	Reserved
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>*

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

- **+ACK:GTHRM,**

Example: **+ACK:GTHRM,4C0203,865084030960726,gb100p,00A3,20190411135536,049E$**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Protocol Version	6	XX0000 – XXFFFF, X∈{'A' – 'Z','0' – '9'}	

Unique ID	15	IMEI	
Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	$	$

4.2.Acknowledgement +ACK

➢ **+ACK,**

Example: **2B41434B027F244C020303106762313030700000000A507E3040B0D381B04A3E4410D0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+ACK	+ACK
Message Type	1		
Report Mask	1	00 – FF	
Length	1		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
ID	1		
Serial Number	2	0000 – FFFF	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

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

Command	**ID**
AT+GTBSI	0

AT+GTSRI	1
AT+GTQSS	2
Reserved	3
AT+GTCFG	4
AT+GTTOW	5
AT+GTEPS	6
Reserved	7
Reserved	8
Reserved	9
AT+GTTMA	10
AT+GTFRI	11
AT+GTGEO	12
AT+GTSPD	13
Reserved	14
Reserved	15
AT+GTRTO	16
Reserved	17
Reserved	18
Reserved	19
Reserved	20
AT+GTUPD	21
AT+GTPIN	22
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+GTCRA	36
AT+GTPDS	38
Reserved	39
Reserved	40
AT+GTSSR	41
Reserved	42
AT+GTGPJ	43
AT+GTASC	44
AT+GTUPC	45
AT+GTCMD	46
AT+GTUDF	47
Reserved	48
Reserved	49
AT+GTRMD	50
AT+GTFFC	51
Reserved	52
…	…
AT+GTGAM	58
AT+GTUDT	59
…	…
AT+GTFVR	61
…	…
Reserved	72
AT+GTVVS	73
AT+GTAVS	74

Reserved	75
AT+GTVMS	76
…	…
AT+GTBTS	89
AT+GTBMS	90
…	…
AT+GTBAS	103
…	…
AT+GTBID	109

- <*Report Mask*>: Please refer to the <*+ACK Mask*> in **AT+GTHRM**.
- <*Length*>: The whole length of the 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 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**	**b**	**1**	**0**	**0**	**p**		
HEX	**67**	**62**	**31**	**30**	**30**	**70**	**00**	**00**

- <*ID*>: The ID of the sub-command of **AT+GTRTO** or the ID of **AT+GTGEO**. For other commands, set it to 0.
- <*Send Time*>: The local time to send the acknowledgement message. 7 bytes in total. The first 2 bytes are for year, and the 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**

- <*Checksum*>: The CRC16 checksum of data between the fields of <*Message Header*> and <*Checksum*> (exclude <*Message Header*> and <*Checksum*>).

4.3.Location Report +RSP

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

- **+RSP,**

Example: **2B5253500900FC1FBF005D4C020303105632540309 3C4806642F8622080001010000000167003206FB40C801E5D37107E3040B05391B04600000550BB969000000000000000000010000000000000000000007E3040B0D391C04A694100D0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+RSP	+RSP
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0 – 100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Report ID / Report Type	1		
Number	1	1 – 15	
GNSS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9 km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		

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

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

Message	**ID**
Reserved	0
+RESP:GTTOW	1
Reserved	2
+RESP:GTLBC	3
+RESP:GTEPS	4
Reserved	5
Reserved	6
+RESP:GTFRI	7
+RESP:GTGEO	8
+RESP:GTSPD	9
Reserved	10
+RESP:GTRTL	11
+RESP:GTDOG	12

Reserved	13
Reserved	14
+RESP:GTHBM	15
Reserved	16
Reserved	17
+RESP:GTERI	18
…	…
Reserved	25
+RESP:GTVGL	26
+RESP:GTFRI (Compressed)	100

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

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

If Bit 6 of <*+RSP Mask*> 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**	**b**	**1**	**0**	**0**	**p**		
HEX	**67**	**62**	**31**	**30**	**30**	**70**	**00**	**00**

- <*Motion Status*>: The current motion status of the device. 0x1A is a status which is before 0x16 status.
- <*Satellites in View*>: The low nibble is for <*Satellites in View*>.
- <*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 two 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 other 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**

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

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

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

➢ **+RSP,**

Example:
2B5253501200FE2FBF0000010200E75A020002095637550400072200640000010021 0C1000042811829D0A00002C0102019F28FF0C41030000E20102019C28FFE671A3150449010 2019C28FFA180A315040F010201970301010001010 01F54445F3130303130390004D7E63D6DFD01015E180501000101001F54445F31303031313400B339808571D901015E190901000101001F54445F31303031313400B339808571D900015E18010100000000AA004E06FB407501E5D41707E30518050A1A04600000550BB969000002060000000501000000000000000000007E30518050A1B2FBC5F5C0D0A

Parameter		Length (byte)	Range/Format	Default
Message Header		4	+RSP	+RSP
Message Type		1		
Report Mask		4	00000000 – FFFFFFFF	
ERI Mask		4	00000000 – FFFFFFFF	
Length		2		
Device Type		1	4C	4C
Protocol Version		2	0000 – FFFF	
Firmware Version		2	0000 – FFFF	
Unique ID		8	IMEI	
Battery Level		1	0 – 100	
External Power Supply Voltage		2		
Motion Status		1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View		1		
Report ID / Report Type		1		
Reserved		1		
Bluetooth Accessory Data(Optional)	Bluetooth Accessory Number	1	0 – 10	
	Index	1	0 – 9|0xFF	
	Accessory Type	1	0 – 2|6	
	Accessory Model	1	0|2	
	Raw Data Length	1	(HEX)	
	Raw Data			
	Accessory Append Mask	2	(HEX)	
	Accessory Name	<=21		
	Accessory MAC	6	(HEX)	
	Accessory Status	1	0|1	
	Accessory Voltage	2	0 – 5000(mV)	

	Accessory Temperature	1	-40 – 80(℃)	
	Accessory Humidity	1	0 –100%(rh)	
Number		1	1 – 15	
GNSS Accuracy		1	0|1 – 50	
Speed		3	0.0 – 999.9km/h	
Azimuth		2	0 – 359	
Altitude		2		
Longitude		4		
Latitude		4		
GNSS UTC Time		7	YYYYMMDDHHMMSS	
MCC		2	0000 – FFFF	
MNC		2	0000 – FFFF	
LAC		2	0000 – FFFF	
Cell ID		2	0000 – FFFF	
Reserved		1	00	00
Current Mileage		3	0.0 –65535.0 km	
Total Mileage		5	0.0 – 4294967.0 km	
Current Hour Meter Count		3	HHMMSS	
Total Hour Meter Count		6	HHHHHHHHMMSS	
Send Time		7	YYYYMMDDHHMMSS	
Count Number		2	0000 – FFFF	
Checksum		2	0000 – FFFF	
Tail Characters		2	0x0D 0x0A	0x0D 0x0A

- <*Bluetooth Accessory Number*>: It indicates the number of accessories connected with the device.
- <*Index*>: There are two meaning for <*Index*>.
  - The index of Bluetooth accessory defined in **AT+GTBAS** which triggers the **+RESP:GTBAA** message.
  - 0xFF for WKF300.
- <*Accessory Type*>: The type of the Bluetooth accessory which is defined in the <*Index*>. The following is supported now:
  - 0: No Bluetooth accessory.
  - 1: Reserved.

- 2: Beacon temperature sensor.
- 6 : Beacon Multi-Functional Sensor.

✧ <*Accessory Model*>: The model of the Bluetooth accessory which is defined in **AT+GTBAS**.

✧ <*Raw Data*>: The data is read from Bluetooth accessory. It varies depending on <*Accessory Type*> and <*Accessory Model*>.

