GB100CG @Track Air Interface Protocol

GSM/GPRS/LTE CAT1/GNSS Tracker

TRACGB100CGAN004

Version: 4.02

Driving Smarter IoT

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Document Title	GB100CG @Track Air Interface Protocol
Version	4.02
Date	2025-02-14
Status	Release
Document Control ID	TRACGB100CGAN004

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1 Revision History

Version	Date	Author	Description of Change
1.00	2023-06-30	Aleo Liu	1. Initial.
2.00	2024-01-18	Allen Zhang	1. Added the parameter <Fast STP Mode> to the command **AT+GTSSR**. 2. Deleted the parameters <Brake Speed Threshold>, <Delta Speed Threshold>, <Delta Heading Threshold> and <Clear Factor Mode> from the command **AT+GTASC**. 3. Added the parameter <Report Mode> to the command **AT+GTASC**.
2.01	2024-04-22	Archie Li	1. Added type 15 and model 1 to the parameters <Accessory Type> and <Accessory Model> in the command **AT+GTBAS** to support MOV ELA Bluetooth sensor.
3.00	2024-07-15	Archie Li	1. Added the parameters <Scan Interval> and <Scan Window> to the command **AT+GTBTS**.
3.01	2024-08-14	Allen Zhang	1. Added the parameters <Primary DNS Server> and <Secondary DNS Server> to the commands **AT+GTSRI** and **AT+GTQSS**. 2. Added the command **AT+GTOWL**.
3.02	2024-09-04	Bennett Cui	1. Added the parameters <Ignition Mode> and <SLM Report Mode> to the command **AT+GTSLM**.
3.03	2024-09-14	Allen Zhang	1. Added the parameter <WAN Ping> to the command **AT+GTBSI**.
3.04	2024-09-21	Bennett Cui	1. Modified the value range of parameter <IGF Report Interval> in the command **AT+GTFRI**. 2. Deleted the parameter <Read Interval> from the command **AT+GTBAS**.
3.05	2024-10-15	Bennett Cui	1. Modified the value range of parameter <Sampling Frequency Mode> in the command **AT+GTCRA**.
	2024-10-29	Bennett Cui	2. Modified the value range of parameter <Satellites in Use>.

Version	Date	Author	Description of Change
4.00	2024-11-20	John Wang	1. Modified the description of <SACK Mode> in the command **AT+GTSRI**. 2. Added Enhanced <Satellite in Use> to <+RSP Expansion Mask> and <+EVT Expansion Mask> in the **AT+GTHRM** command.
		Bennett Cui	3. Added the command **AT+GTSVR**. 4. Added the parameters <Real-Time State>, <Ghost Battery Percentage> and <Ghost Status> to the message **+RESP:GTBTI**.
	2024-12-18	Bennett Cui	5. Modified the value range of parameter <Sampling Frequency Mode> in the command **AT+GTCRA**.
4.01	2025-01-16	Bennett Cui	1. Added parameters <CSQ RSSI/CSQ BER> to <+RSP Expansion Mask> in the **AT+GTHRM** command. 2. Added the model 9 to the parameter <Beacon ID Model> in the command **AT+GTBID** to report **+RESP:GTBFS** message. 3. Added Bit20 to <ERI Mask> in the **AT+GTFRI** command to report CSQ RSSI/RSRP and CSQ BER. 4. Added the command **AT+GTBFS**. 5. Added the mode 2 to the parameter <Mode> in the command **AT+GTBID**. 6. Added %IMEI% to the parameter <Subscribe/Publish Topic> in the command **AT+GTMQT**.
4.02	2025-02-07	Bennett Cui	1. Added parameter <GNSS off Latency> to the command **AT+GTCFG**.

2 Overview

2.1 Scope of This Document

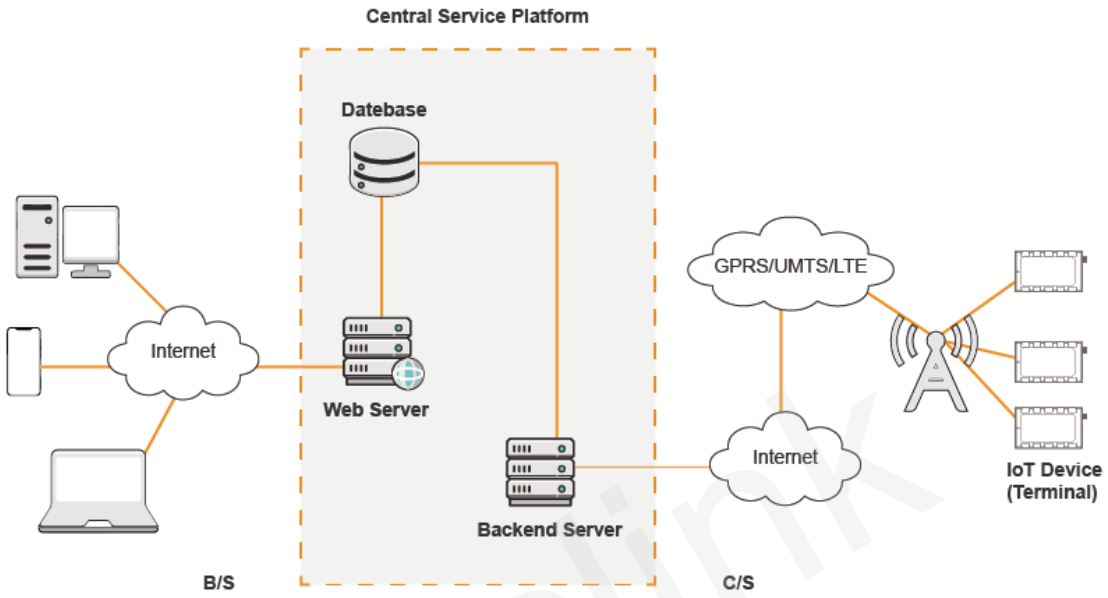
The @Track Air Interface Protocol is a digital communication interface between Queclink Trackers and the backend server. It is used for all communication between the backend server and the terminal via SMS or GPRS. The backend server sends a command to the terminal and then the terminal confirms the 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.

2.2 Terms and Abbreviations

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

2.3 System Architecture

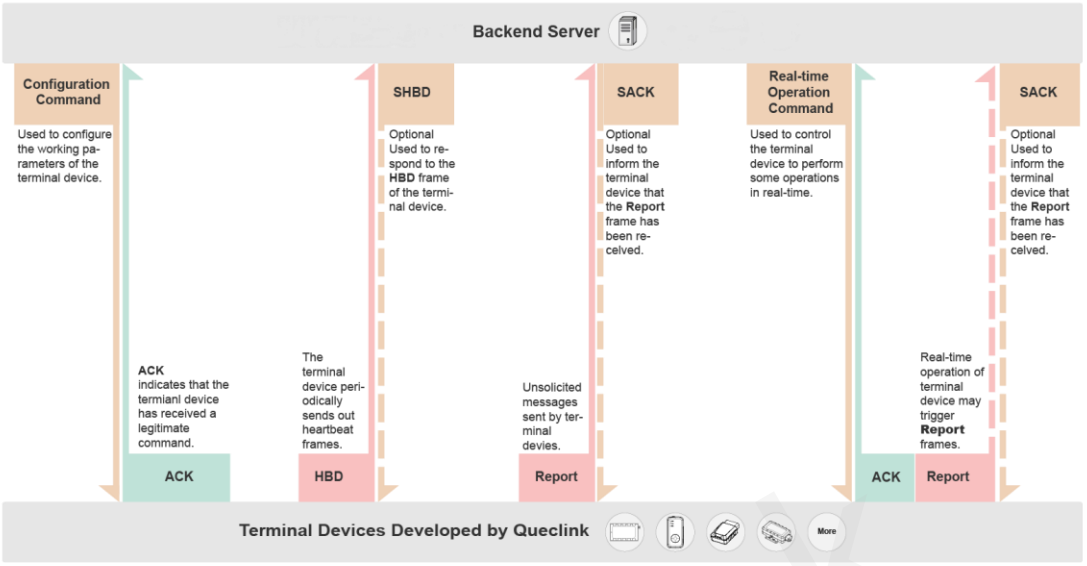


The backend server needs to be accessible by many terminals and should have the following abilities:

- ✧ The backend server should be able to access the Internet and listen for the connection requests 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.

2.4 Frame Types

The @Track protocol contains the following types of frames, depending on their purpose:



Frame Types and Encoding

For each frame, the unit of Length is Byte. Please refer to (Commands)/(ASCII)/(HEX) for the detailed format of the above types of frames.

3 Commands

Commands are used to set the working parameters of the terminal or to cause the terminal to perform certain operations. Please refer to the details below.

3.1 Network Settings

This section describes the commands related to the connection between the terminal device and external units (such as the backend server). Please refer to the details below.

3.1.1 BSI (Bearer Setting Information)

The command **AT+GTBSI** is used to configure the parameters for GSM/GPRS/LTE Cat1 data connection.

Example:
AT+GTBSI=gb100cg,cmnet,,,3gnet,,,0,,,0000$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	BSI	BSI
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	APN	<=64		
	APN User Name	<=30		
	APN Password	<=30		
	Backup APN	<=64		
	Backup APN User Name	<=30		
	Backup APN Password	<=30		
	Network Mode	1	0 | 1 | 3	0
	WAN Ping	1	0 | 1	0
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gb100cg".

✧ *APN*

Access point name (APN).

- *APN User Name*
  The user name of APN.
- *APN Password*
  The password of APN.
- *Backup APN*
  Backup access point name. If <APN> does not work, <Backup APN> will be used.
- *Backup APN User Name*
  The user name of backup APN.
- *Backup APN Password*
  The password of backup APN.

Note

Please set the parameter value to "%CLR%" if there is a need to erase the parameter <APN>, <APN User Name>, <APN Password> , <Backup APN>, <Backup APN User Name> or <Backup APN Password>. These parameter values will not be cleared if they are empty.

- *Network Mode*
  - **0** - Auto (LTE & GSM/EGPRS)
  - **1** - GSM/EGPRS Only
  - **3** - LTE Only
- *WAN Ping*
  A setting that indicates whether the server is allowed to ping the device when it has a static IP address.
  - **0** - Disable.
  - **1** - Enable.
- *Serial Number*
  The serial number of the command. It will be included in the ACK message for the command.
- *Tail Character*
  A character which indicates the end of the command. It must be "$".

3.1.2 SRI (Backend Server Registration Information)

The command **AT+GTSRI** is used to configure 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.

Example:
AT+GTSRI=gb100cg,3,,5,60.174.225.173,10046,60.174.225.173,10046,112,2,1,0,0,00,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	SRI	SRI

Parts	Fields	Length	Range/Format	Default
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Report Mode	1	0-7 | 9	0
	Reserved	0		
	Buffer Mode	1	0-2 | 5	1
	Main Domain	<=60	ASCII (not including '=' and ',')	
	Main Port	<=5	0 - 65535	
	Backup Domain	<=60	ASCII (not including '=' and ',')	
	Backup Port	<=5	0 - 65535	
	SMS Gateway	<=20		
	Heartbeat Interval	<=3	0 | 2 - 360(min)	0
	SACK Mode	1	0-2	0
	Protocol Format	1	0 | 1	0
	SMS ACK Mode	1	0 | 1	0
	High Priority Report Mask	<=2	0 - FF	0
	Reserved	0		
	Primary DNS Server	<=15		0.0.0.0
	Secondary DNS Server	<=15		0.0.0.0
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *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 to the SMS gateway via SMS.
- **2** - TCP short-connection forced mode.