- WTS300: It is a four-byte hexadecimal value. The 2 higher bytes of the hexadecimal value indicate battery voltage, the unit is millivolt. And the 2 lower bytes of the hexadecimal value indicate temperature, the high byte is the integer part and the low byte is the fractional part. Temperature is equal to the low byte divided by 256 plus the high byte, the unit is Celsius. If this value is negative, it is represented in 2's complement format.
- WTH300: It is a four-byte hexadecimal value. The 2 higher bytes of the hexadecimal value indicate temperature. And the 2 lower bytes of the hexadecimal value indicate humidity. The high byte is the integer part and the low byte is the fractional part. Temperature is equal to the low byte divided by 256 plus the high byte, and the unit is Celsius. Humidity is equal to the low byte divided by 256 plus the high byte, and the unit is RH.

✧ <*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 Voltage*>: The voltage of Bluetooth accessory.

✧ <*Accessory Temperature*>: Temperature data of Bluetooth accessory.

✧ <*Accessory Humidity*>: Humidity data for the Bluetooth accessory.

Note: The item denoted with "(Optional)" indicates the item is controlled by the parameter <*ERI Mask*>.

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

Example: **2B5253500300FC1FBF00644C020303105632540309 3C4806642F8621090070133656940 59F0101000000016700 3206FB40C801E5D37107E3040B053A2704600000550BB9690000000000000000001000000000000000000007E3040B0D3A2804A890E20D0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+RSP	+RSP
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	

Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0~100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Report ID / Report Type	1		
Number Length / Number Type	1		
Phone Number	<=10		
Number	1	1 – 15	
GNSS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9 km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	

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

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

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

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

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

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

➢ **+RSP,**

Example: 2B5253500800FC1FBF005D4C020303105632540309 3C4806642F86220901010100000001670032 06FB40C801E5D37107E3040B053B3004600000550BB969000000000000000010000000000000 0000007E3040B0D3B3104AC528D0D0A			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+RSP	+RSP
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device Name	
Battery Level	1	0 – 100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22	

		0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Report ID / Report Type	1		
Number	1	1 – 15	
GNSS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9 km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 – 65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

✧ <*Report ID / Report Type*>: Bit 0 is used for Report Type, Bit 1 – Bit 3 are used as high 3 bits of Report ID, and Bit 4 – 7 are used as low 4 bits of Report ID.

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

Compressed Location Report

The compressed location report is only valid for fixed time report in HEX format. It will be generated only when the parameter <*Compressed Report*> in the command **AT+GTFRI** is set to 1 and the <*Check Interval*> for the location report is set to 1 second. Please see below for details.

➢ **+RSP,**

Example:

**2B5253506400FC0FBF04644C010202015632540300012003642209010E60905E073C3E5701DB87
CC5924248FA03F009000A03C007803BF40007002A03B807000BF810037FFBFC00027FDA0007FF
FFDA0007FFFFDA000000FFEBFC0000000E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0
E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0E0A1FA005011A13C817015A0BE016013A0
7D00D015A07580A823A0BA00502DA0B7FFA82AA0F97F582CA0BD7F3038A0417F5039A0817F7
041A0817F6846A0807F5848A0007F504AA07FFF384AA0407F184CA040FF4853A07F7F0850A001
7FA05DA0007F4054BFC07F3854A000FF4052A000FF5053BFFFFF5053BFBF7F284ABF40806856BF
80FF683EBF00FF8838BFC07FA835BF407F902DBFBFFFA027BF3FFFA81FBF407FC819BF817FD812
BF407FE80BBF40000006A000000803E0BFC0000000E0E0E0E0E0E0E0E0E0E0A27EFFA817A0
FFFFB021A1007F9825A0C0FF802BA0C07FF83BA0C0FF903EA0807F7841A0807F5845A0807F584
BA0807F484EA0BFFF1853A0BFFF0057A0807EE85BBFC07EE85AA0007EE85EA07FFEF860A0407E
D060A0BF7EB060A0427EE067A040FEE869A03E7EA064BFC17EB866A03FFEB063A040FED869A0
3FFEB869A0417EC06BBF807EC067BFFF7EC866BFC0FEE863A07FFEE86AA0807EE06BA041FF8078
A000FEF06EBFFF7EE86BBFC17F006AA000FF0869BF7FFF1863BFC17F7868BFBF7ED057BF417F50
55BFFF7F4050BFC07F484FBFBFFF4049BF00FF583FBEFFFF5832BF40FFA02FBF7FFF8823BF80FFB8
1FBF3EFFF818A0CC00B82AA043809821BF45808818BF43005015A08900401DA10400E81CA0830
11818A04301480EA081818810BF42014804A043017008A10081E00BA27B02B81CA0BF82F821A
03E82D820A04082C81EA00082C81EA0C0031823A0BF83B025A00183681EA03E838026A000033
023BFFF032023BF8103402DA000031824A000031825A000832028A040032824A0BF834026A041
035827A03F835824BFBF832022BF4082E820A00002E820A04083081EA040032022A08003401EA
04003501FA080837821A040039824A07F03B027A03F039828A03F839029BFBF836829BFC00348
25BFC0833824BFC0833022BFC083081FBFBF82E820BFC002C01DBFBF02801DA00102981CBFC08
2A01ABFFF826819BFC0025819BF80023816BFBF822816BFC0020013BFC001D814BF4001980FBF
C081800DBFC081700EBF8001480BBFFF81280BBFBF00D807BEBF8027FBBF7C800000BFC000000
0BFC0000000BFC0000000E0E0E0E0E0E0E0E0E0E0E0E0E0A1CC00B006A0C2815004A13
E81E017A0BF021804A07E82180AA0FF826011A0FF02C017A0FF82D81BA0FF02F020A07F02F826
A07E827829A07C82C836A03C826032BFBC820036BF3D017830BF7C81302CBF7B80D030BF3D80
A02CA036801830A0B9FFC833A13DFFA03BA0FF7F683FA0C07F4845A0C07F284CA1007F1852A04
17F185804600000187703D300000202000000020400000000000000000007E105170C053002135
EF50D0A**

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+RSP	+RSP
Message Type	1		100
Report Mask	4	00000000 – FFFFFFFF	
Length	2		

Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0~100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Number	2	1 – 270	
Compressed Location Info			
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 – 65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

- <*Message Type*>: For the compressed location report, the value is 100.
- <*Compressed Location Info*>: Information of at most 270 GNSS positions can be compressed. Each position can be represented by either its absolute value or its relative value, but the first successful position must be represented by its absolute value. Relative value indicates the difference between the current location and the previous location, so the current location can be calculated based on the previous location and the relative value.

Format table for the first SUCCESSFUL location (represented by absolute value):

Parameter	Length (bit)	Range/Format	Default
Accuracy and Point Attribute	3		
Absolute Speed	12		
Absolute Heading	9		
Absolute Longitude	32		
Absolute Latitude	32		
UTC Time	32		

Absolute Value Format Table

Parameter	Length (bit)	Range/Format	Default
Accuracy and Point Attribute	3		
Absolute Speed	12		
Absolute Heading	9		
Absolute Longitude	32		
Absolute Latitude	32		

Relative Value Format Table

Parameter	Length (bit)	Range/Format	Default
Accuracy and Point Attribute	3		
Relative Speed	7		
Relative Heading	7		
Relative Longitude	12		
Relative Latitude	11		

- <*Accuracy and Point Attribute*>: The highest two bits are for point attribute. Below are the details about point attribute.
  0b00: It indicates the GNSS location is invalid and the device has failed to get the current GNSS position. In this case, there is only one byte for the current location. The speed, heading, longitude and latitude will not be shown, and the lowest 5 bits of the byte will be filled with 0.
  0b01: The GNSS location will be represented by absolute value.
  0b10: The GNSS location will be represented by relative value.
  0b11: GNSS location is the same as the previous one. In this case, there is only one byte for the current location. The speed, heading, longitude and latitude will not be shown, as they are the same as those of the previous location. The lowest 5 bits of the byte will be filled with 0.
  The lowest bit indicates 2D position or 3D position.
  0: This is a 2D position.
  1: This is a 3D position.
- <*Absolute Speed*>: An unsigned integer to indicate the actual speed. The unit is 0.1 km/h and the range is 0 – 409.5 km/h.
- <*Absolute Heading*>: An unsigned integer to indicate the actual heading. The unit is degree and the range is 0 – 360 degree.

- <*Absolute Longitude*>: An integer value for the longitude. The unit is 0.000001 degree. The value is in two's complement. Examples of calculation: 0x061805F0 represents 102237680 in decimal, so the longitude is 102.237680 degree; as 0xFA04E486 represents the signed integer -100342650 in decimal, the longitude is -100.342650.
- <*Absolute Latitude*>: An integer value for latitude. The unit is 0.000001 degree. The value is in two's complement.
- <*UTC Time*>: The time of the position fix based on seconds since 1970/1/1, 00:00:00. This is a standard calculation for UTC time. It appears ONLY ONE TIME in the first SUCCESSFUL location. The time for the subsequent location fixes will be increased by one second each time one by one.
- <*Relative Speed*>: An integer to indicate the speed relative to the previous speed value. The unit is km/h and the range is -64 km/h to 63 km/h. The value is in two's complement.
- <*Relative Heading*>: An integer to indicate the heading relative to the previous heading. The unit is degree and the range is -64 to 63 degree. The value is in two's complement. As the heading range is 0 – 360 degrees, add 360 to get the final heading in the range of (0, 360) if the current heading value calculated is negative.
- <*Relative Longitude*>: An integer to indicate the longitude relative to the previous longitude. The unit is 0.000001 degree and the range is -0.002408 to 0.002047 degree. The range of distance that can be represented by the relative longitude on the Arctic Circle is -89m to 89m. The value is in two's complement.
- <*Relative Latitude*>: An integer to indicate the latitude relative to the previous latitude. The unit is 0.000001 degree and the range is -0.001024 to 0.001023 degree. The range of distance that can be represented by the relative latitude is -112m to 112m. The value is in two's complement.

Note: The Relative Value is the difference between the Absolute Value of the current location and the Absolute Value of the previous location. If the difference of some parameter is out of the range that is allowed, the GNSS information will be represented by its Absolute Value.

4.4.Information Report +INF

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

➢ **+INF,**

Example:

2B494E4601FD7F006C67623130307000004C020303100205030000002100084107E3040B0601150001007F001E02580000000000D02FA4108664898600F51236F51425711F000008000002046 00000550BB96A002504600000550BB969001F07E3040B0E011804AF9E3C0D0A			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+INF	+INF
Message Type	1		
Report Mask	2	0000 – FFFF	
INF Expansion Mask	2	0000 – FFFF	
Length	2		
Unique ID	8	IMEI / Device name	
Device Type	1	4C	
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Hardware Version	2	0000 – FFFF	**+RESP:GTVER**
MCU Version	2	0000 – FFFF	
Reserved	2	0000	
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	**+RESP:GTGPS**
Reserved	1	00	
Satellites in View	1		
Power Saving Enable/ OWH Mode/ Outside Working Hours/ AGPS	1		
Last Fix UTC Time	7	YYYYMMDDHHMMSS	
Reserved	1	00	
FRI Discard No Fix	1	0|1	
Report Composition Mask	2		
IGN Interval	2		
IGF Interval	2		
Reserved	4	00000000	
Reserved	1	00	

External Power Supply / Backup Battery On / Charging / LED State / Backup Battery Charge Mode	1		**+RESP:GTBAT**
External Power Voltage	2	0	
Backup Battery Voltage	2	0 – 4350 mV	
Backup Battery Level	1	00	
ICCID	10	ICCID	**+RESP:GTCID**
CSQ RSSI	1	0 – 31 | 99	**+RESP:GTCSQ**
CSQ BER	1	0 – 7 | 99	
Time Zone Offset Sign / Daylight Saving Enable	1		**+RESP:GTTMZ**
Time Zone Offset	2	HHMM	
GIR Trigger Type	1		**+RESP:GTGIR**
Cell Number	1		
MCC	2		
MNC	2		
LAC	2		
Cell ID	2		
TA	1		
RX Level	1		
Bluetooth Name	<=21	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	**+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	
Bluetooth State	1	0|1	**+RESP:GTBSC**
Nearby Device Number	1	0-30	

Nearby Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Nearby MAC Address Type	1	0|1	
Nearby Device MAC	6	000000000000 – FFFFFFFFFFFF	
Nearby Device RSSI	1	-120 - 0	
Nearby Device Status	1	0|1|2	
Bluetooth State	1	0|1	+RESP:GTBAU
Peer Device Name	<=20	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Peer Device MAC	6	000000000000 – FFFFFFFFFFFF	
Peer Device State	1	0|1	
Service UUID Number	1	0 – 30	
Service UUID Type	1	1|2	
Service UUID	2|16	0000 – FFFF|00000000000000000000000000000000 – FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	
Characteristic UUID Number	1	0-30	
Characteristic UUID Type	1	1|2	
Characteristic UUID	2|16	0000 – FFFF|00000000000000000000000000000000 – FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	
Characteristic Properties	1	00-FF	
Self Calibration Status	1	0|1|2	+RESP:GTSCS
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	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

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

Message	ID
+RESP:GTINF	1
+RESP:GTGPS	2
+RESP:GTCID	4
+RESP:GTCSQ	5
+RESP:GTVER	6
+RESP:GTBAT	7
Reserved	8
+RESP:GTTMZ	9
+RESP:GTGIR	10
+RESP:GTBTI	24
+RESP:GTBSC	25
+RESP:GTSCS	28
+RESP:GTBAU	31

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

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

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

If Bit 1 of <*+INF Mask*> 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	b	1	0	0	p		
HEX	67	62	31	30	30	70	00	00

- <*Device Type*>: If <*Message Type*> is 6 (**+RESP:GTVER**) in the message, Bit 2(<*Device Type*>) in <*+INF Mask*> will be forced to 1, so the field always appears in the hex report of **+RESP:GTVER**.
- <*Protocol Version*>: If <*Message Type*> is 6 (**+RESP:GTVER**) in the message, Bit 3(<*Protocol Version*>) in <*+INF Mask*> will be forced to 1, so the field always appears in the hex report of **+RESP:GTVER**.
- <*Firmware Version*>: If <*Message Type*> is 6 (**+RESP:GTVER**) in the message, Bit 4(<*Firmware Version*>) in <*+INF Mask*> will be forced to 1, so the field always appears in the hex report of **+RESP:GTVER**.
- <*Power Saving Enable/ OWH Mode/ Outside Working Hours/ AGPS*>: The highest bit, or 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 Hour*>. Bit 0 is for <*AGPS*>. <*Outside Working Hours*> is used to indicate whether the device is currently outside the working hours. 1 means “outside the 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 is for <*Backup Battery On*> which indicates whether the backup battery is working. Bit 5 is for <*Charging*> which indicates whether the backup battery is currently charging. Bit 4 is for <*LED State*> which indicates whether the LED’s are turned on. Bit 0 is for <*Backup Battery Charge Mode*>.
- <*ICCID*>: The ICCID is a 20-digit string. In the HEX format message, every 4 bits are used to represent one digit of the 20 digits of the ICCID.