  The connection is based on TCP protocol. The terminal connects to the backend server

every time it needs to send data and will shut down the connection when the terminal finishes sending data. If the terminal fails to establish TCP connection to the backend server (both Main Server and Backup Server), it will store the data in the memory buffer if the buffer report function is enabled. Otherwise, the data is discarded.

- **3** - TCP long-connection mode.
  The connection is based on TCP protocol. The terminal connects to the backend server and maintains the connection using 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 through the UDP protocol. Receiving protocol commands via UDP is supported if the GPRS network allows it. It is recommended to enable heartbeat and **PDP** (ASCII)/(HEX) report when receiving commands via UDP.
- **5** - Forced SMS mode. Only SMS is used for data transmission.
  Note
  The messages **GSM** (ASCII)/(HEX) , **ALM** (ASCII) , 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 main server.
- **7** - Backup server supported TCP long-connection mode.
  The connection is based on TCP protocol. The terminal connects to the backend server and maintains the connection using the heartbeat data. The backend server should respond to the heartbeat data from the terminals. If the connection to the main server is lost, the terminal will try to connect to the backup server. If the connection to the backup server is also lost, the terminal will try to connect to the main server again.
- **9** - MQTT mode.
  MQTT is a Client-Server based on message Publish/Subscribe transport protocol. The protocol is built on the TCP protocol. This mode has a default username(**admin**) and password(**password**) as well as a subscription topic(**quec_msg**) and a publication topic(**quec_ctrl**).

✧ *Buffer Mode*

The working mode of the buffer report function.

If the buffer report function is enabled and the device goes into areas without network coverage, it will store all reports locally.

If the device goes into areas with network coverage again, it will then send all the buffered reports.

- **0** - Disable.
- **1** - Low priority. In this mode, the device will send the buffered messages after real-time messages.

- **2** - High priority. In this mode, the device will send all the buffered messages before real-time messages, except the messages **+RESP:GTPFA**, **+RESP:GTPFR**, **+RESP:GTPDP**, **+RESP:GTSLM**, **+RESP:GTUPD**.
- **5** - Timestamp priority. In this mode, all messages will be saved and sent in the order they are generated, but the messages configured in <High Priority Report Mask> will be reported first. And the message header won't be changed to the string "**+BUFF:**".

✧ *Main Domain*

The IP address or the domain name of the main server.

✧ *Main Port*

The port number of the main server.

✧ *Backup Domain*

The IP address or the domain name of the backup server.

✧ *Backup Port*

The port number of the backup server.

✧ *SMS Gateway*

It is 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 heartbeat messages (**+ACK:GTHBD**) when report mode is TCP long-connection mode or UDP mode. If it is set to 0, no heartbeat message will be sent.

✧ *SACK Mode*

Specify whether the terminal needs to wait for the SACK message from the backend server after successfully sending a message to the backend server. Please note that it requires the backend server to be able to reply to the terminal with the SACK message if <SACK Mode> is not 0.

- **0** - The terminal does not wait for the SACK message after sending a message to the backend server.
- **1** - The terminal will wait for the SACK message for 20 seconds after sending a message to the backend server. It will resend the message up to 4 times if the SACK message from backend server cannot be received correctly or the serial number of the SACK message does not match the last message sent.
- **2** - Similar to <SACK Mode> 1, the difference is that the terminal does not check the serial number of the SACK message in this mode.

Note

If the terminal receives **+SACK:GTHBD** from the backend server, the terminal must check the serial number of the SACK message **+SACK:GTHBD** regardless of the value of <SACK Mode>.

✧ *Protocol Format*

This parameter defines the format of the report messages sent from the device to the backend server.

- **0** - ASCII format.
- **1** - HEX format.

✧ *SMS ACK Mode*

This parameter defines whether to reply with the ACK confirmation via SMS when the command is sent via SMS.