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

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

Fix Type	ID
INF	0
Reserved	1
RTL	2
LBC	3
TOW	4
FRI	5
GIR	6

✧ <*Cell Number*>: The number of cells. It also indicates the number of cell information groups. One cell information group consists of MCC, MNC, LAC, and Cell ID.

4.5.Event Report +EVT

Event report messages including **+RESP:GTPNA**, **+RESP:GTPFA**, **+RESP:GTMPN**, **+RESP:GTMPF**, **+RESP:GTBTC**, **+RESP:GTSTC**, **+RESP:GTSTT**, **+RESP:GTPDP**, **+RESP:GTIDN**, **+RESP:GTJDR**, **+RESP:GTSTR**, **+RESP:GTSTP,** **+RESP:GTBAA**, **+RESP:GTBID** and **+RESP:GTLSP** use the format below.

➢ **+EVT,**

Example: **2B4556540900FC1FBF005C4C020303105632540309 3C4806642FA42207010000000001670032060FB40C801E5D37107E3040B05383304600000550BB969000000000000000000100000000000000000007E3040B0D383704A447AB0D0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0 – 100	

External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Number	1	1	
GNSS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9 km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

✧ <*Message Type*>: The ID of an 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
Reserved	13
Reserved	14
+RESP:GTUPD	15
+RESP:GTIDN	16
+RESP:GTIDF	17
+RESP:GTDAT	18
Reserved	19
+RESP:GTJDR	20
+RESP:GTGSS	21
Reserved	22
+RESP:GTCRA	23
Reserved	25
+RESP:GTGES	26
+RESP:GTSTR	28
+RESP:GTSTP	29
+RESP:GTLSP	30
+RESP:GTGPJ	31
+RESP:GTASC	32
+RESP:GTJDS	33

+RESP:GTUPC	34
+RESP:GTRMD	35
Reserved	36
…	…
Reserved	44
+RESP:GTVGN	45
+RESP:GTVGF	46
…	…
+RESP:GTBCS	52
+RESP:GTBDS	53
Reserved	54
+RESP:GTBDR	55
…	**…**
+RESP:GTBAA	65
…	**…**
+RESP:GTBID	67

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

- <*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. If Bit 6 of <*+EVT Mask*> is *1, the d*evice 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 m*ore 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**	**b**	**1**	**0**	**0**	**p**		
HEX	**67**	**62**	**31**	**30**	**30**	**70**	**00**	**00**

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

- **+EVT,**

Example:
2B4556540600FC1FBF005E4C020303105632540309 3C48061000B711080E5A010000000000B70 06A06FB403B01E5D46907E3040B0808020460000 0550BB969000000000000000000400000000000 0000000007E3040B10080408AF66DE0D0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0 – 100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Backup Battery Voltage	2	0 – 4350 mV	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9 km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	

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

The event report messages **+RESP:GTVGN** and **+RESP:GTVGF** use the format below. For these two messages, the <*Current Mileage*> and <*Total Mileage*> fields will always be present regardless of the <*+EVT Mask*> setting.

- **+EVT,**

Example:
2B4556542E00FC1FBF00634C020303105632540309 3C4806642F86120800000200001CF301000000000167003206FB40C801E5D37107E3040B06051A04600000550BB96900000000000000000001000000000000000000007E3040B0E051B04BEDE710D0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0 – 100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Reserved	2	00	

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

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

- **+EVT,**

Example:
2B4556540F00FC1FBF005F4C020303105632540309 3C4806642F86110800C80101000000000167005B06FB412A01E5D4C107E3040B06062E04600000550BB969000000000000000001000000000000000007E3040B0E063004C81AF00D0A

Parameter	Length (byte)	Range/Format	Default

Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0 – 100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Code	2		
Retry	1		
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9 km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	

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

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

- **+EVT,**

Example: **2B4556541100FC1FBF00604C020303105632540309 3C4806642FA42209000005070100000000016700 3206FB40C801E5D37107E3040B0604160460000055 0BB969000000000000000001000000000000000 00007E3040B0E041704B747650D0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0~100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Duration of Idling	4		
Number	1	1	
GNSS Accuracy	1	0	0

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

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

- **+EVT,**

Example:
2B4556541500FC1FBF00614C020303105632540309 3C4806642F8611060000000000010000020800040 05B06FB410E01E5D4E607E3040B06100704600000550BB969000000000000000000100000000000000000007E3040B0E110A04F88FF00D0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C

Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0~100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
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		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	

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

- ✧ <*Satellites in Use*>: Number of satellites being used for tracking, the high nibble is reserved and the low nibble is valid.
- ✧ <*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:GTGES** uses the format below.

➢ **+EVT,**

Example: **2B4556541A00FC1FBF00684C020303105632540309 3C4806642F8611050008011500000 0A4000000050104000000000 4004F06FB42A101E5DAFE07E3040B06113A04600000550BB969000000000000000001000000000000000000007E3040B0E113B04FABA810D0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0 – 100	
External Power Supply Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Trigger GEO ID	2	0-19	
Trigger GEO Enable	1	0|1	
Trigger Mode	1	0|21|22	
Radius	4	50 – 6000000 m	

Check Interval	4	0|5 – 86400 sec	
Number	1	1	
GNSS Accuracy	1	0|1	
Speed	3	0.0 – 999.9 km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

- ✧ <*Trigger GEO ID*>: The ID of Geo-fence. It is in hex format. The range is 0 – 19.
- ✧ <*Trigger GEO Enable*>: Enable/disable the zone's Geo-fence function.
  - 0: Disable the zone's Geo-fence function.
  - 1: Enable the zone's Geo-fence function.

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

➢ **+EVT,**

Example:
2B4556541F00FC1FBF005E4C020303105632540309 3C4806642FA422070F020100000000000400 2006FB40D701E5D4E807E3040B060D2804600000550BB969000000000000000000100000000000

000000007E3040B0E0D2804DD62110D0A			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000–FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0~100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
CW Jamming Value	1	0-255	
GNSS Jamming State	1	0|1|2|3	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 –999.9 km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	

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

- ✧ <*CW Jamming Value*>: The current continuous wave (CW) jamming value.
- ✧ <*GNSS Jamming State*>: The current jamming state.
  - 0: Unknown or feature disabled
  - 1: (OK) No significant jamming
  - 2: (Warning) Interference visible but fix OK
  - 3: (Critical) Interference visible and no fix

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

- ➢ **+EVT,**

Example: **2B4556542300FC1FBF005D4C020303105632540309 3C4806642F861A0702010000000000040038 06FB415D01E5D47607E3040B0614110460000055 0BB969000000000000000001000000000000 00000007E3040B0E14150511ED1A0D0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0 – 100	
External Power Supply	2		

Voltage			
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Roaming 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		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

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

- **+EVT,**

Example: **2B4556542100FC1FBF005D4C020303105632540309 3C48064500B722070101000000000011F0062 06FB408501E5CE6F07E3040B07052E04600000550BB969000000000000000000300000000000000 000007E3040B0F0A2D06189B8B0D0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000–FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0 – 100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Jamming Status	1	1|2	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9 km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	

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

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

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

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

➢ **+EVT,**

Example:
2B4556541700FC1FBF005D4C020303105632540309 3C4806642F8622070001000000000004003806FB415D01E5D47607E3040B0614110460000055 0BB969000000000000000001000000000000000000007E3040B0E15120517E4810D0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0 – 100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12	

		0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Crash Counter	1	0x00 – 0xFF	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9 km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

✧ <*Crash Counter*>: A parameter to indicate the crash sequence. It combines the reports of **+RESP:GTCRA** and **+RESP:GTCRD** into one crash event. It rolls from 0x00 to 0xFF.