- **0** - The device will send the ACK confirmation using the mode specified by <Report Mode>.
- **1** - The device will send the ACK confirmation via SMS to the phone number from which the command is sent 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**
- **Bit 3** - for **+RESP:GTSLM**

✧ *Primary DNS Server*

The address of primary DNS server.

✧ *Secondary DNS Server*

The address of secondary DNS server.

Note

If both <Primary DNS Server> and <Secondary DNS Server> are 0.X.X.X, 127.X.X.X or 255.X.X.X, the default DNS server obtained from network will be used.

3.1.3 QSS (Quick Start Settings)

The command **AT+GTQSS** is used to configure GPRS and backend server parameters if the length of all the settings is less than 160 bytes. Otherwise, the two commands (AT+GTBSI) and (AT+GTSRI) are used to set those parameters.

Example:
AT+GTQSS=gb100cg,cmnet,,,3,,1,60.174.225.173,20581,60.174.225.173,20581,13812341234,15,1,0,0,0.0.0.0,0.0.0.0,0,0002$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	QSS	QSS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	APN	<=64		
	APN User Name	<=30		
	APN Password	<=30		
	Report Mode	1	0-7 | 9	0
	Reserved	0		
	Buffer Mode	1	0-2 | 5	1

Parts	Fields	Length	Range/Format	Default
	Main Domain	<=60	ASCII (not including '=' and ',')	
	Main Port	<=5	0 - 65535	
	Backup Domain	<=60	ASCII (not including '=' and ',')	
	Backup Port	<=5	0 - 65535	
	SMS Gateway	<=20		
	Heartbeat Interval	<=3	0 | 2 - 360(min)	0
	SACK Mode	1	0-2	0
	Protocol Format	1	0 | 1	0
	SMS ACK Mode	1	0 | 1	0
	Primary DNS Server	<=15		0.0.0.0
	Secondary DNS Server	<=15		0.0.0.0
	High Priority Report Mask	<=2	0 - FF	0
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

3.1.4 MQT (MQTT Server Information)

The command **AT+GTMQT** is used to configure the username and password to connect to the MQTT server and to subscribe and publish topics. If the terminal is configured correctly, it should be able to report data to the MQTT server.

Example:
AT+GTMQT=gb100cg,0,60,admin,password,,quec_ctrl,,quec_msg,,#,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	MQT	MQT
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Server ID	1	0	0
	Keep Alive	<=4	0 | 5 - 1080(min)	60
	Username	<=64	ASCII (not including ',')	admin
	MQTT Password	<=64	ASCII String	password
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	Subscribe Topic	<=64	ASCII String	quec_ctrl
	Reserved	0		
	Publish Topic	<=64	ASCII String	quec_msg
	Reserved	0		
	Client ID	<=64	'0'-'9' 'a'-'z' 'A'-'Z' '#'	#
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

- *Password*

  The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

- *Keep Alive*

  It is used to set keep alive mechanism for MQTT. It is a time interval measured in minutes. In particular, 0 means the keep alive mechanism is disabled. Unit: minute.

- *Username*

  If the MQTT server uses authentication, the username is specified here.

- *MQTT Password*

  If the MQTT server uses authentication, the password is specified here.

- *Subscribe Topic*

  The client subscribes to topic name.

  Note

  If the MQTT server supports wildcards, the rules for using the ('#' U+0023) and ('+' U+002B) wildcards in the <Subscribe Topic> are as follows:

  The number sign ('#' U+0023) is a multi-level wildcard that can match any number of levels within a topic. When used, it must be specified either on its own or following a topic level separator ('/' U+002F). In either case, it must be the last character specified in the Topic Filter.

  The plus sign ('+' U+002B) is a single-level wildcard that matches only one level within a topic. The single-level wildcard can be used at any level in the Topic Filter, including the first and the last levels. Where it is used, it must occupy the entire level of the filter. It can be used at more than one level in the Topic Filter and can also be used in conjunction with the multi-level wildcard.