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

➢ **+EVT,**

Example: **2B4556542200FC1FBF005F4C020303105632540309 3C48066400B722080000640100000000015B006806FB405501E5D48107E3040B0634170460000055 0BB969000000000000000020000000000000000007E3040B0E341905B8870F0D0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000–FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0 – 100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Command ID	1		
Result	2	100|101|102|103|200|201|202|300|301|302	
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 –999.9 km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	

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

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

- **+EVT,**

Example:
2B4556541200FC1FBF00754C020303105632540309 3C4806642FA411080017646174617461746F7468656261636B656E642073657276657201000000000158005C06FB40A501E5D3D107E3040B06162604600000550BB969000000000000000001000000000000000000007E3040B0E1628052C86120D0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	25	25
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI	
Battery Level	1	0~100	
External Power Supply Voltage	2		
Motion Status	1	0x11 | 0x12	

		0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
External GNSS Antenna Status | Satellites in View	1		
Data Length	2		
Data			
Number	1	1	
GNSS Accuracy	1	0	0
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

✧ <*Data Length*>: It indicates the length of the <*Data*> parameter.

The event report messages **+RESP:GTBCS** and **+RESP:GTBDS** use the format below.

➢ **+EVT,**

Example:
2B4256543400FC1FBF00764C020303105632540309 3C4806642F8611080D034742313030505F42540078054100B5DE0100067DA3C26E5401000000000158005C06FB40A501E5D3D107E3040B06171804600000550BB969000000000000000001000000000000000000007E3040B0E1727053033F30D0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0 – 100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Bluetooth Report Mask	2	0000 – FFFF	
Bluetooth Name	<=21	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
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|1 – 50	
Speed	3	0.0 – 999.9 km/h	

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

✧ <*Bluetooth Name*>: The name of the device for Bluetooth identification. It ends with 0x00.

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

➢ **+EVT,**

Example:
2B 45 56 54 41 00 FC 1F BF 00 73 4C 05 01 05 11 56 32 54 03 09 3E 57 00 64 2F D0 21 08 01 02 00 02 00 1F 57 54 53 33 30 30 00 78 05 41 01 E6 52 01 0C 2B 16 01 00 00 00 00 00 B6 00 78 06 FB 40 D9 01 E5 D3 8F 07 E4 03 19 02 37 1E 04 60 00 00 55 0B B9 6A 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 07 E4 03 19 02 37 21 07 DD 6F 02 0D 0A

Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	(HEX)	
Length	2		

Device Type	1	4C	4C
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI)	
Battery Level	1	0 – 100	
External Power Voltage	2		
Motion Status	1	11|12|16|1A|21|22|41|42	
Satellites in View	1		
Index	1	0 - 9|0xFF	
Accessory Type	1	0 – 3|6	
Accessory Model / Beacon ID Accessory Model	1	0|2	
Alarm Type	1	(HEX)00 - FF	
Append Mask	2	(HEX)	
Accessory Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_'	
Accessory MAC	6	(HEX)	
Accessory Status	1	0|1	
Accessory Voltage	2	0 - 5000(mV)	
Accessory Temperature	1	-40 - 80(℃)	
Accessory Humidity	1	0-100%(rh)	
Number	1	1	
GNSS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	

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

- <*Index*>: There are two meaning for <*Index*>.
  - The index of Bluetooth accessory defined in **AT+GTBAS** which triggers the **+RESP:GTBAA** message.
  - 0xFF for WKF300.
- <*Accessory Type*>: The type of the Bluetooth accessory which is defined in the <*Index*>. The following is supported now:
  - 0: No Bluetooth accessory.
  - 1: Reserved.
  - 2: Beacon temperature sensor.
  - 3: BLE beacon ID device.
  - 6: Beacon Multi-Functional Sensor.
- <*Accessory Model / Beacon ID Accessory Model*>: The model of the Bluetooth accessory which is defined in **AT+GTBAS** or the model of the Bluetooth Beacon ID accessory which is defined in **AT+GTBID**.
- <*Alarm Type*>: The type of alarm which generated according to <*Sensor Type*> and <*Sensor Model*> specified in the **AT+GTBAS** command.
  - 0: The voltage of the Bluetooth accessory is low.
  - 1: The temperature alarm: current temperature value is below <Low Temperature> set in the **AT+GTBAS** command.
  - 2: The temperature alarm: current temperature value is upper <*High Temperature*> set in the **AT+GTBAS** command.
  - 3. The temperature alarm: current temperature value is within the range defined by <*Low Temperature*> and <*High Temperature*> set in the **AT+GTBAS** command.
  - 4. Push Button Event on WKF300 is detected.
  - 7: Humidity alarm: The current humidity value is below <*Low Humidity*> set in the **AT+GTBAS** command.

- 8: Humidity alarm: The current humidity value is above <*High Humidity*> set in the **AT+GTBAS** command.
- 9:Humidity alarm: The current temperature value is within the range defined by <*Low Humidity*> and <*High Humidity*> set in the **AT+GTBAS** command.

✧ <*Append Mask*>: Bitwise mask defined in **AT+GTBAS** and **AT+GTBID** commands to configure which data item is reported.

- Bit 0: <*Accessory Name*>.
- Bit 1: <*Accessory MAC*>.
- Bit 2: <*Accessory Connection Status*>.
- Bit 3: <*Accessory Voltage*>.
- Bit 4: <*Accessory Temperature*>.
- Bit 5: <*Accessory Humidity*>

✧ <*Accessory Name*>: Bluetooth accessory name ended with '\0'(0x00). If the Accessory name is empty, this filed will be filled with one byte: 0x00.

✧ <*Accessory MAC*>: Bluetooth accessory MAC address.

✧ <*Accessory Status*>: A numeral to indicate whether the accessory is available.

- 0: The Accessory is not available.
- 1: The accessory is available.

✧ <*Accessory Voltage*>: The voltage of Bluetooth accessory.

✧ <*Accessory Temperature*>: Temperature data of Bluetooth accessory.

✧ <*Accessory Humidity*>: Humidity data of the Bluetooth accessory.

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

➢ **+EVT,**

Example:
2B 45 56 54 43 00 FC 1F BF 00 7E 4C 05 01 05 11 56 32 54 03 09 3E 57 00 64 2F D0 22 0B 03 00 00 0A 78 05 41 01 F4 95 0B 4D 00 00 0A 78 05 41 01 F5 37 0B AC 00 00 0A 78 05 41 01 F4 E2 0B C0 01 00 00 00 00 00 B6 00 79 06 FB 40 29 01 E5 D3 D2 07 E4 03 19 03 21 23 04 60 00 00 55 0B B9 6A 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 07 E4 03 19 03 21 26 08 74 BE 10 0D 0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	(HEX)	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	(HEX)	
Firmware Version	2	(HEX)	
Unique ID	8	(IMEI)	

Battery Level	1	0 – 100	
External Power Voltage	2		
Motion Status	1	11|12|16|1A|21|22|41|42	
Satellites in View	1		
Number	1	0 – 3	
Beacon ID Accessory Model	1	0	
Append Mask	2	0000 – FFFF	
Accessory MAC	6	'0' – '9' 'A' – 'F'	
Accessory Voltage	2	0 – 5000mV	
Number	1	1	
GNSS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

- ✧ <*Number*>: The number of Bluetooth beacon ID.
- ✧ <*Accessory Model*>: The model of the Bluetooth accessory which is defined in **AT+GTBID**.
- ✧ <*Append Mask*>: Bitwise mask defined in the **AT+GTBID** command to configure which data item is reported.
  - Bit 0: Reserved.
  - Bit 1: <*Accessory MAC*>.
  - Bit 2: Reserved.
  - Bit 3: <*Accessory Voltage*>.
  - Bit 4: Reserved.
- ✧ <*Accessory MAC*>: Bluetooth accessory MAC address.
- ✧ <*Accessory Voltage*>: The voltage of Bluetooth accessory.