- *Publish Topic*

  The client publishes topic name.

- *Client ID*

  Each client connected to the server has a unique client identifier (Client ID). Both the client and the server must use the Client ID to identify the state associated with the MQTT session between them. The Client ID can contain only uppercase letters, lowercase letters and numeric characters.

For example:

0123456789abcdefghijklmnopqrstuvwxyzABCDEFGHIJKLMNOPQRSTUVWXYZ

Note

In addition, a single character "#" is defined to indicate the use of the IMEI number that will be used internally as the Client ID.
The "%IMEI%" in the Subscribe Topic or Publish Topic name are replaced with IMEI number.

3.1.5 OWL (Operator List Configuration)

The command **AT+GTOWL** is used to configure an allowlist or blocklist of operators to allow GPRS connection.

Example:
AT+GTOWL=gb100cg,1,1,1,46000,60,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	OWL	OWL
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0-2	0
	Start Index	<=3	1 - 100	
	End Index	<=3	1 - 100	
	Operator List	<=6*100		
	TCP Connection Timeout	2	30 - 90(min)	60
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of this function.

- **0** - Disable.
- **1** - Allowlist mode. The parameter <Operator List> is allowlist.
- **2** - Blocklist mode. The parameter <Operator List> is blocklist.

- *Start Index*
  A numeral to indicate the first index of the list operator numbers to be input. For example, if it is 1, the device will update the list operators from the first one. If it is empty, there should be no list number.
- *End Index*
  A numeral to indicate the last index of the list operator numbers to be input. For example, if it is 2, the device will update the list operators until the second one. If it is empty, there should be no list number.
- *Operator List*
  A list of PLMN codes for network operators. The PLMN code comprises of mobile country code **MCC** and mobile network code **MNC**, each of which consists of 3 digits. The last digit of MNC can be omitted, for example, **46001F** or **46001** represents the PLMN of **CHINA UNICOM**.
  The operators in this list will be considered as in **Home** state. And two adjacent operator codes 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 codes (empty value acceptable) and the two numbers are separated by with ','.
  MCCFF type code is used to identify operators across a whole country. For example, **460FF** covers the mobile network operators all across China.
- *TCP Connection Timeout*
  The timeout period for the terminal to establish connection to the TCP server.

Note

In order to prevent conflicts, please do not use commands **AT+GTOWL** and (AT+GTRMD) to configure the same operator.

3.1.6 TLS (TLS Data Encryption)

The command **AT+GTTLS** is used to configure TLS encryption parameters.

Example:
AT+GTTLS=gb100cg,0,1,1,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	TLS	TLS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Server ID	1	0	0
	Mode	1	0 | 1	0
	Verification Mode	1	0-2	0

Parts	Fields	Length	Range/Format	Default
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gb100cg".

✧ *Server ID*

The index of the Server.

- **0** - The server is configured in the (AT+GTSRI) command.

✧ *Mode*

The working mode of the TLS function.

- **0** - Disable.
- **1** - Enable.

✧ *Verification Mode*

It specifies the certificate verification method for the terminal.

- **0** - Do not verify the certificates.
  In this method, no certificates need to be built into the terminal.
- **1** - Only server certification.
  In this method, at least the CA file needs to be built into the terminal.
- **2** - Two-way certification between server and client.
  In this method, at least the CA file, Client Certificate file, Client key file need to be built into the terminal.

Note

TLS encryption is only valid for TCP and MQTT connections.

3.2 Device Configuration

This section describes the commands related to the device generic configurations. Please refer to the details below.

3.2.1 ASC (Axis Self-Calibration)

The command **AT+GTASC** is used to define the condition for calibrating the directions of accelerometer. When the auto self-calibration factor is updated, the device will report the event message **ASC** (ASCII)/(HEX) containing the calibration result to the backend server. The pre-condition for the calibration is ignition on and movement.