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

➢ **+EVT,**

Example: **2B4556543700FC1FBF00954C020303105632540309 3C4806642FA421091D034742313030505F42 540078054100B5DE000078054100B6F54742313030505F33353134000003011 80F012A29000008 517565636C696E6B0100000000011500 1106FB419D01E5D3FB07E3040B062804046000 00550BB 969000000000000000001000000000000000000007E3040B0E2808057A97CD0D0A**			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+EVT	+EVT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0 – 100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Bluetooth Report Mask	2	0000 – FFFF	

Bluetooth Name	<=21	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Bluetooth MAC Address	6	000000000000 – FFFFFFFFFFFF	
Peer Role	1	0|1	
Reserved	1	00	00
Peer MAC Address	6	000000000000 – FFFFFFFFFFFF	
Peer Device Name	<=21	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Data Mask	2	0000-0003	
Service UUID Type	1	1|2	
Service UUID	2|16	0000 – FFFF|00000000000000000000000000000000 – FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	
Characteristic UUID Type	1	1|2	
Characteristic UUID	2|16	0000 – FFFF|00000000000000000000000000000000 – FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	
Data Format	1	0|1	
Data Length	2	0000 - FFFF	
Data	<= 245|123	'0'-'9' 'a'-'f' | ASCII	
Number	1	1	
GNSS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9 km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	

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

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

- **+EVT,**

Example:
2B4556542000FC1FFF0065450204052E67623130302D3730643350220C63F7020963FAFF066301
00003B030078001206FB965B01E4B0F307E3031A022C0504600000550414E8000010080000012
106082B28000000C8201507E3031A0A2C060A138BFD0D0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+EVT	+EVT
Message Type	1		32
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	2F	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0~100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12	

		0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
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 – 999.9km/h	
Azimuth	2	0 – 359	
Altitude	2		
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
MCC	2	0000 – FFFF	
MNC	2	0000 – FFFF	
LAC	2	0000 – FFFF	
Cell ID	2	0000 – FFFF	
Reserved	1	00	00
Current Mileage	3	0.0 –65535.0 km	
Total Mileage	5	0.0 – 4294967.0 km	
Current Hour Meter Count	3	HHMMSS	
Total Hour Meter Count	6	HHHHHHHHMMSS	

Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

- ✧ <*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.

4.6.Heartbeat Data +HBD

➢ **+HBD,**

Example: 2B484244EF204C020303105632540309 3C480607E3040B0E1828053643AD0D0A			
Parameter	**Length (byte)**	**Range/Format**	**Default**
Message Header	4	+HBD	+HBD
Report Mask	1	00 – FF	
Length	1		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

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

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

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

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

Device Name	g	b	1	0	0	p		
HEX	67	62	31	30	30	70	00	00

If the mask of <*UID*> in <*+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*>.

4.7.Crash Data Packet +CRD

➢ **+CRD,**

Example:

2B435244007D04D84C020303105632540309 3C48060007030104B0FE5400E10057FEDA0093000 4FF1B007C0019FFA10058007B00500073011E00C50104020C01CF017902F7044D00E1017E0377F E7F00FD001FFEE101600050FF8500C20128FFFC003C00EB0063FFEB006400640017001800030033 FFE3FF93001AFFD4FF660000FFDFFF6D0009FFF7FF8F00250017FFB5003F0035FFD0004D0059FFD F00530084FFDF005000A3FFDC004300A7FFDD00400089FFDC003F004DFFD5002E0003FFD80018 FFB4FFF1000CFF440019FFEBFE8C0051001FFDCB00CE00B6FDFB00F9FFFDFE5E00A8FF4DFEDC00 27FFC8FF7EFFF400AB00200059018100BF00DF0267023100AD03000391FFE6011D01A3FF230037 FFE1FF22014F0066FFC9014B00DA0019003C00BC004AFFE100560035000A0001FFD9001EFFEAFF A40019FFEAFF960020FFF2FFA90014FFF6FFB60019FFF7FFBD00250000FFCA00350007FFCD00390 00FFFC700340018FFC300350021FFC0003D002BFFC100410030FFC9003E0031FFD50039002DFFE 3003F002BFFEE00430029FFF00043002AFFF000440026FFEC00460024FFE1004C0023FFD2005200 17FFCC004B000CFFD100400009FFD8003A0009FFDC00310007FFEA00430004FFF3004C0001FFF7 004A0000FFF0004CFFFEFFF000460005FFEA00500008FFE300560006FFE6004C0006FFEC004A000 4FFF3004E0006FFFD00580009FFFA0064000AFFEF005C000AFFE9004C0009FFE600440009FFE900 4F0006FFF40067000BFFFB00540008FFF9004D0007FFF8004E0005FFF9004E0002FFF500530005F FF600580006FFF400550001FFF000520001FFF500520000FFF90054FFFDFFF80056FFFDFFF70054F FFDFFF80053FFFDFFF90051FFFEFFFA004F0000FFF900500002FFFA00530003FFFC0055FFFFFFE0

054FFFE00000053FFFE00000053FFFD00010050FFFD0002004EFFFE00000050FFFD00000053FFFC00020050FFFB0004004EFFFB00030051FFFC00040050FFFD00050050FFFE00060052FFFE00080054FFFE00090054FFFF0009005CFFFE0007005FFFFB0008005BFFFC00080054FFFD0008004F0000000B004B0000000C004A00040010004600020000E00480000000C004F0000000C00480000000C003D0004000A00350002000300330000FFF4003DFFE3FFF50070FFF2FFEF008DFFF7FFE3006FFFF2FFF6005BFFF3FFFB0046FFF8FFFC004BFFFCFFF5005BFFFBFFF50053FFFAFFF60053FFF7FFF40054FFF9FFF60050FFFBFFF90051FFF9FFF60051FFF9FFF4004FFFF7FFF2004DFFF7FFF40055FFF9FFF50053FFF8FFF60054FFF7FFF70055FFF5FFF40056FFF5FFF30057FFF6FFF40052FFF7FFF30051FFF7FFF30050FFF7FFE60040FFF3FFE60040FFFAFFF9006F0001000A006E000000060048FFFC00080039000300A0053FFFD00000050FFF6FFF90050FFFAFFF80056FFFBFFFC0050FFFAFFFE004EFFF9FFFF0052FFF000000050FFE6FFF90051FFF9FFFA0057FFF900020052FFF70003004DFFF70003004EFFF800030050FFFBFFFE0053FFF9FFFB0053FFF7FFF90052FFF6FFFA0051FFF6FFFA004FFFF7FFFA004EFFF7FFFC0051FFF6FFFA0053FFF6FFFE0050FFF6FFFE004FFFF7FFFF0052FFF8FFFE0054FFF7FFFD0053FFF7FFFC0052FFF7FFFC0053FFF7FFFD0052FFF7FFFC0051FFF7FFFC0051FFF8FFFD004FFFFCFFFD004F07E3040B0E1514051BFD260D0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+CRD	+CRD
Report Mask	2	0000 – FFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000–FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Crash Counter	1	0x00-0xFF	
Data Type	1	0x00-0xFF	
Total Frame	1	1-80	
Frame Number	1	1-80	
Data Length	2	0-1200	
Data	<=1200	'0'-'9' 'a'-'f'	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

- <*Report Mask*>: Please refer to the <*+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	b	1	0	0	p		
HEX	67	62	31	30	30	70	00	00

✧ <*Data Type*>: A hexadecimal value to indicate the type 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 details.

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: Positive X-axis direction	1: Negative X-axis direction	0-1
Bit 3	0: Y-axis crash not detected	1: Y-axis crash detected	0-1
Bit 4	0: Positive Y-axis direction	1: Negative Y-axis direction	0-1
Bit 5	0: Z-axis crash not detected	1: Z-axis crash detected	0-1
Bit 6	0: Positive Z-axis direction	1: Negative Z-axis direction	0-1
Bit 7	0: Acceleration data	1: Acceleration data and gyroscope data	0-1

✧ <*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*>: If Bit 7 of <*Data Type*> is 0: There are a maximum of 1200 bytes in one frame which contains acceleration samples in at most 2 seconds. There are 6 bytes in a group: the first 2 bytes represent X axis acceleration data, the middle 2 bytes represent Y axis acceleration data and the last 2 bytes are Z axis acceleration data. The data are in the two's complement format.

If Bit 7 of <*Data Type*> is 1: There are a maximum of 1200 bytes in one frame which contains acceleration and gyroscope samples in at most 2 seconds. There are 12 bytes in a group: the first 2 bytes represent X axis acceleration data, the 3rd and 4th bytes represent Y axis acceleration data, the 5th and 6th bytes represent Z axis acceleration data, the 7th and 8th bytes are X axis gyroscope data, the 9th and 10th bytes are Y axis gyroscope data and the 11th and 12th bytes are Z axis gyroscope data. The data are in the two's complement format.

4.8.Data Report +DAT

The data report messages **+RESP:GTPGR** uses the format below and it is only sent via GPRS even if the report mode is forced SMS mode.

- **+DAT,**

Example:
2B444154060000007F011C4C020303106762313030700000010201020200A000101000000016600
3706FB41B701E5D48E07E3040B06242C020100000000166003706FB41B701E5D48E07E3040B062
42D030100000000166003706FB41B701E5D48E07E3040B06242E040100000000166003706FB41B7
01E5D48E07E3040B06242F050100000000166003706FB41B701E5D48E07E3040B0624300601000
0000166003706FB41B701E5D48E07E3040B062431070100000000166003706FB41B701E5D48E07
E3040B062432080100000000166003706FB41B701E5D48E07E3040B062433090100000000166003
706FB41B701E5D48E07E3040B0624340A0100000000166003706FB41B701E5D48E07E3040B0624
3507E3040B0E2436055B62D70D0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+DAT	+DAT
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	45	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI/Device Name	
Trigger Type	1	1	**+RESP:GTPGR**
Crash Counter	1	0x00-0xFF	
Data Type	1	0 | 1	
Total Frame	1	1 – 6	
Frame Number	1	1 – 6	
GNSS Validity Number	1	0 – 20	
Reserved	1	0x00	
GNSS Point Index	1	1	
GNSS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9 km/h	
Azimuth	2	0 – 359	

Altitude	2	(–)xxxxx.x m	
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
…			
GNSS Point Index	1	10	
GNSS Accuracy	1	0|1 – 50	
Speed	3	0.0 – 999.9 km/h	
Azimuth	2	0 – 359	
Altitude	2	(–)xxxxx.x m	
Longitude	4		
Latitude	4		
GNSS UTC Time	7	YYYYMMDDHHMMSS	
Send Time	7	YYYYMMDDHHMMSS	
Count Number	2	0000 – FFFF	
Checksum	2	0000 – FFFF	
Tail Characters	2	0x0D 0x0A	0x0D 0x0A

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

Message	ID
+RESP:GTPGR	6

✧ <*Trigger Type*>: It indicates which incident triggers the report message.

- 1: Crash incident.

✧ <*Total Frame*>: The total number of **+RESP:GTPGR** messages that are sent to the backend server for the crash event.

✧ <*Frame Number*>: A numeral to indicate the sequence of the current message.

✧ <*Crash Counter*>: A value to indicate the crash sequence. The three report messages **+RESP:GTCRA**, **+RESP:GTCRD** and **+RESP:GTPGR** are combined into one crash event. It rolls from 0x00 to 0xFF.

✧ <*Data Type*>: It indicates whether the data reported to the backend server is recorded before crash or after crash.

- 0: Before crash.
- 1: After crash.

✧ <*GNSS Validity Number*>: The number of the successfully fixed GNSS positions included in the report message.

✧ <*GNSS Point Index*>: The index of GNSS point.

4.9.Compressed Report Information +CRI

The compressed report information is only valid for fixed time report in HEX format. It will be generated only when the parameter <*Compressed Report*> in the command **AT+GTFRI** is set to 2. Please see below for details.

➢ **+CRI,**

Example:
2B43524901010408F701076762313030700000644214006819F00000015D6666000416C0FFFF10C063FDCB8C1800011830CEEF40D8950001197004C0E6338AEC00ABB00001197042C0E63391D440C1C64001190042011800011800011800011800011800011800011800011800011800011800011800011800011800011800011800011800011800011800010078FFFF00040050FFFF00070050FFFE0004004F000000080050FFFF00060050FFFE0004004FFFFF00050050FFFF0004004FFFFE00040050FFFF0004004FFFFE00050051FFFF00060050FFFF00060050FFFF00070050FFFF00070050FFFF00070050FFFE00060050FFFF00070050FFFF0005004F07E7021C0926280041BE170D0A

Parameter	Length (byte)	Range/Format	Default
Message Header	4	+CRI	+CRI
Message Type	1		
Report Mask	4	00000000 – FFFFFFFF	
Length	2		
Device Type	1	4C	4C
Protocol Version	2	0000 – FFFF	
Firmware Version	2	0000 – FFFF	
Unique ID	8	IMEI / Device name	
Battery Level	1	0 – 100	
External Power Voltage	2		
Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A	
Satellites in View	1		
Number	1	0 – 60	
Compression GNSS Length	2	0 – 1200	
Compressed GNSS Info			
Compression ACC Length	2	0 – 360	

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

✧ <*Message Type*>: The ID of the **+CRI** report message.

Message	**ID**
+RESP:GTCRI	1

✧ <*Report Mask*>: Please refer to the <*+CRI Mask*> in **AT+GTHRM**.

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

✧ <*Compressed GNSS Info*>: Compress information of 60 GNSS positions and cells at most. Each position can be represented by its absolute value or its relative value, and the first successfully fixed position must be represented by its absolute value. As for the relative value, it is the difference between the current location and the previous location, so the current location can be calculated based on the previous location and the relative value.

Here is the configuration for the first successfully fixed location and cell information in the report. The parameters are always absolute value.

Parameter	**Length(bit)**	**Range/Format**	**Default**
HDOP and Point Attribute	5		
Position type	2	0|1	
Bitwise Mask for GNSS	5		0b11111
Bitwise Mask for Cell	4		0b1111
Absolute Speed	16		
Absolute Azimuth	16		
Absolute Altitude	16		
Absolute Longitude	32		
Absolute Latitude	32		
Absolute UTC Time	32		
Absolute MCC	16	0000 – FFFF	
Absolute MNC	16	0000 – FFFF	
Absolute LAC	16	0000 – FFFF	
Absolute Cell ID	32	00000000 – FFFFFFFF	

And here is the Relative Value format configuration.