Note

To avoid possible inaccuracies caused by historical calibration data, please clear the self-

calibration status of the acceleration data via the sub command 25 in (AT+GTRTO) after the device is installed.

Example:
AT+GTASC=gb100cg,,,,,1,,,,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	ASC	ASC
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Report Mode	1	0 | 1	1
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Report Mode*

Enable/disable the **+RESP:GTASC** report.

- **0** - Disable.
- **1** - Enable.

3.2.2 CFG (Global Configuration)

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

Example:
AT+GTCFG=gb100cg,gb100cg,GB100CG,0,0.0,,,003F,1,00,3DEF,,0,0,300,00,1,0,0,0017,0,,,,,,,,300,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	CFG	CFG
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	New Password	4 - 20	'0'-'9' 'a'-'z' 'A'-'Z'	
	Device Name	<=20	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'	GB100CG
	ODO Mode	1	0 | 1	0
	ODO Initial Mileage	<=9	0.0 - 4294967.0(km)	0.0
	Reserved	0		
	Reserved	0		
	Report Item Mask	<=4	0000 - FFFF	003F
	Power Saving Mode	1	0-2	1
	Position Append Mask	2	00 - FF	00
	Event Mask	<=8	00000000 - FFFFFFFF	3DEF
	Reserved	0		
	LED Mode	1	0-2	0
	Device Information Report	1	0 | 1	0
	Device Information Interval	<=5	30 - 86400(s)	300
	Location Request Mask	2	00 - 23	00
	Battery Working Mode	1	0 | 1	1
	Power Mode	1	0 | 1	0
	AGPS Mode	1	0 | 1	0
	Cell Report	4	0000 - FFFF	0017
	GNSS Lost Time	<=2	0 - 30(min)	0
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	GNSS off Latency	<=3	0 - 300 (s)	300

Parts	Fields	Length	Range/Format	Default
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gb100cg".

✧ *New Password*

It is set to change the current password.

✧ *Device Name*

An ASCII string which represents the name of the device.

✧ *ODO Mode*

Enable/disable the odograph function to calculate the total mileage. The current mileage is included in every position report message.

- **0** - Disable.
- **1** - Enable the odograph function to calculate the total mileage by GNSS.

✧ *ODO Initial Mileage*

The initial value for calculating the total mileage.

✧ *Report Item 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 Cell information, including <MCC>, <MNC>, <LAC>, <Cell ID>.
- **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. This mask is valid for all report messages.

Note

The GSM tower data is not controlled by Bit 3 in the message **GSM** (ASCII)/(HEX).

✧ *Power Saving Mode*

The mode of the power saving function.

If <Power Saving Mode> is set to 0, the fixed report will follow <IGF Report Interval> when the engine is off.

If <Power Saving Mode> is set to 1, the fixed report (**FRI**(ASCII)/(HEX)), geo-fence (**GIN/GOT**(ASCII)/(HEX)) and speed alarm (**SPD**(ASCII)/(HEX)) report messages will be suspended when the device is stationary or the engine is off (Auto parking fence and manual parking fence will not be suspended in this case).

If <Power Saving Mode> is set to 2, it is mostly like Mode 1 and the difference is that the fixed report will not be suspended and the fix and send interval of it will be set to <IGF Report Interval> in (AT+GTFRI) when the engine is off.

- **0** - Disable the power saving function.

- **1** - GNSS deep saving mode.
- **2** - GNSS low saving mode.

✧ *Position Append Mask*

A bitwise numeral to control whether to include the corresponding fields in each position after <Cell ID>.

- **Bit 0** - The number of satellites in view for the current position (GNSS Satellite Number).
- **Bit 1** - Reserved for indicating <GNSS Trigger Type> in **FRI** (ASCII)/(HEX) and **ERI** (ASCII)/(HEX) report, which can't be set here.
- **Bit 2** - Reserved.

Note

If <Wrap Corner Point> is set to 1, the bit 1 of <Position Append Mask> in **FRI** (ASCII)/(HEX) and **ERI** (ASCII)/(HEX) will be set to 1, but it will always be 0 in other messages.