Parameter	Length(bit)	Range/Format	Default
HDOP and Point Attribute	5		
Position Type	2	0|1	
Bitwise Mask for GNSS	5		
Bitwise Mask for Cell	4		
Relative Speed	<=16		
Relative Azimuth	<=16		
Relative Altitude	<=16		
Relative Longitude	<=32		
Relative Latitude	<=32		
Relative UTC Time	<=32		
Relative MCC	<=24	000000 – FFFFFF	
Relative MNC	<=24	000000 – FFFFFF	
Relative LAC	<=24	000000 – FFFFFF	
Relative Cell ID	<=40	0000000000 – FFFFFFFFFF	

- <*HDOP and Point Attribute*>: The highest four bits are for HDOP. The range is [0, 15]. If it is 0, it means the device fails to get a GNSS position at this time, and a GNSS position does not have to be included in the following bytes. In this situation, one point takes one byte. If it is not 0, it represents HDOP. If the actual HDOP is greater than 15, it is taken as 15. Normally, 15 indicates very poor GNSS HDOP. The lowest bit indicates a 2D position or 3D position.
  - 0b0 - This is a 2D position.
  - 0b1 - This is a 3D position.
- <*Position type*>: The range (0 - 1) which indicates the following fix type.
  - 0b00: Fixed GNSS fix.
  - 0b01: GNSS corner location fix.
- <*Bitwise Mask for GNSS*>: Each bit from the highest to the lowest bit indicates whether the corresponding field will be included in the following message. If the bit is 1, then the corresponding field will be included in the following message. If it is 0, then the corresponding field will not be included in the following message. If the corresponding field is not included, it is assumed to be the same as the previous point.
  - Bit 4: Speed
  - Bit 3: Heading
  - Bit 2: Altitude
  - Bit 1: Longitude
  - Bit 0: Latitude
- <*Bitwise Mask for Cell*>: Each bit from the highest to the lowest bit indicates whether the corresponding field (MCC/MNC/LAC/Cell ID) will be included in the following message. If the bit is 1, then the corresponding field will be included in the following message. If it is 0, then the corresponding field will not be included in the following message. If the corresponding field is not included, it is assumed to be the same as the previous point/position.

- Bit 3: MCC
- Bit 2: MNC
- Bit 1: LAC
- Bit 0: Cell ID

✧ <*Relative Speed*>: For all the other points rather than the first point in the report, it is a relative value. The highest bit of each byte indicates whether it will be followed by a byte. If it is 1, it means it will be followed by a byte for the relative speed value. The Bit6 of the first byte of each relative value is used to indicate whether the relative value is positive or negative, while the remaining bytes indicate the absolute value of the relative value. Therefore, when decompressing, the Bit6 of the first byte is used to determine whether the relative value should be converted to a negative number. And the lowest 6 bits of the first byte of the relative speed and the lowest 7 bits of the remaining bytes together form the value of the relative speed. The unit is 0.1 km/h. So with one byte, it can represent +/-6.3km/h and with two bytes, it represents +/-819.1km/h. Thus two bytes are enough for the relative speed.

✧ <*Relative Azimuth*>: For all the other points rather than the first point in the report, it is a relative value. The definition for the relative value is the same as speed. With one byte, it can represent +/-63 degree, and with two bytes, it can represent +/-8191 degree. Thus two bytes are enough for relative heading. Normally, one byte is taken.

✧ <*Relative Altitude*>: For all the other points rather than the first point in the report, it is a relative value. The definition for the relative value is the same as speed. With one byte, it can represent +/-63m, and with two bytes, it can represent +/-8191m. Thus two bytes are enough for relative heading. Normally, one byte is taken.

✧ <*Relative Longitude*>: For all the other points rather than the first point in the report, it is a relative value. The definition for the relative value is the same as speed. With one byte, it can represent +/-0.000063 degree; with two bytes, it can represent +/-0.008191 degree; with three bytes, it can represent +/-1.048575 degree; and with four bytes, it can represent +/-134.217728 degree. Normally, three bytes are taken.

✧ <*Relative Latitude*>: For all the other points rather than the first point in the report, it is a relative value. The definition for the relative value is the same as speed. With one byte, it can represent +/-0.000063 degree; with two bytes, it can represent +/-0.008191 degree; with three bytes, it can represent +/-1.048576 degree; and with four bytes, it can represent +/-134.217728 degree. Normally, three bytes are taken.

✧ <*Relative UTC time*>: For all the other points rather than the first point in the report, it is a relative value. The definition for the relative value is the same as speed. With one byte, it can represent 127s at most; with two bytes, it can represent 16383s at most; and with three bytes, it can represent 2097152s. Thus, three bytes are enough. Normally, one byte is taken.

✧ <*Relative MCC*>: The defining method is the same as <*Relative Speed*>.

✧ <*Relative MNC*>: The defining method is the same as <*Relative Speed*>.

✧ <*Relative LAC*>: The defining method is the same as <*Relative Speed*>.

✧ <*Relative Cell ID*>: The defining method is the same as <*Relative Speed*>.

✧ <*Compression ACC Length*>: The length of the <*Compressed ACC Info*>.

✧ <*Compressed ACC Info*>: There are 6*60 bytes in one message at most with 6 bytes in a group. The first 2 bytes of these 6 numbers 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. If the send Interval for **+CRI** message is greater than 60s, the acceleration data of the last 60s will be reported.

4.10.Buffer Report in HEX Format

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

Appendix: Message Index

- **Command and ACK**

AT+GTCRA
+ACK:GTCRA
AT+GTGPJ
+ACK:GTGPJ
AT+GTEPS
+ACK:GTEPS
AT+GTRTO
+ACK:GTRTO
AT+GTHMC
+ACK:GTHMC
AT+GTWLT
+ACK:GTWLT
AT+GTCMD
+ACK:GTCMD
AT+GTUDF
+ACK:GTUDF
AT+GTUPC
+ACK:GTUPC
AT+GTVVS
+ACK:GTVVS
AT+GTAVS
+ACK:GTAVS
AT+GTVMS
+ACK:GTVMS
AT+GTGAM
+ACK:GTGAM
AT+GTBTS
+ACK:GTBTS
AT+GTDAT
+ACK:GTDAT
AT+GTBMS
+ACK:GTBMS
AT+GTASC
+ACK:GTASC

✧ **Position Related Report**

+RESP:GTTOW
+RESP:GTEPS
+RESP:GTFRI
+RESP:GTGEO
+RESP:GTSPD
+RESP:GTRTL
+RESP:GTLBC
+RESP:GTDOG

+RESP:GTVGL
+RESP:GTHBM
+RESP:GTGES

✧ **Device Information Report**

+RESP:GTINF

✧ **Report for Querying**

+RESP:GTGPS
+RESP:GTALM
+RESP:GTALC
+RESP:GTALS
+RESP:GTCID
+RESP:GTCSQ
+RESP:GTVER
+RESP:GTBAT
+RESP:GTTMZ
+RESP:GTBTI
+RESP:GTBSC
+RESP:GTBAU
+RESP:GTSCS

✧ **Event Report**

+RESP:GTPNA
+RESP:GTPFA
+RESP:GTMPN
+RESP:GTMPF
+RESP:GTBTC
+RESP:GTSTC
+RESP:GTBPL
+RESP:GTSTT
+RESP:GTPDP
+RESP:GTVGN
+RESP:GTVGF
+RESP:GTIDN
+RESP:GTIDF
+RESP:GTJDR
+RESP:GTGSM
+RESP:GTGSS
+RESP:GTCRA
+RESP:GTSTR
+RESP:GTSTP
+RESP:GTLSP
+RESP:GTGPJ

+RESP:GTRMD
+RESP:GTJDS
+RESP:GTUPC
+RESP:GTBCS
+RESP:GTBDS
+RESP:GTASC

✧ **Crash Data Packet**

+RESP:GTCRD

✧ **Transparent Data Transmission**

+RESP:GTDAT (Short Format)
+RESP:GTDAT (Long Format)

✧ **Bluetooth Data Report**

+RESP:GTBDR

✧ **Heartbeat**

+ACK:GTHBD
+SACK:GTHBD

✧ **Server Acknowledgement**

+SACK

✧ **Hex Format Report Message**

+ACK
+RSP
+EVT
+INF
+HBD
+CRD