✧ *Event Mask*

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

- **Bit 0** - for **PNA** (ASCII)/(HEX)
- **Bit 1** - for **PFA** (ASCII)/(HEX)
- **Bit 2** - for **MPN** (ASCII)/(HEX)
- **Bit 3** - for **MPF** (ASCII)/(HEX)
- **Bit 5** - for **BPL** (ASCII)/(HEX)
- **Bit 6** - for **BTC** (ASCII)/(HEX)
- **Bit 7** - for **STC** (ASCII)/(HEX)
- **Bit 8** - for **STT** (ASCII)/(HEX)
- **Bit 10** - for **PDP** (ASCII)/(HEX)
- **Bit 11** - for the power on **RTL** (ASCII)/(HEX)
- **Bit 12** - for the ignition report **VGN** (ASCII)/(HEX) and **VGF** (ASCII)/(HEX)
- **Bit 13** - for ignition on and off location report **VGL**(ASCII)/(HEX)
- **Bit 15** - for **PNR** (ASCII)/(HEX)
- **Bit 16** - for **PFR** (ASCII)/(HEX)

For each bit, set it to 1 to enable the corresponding event report, and set it to 0 to disable. If **+RESP:GTPNR** and **+RESP:GTPFR** events are enabled, **+RESP:GTPNA** and **+RESP:GTPFA** will not be reported even if they are enabled.

Note

The configuration in order to avoid generating a large amount of **STT** (ASCII)/(HEX) messages, 1A (Fake Tow) state is ignored.

✧ *LED Mode*

It configures the working mode of the LED lights.

- **0** - Each time the device is powered on, all the LEDs will work for 30 minutes and then turn off.
- **1** - All the LEDs turn on as configured.
- **2** - After the device is powered on, all the LEDs will work for 10 minutes and then turn off.

✧ *Device Information Report*

Enable/disable the device information report (**INF**(ASCII)/(HEX)).

The device information includes state of the device, ICCID, GSM signal strength, voltage of external power supply, battery voltage, charging status, working mode of LED lights, the last

known time of GNSS fix, time zone information and daylight-saving setting.

- **0** - Disable.
- **1** - Enable.

✧ *Device Information Interval*

The interval for reporting the device information.

✧ *Location Request Mask*

Bitwise mask for SMS. 4 high bits for SMS request. Each bit represents one kind of report. Set it to 1 to enable the corresponding report, and set it to 0 to disable.

- 4 high bits for SMS request.
  - **0** - Ignore SMS location request.
  - **1** - Report the current location (**LBC**(ASCII)/(HEX)) to server.
  - **2** - Send current location with Google map link to Caller ID via SMS.
- 4 low bits for how to handle the incoming call .
  - **0** - Hang up only.
  - **1** - Hang up and report the current location (**LBC**(ASCII)/(HEX)) to server.
  - **2** - Hang up the call and send current location with Google map link to Caller ID via SMS.
  - **3** - Hang up and report the current location (**LBC**(ASCII)/(HEX)) to server, simultaneously send current location with Google map link to Caller ID via SMS.

✧ *Battery Working Mode*

It configures whether to enable backup battery. The backup battery will only be used when this parameter is set to 1 and the external power is not connected.

- **0** - Disable backup battery.
- **1** - Enable backup battery.

✧ *Power Mode*

It configures the power supply mode of the terminal.

- **0** - If the main power supply is connected, the backup battery is charged as needed.
- **1** - If the main power supply is connected, the backup battery is only charged when ignition is on. The charge process will begin 3 minutes after ignition on and stop when the ignition is off.

✧ *AGPS Mode*

A numeral which indicates whether to enable AGPS. AGPS helps increase the chances of getting GNSS position successfully and reduces the time needed to get GNSS position.

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

✧ *Cell Report*

A hexadecimal numeral to indicate how to report cell information **GSM**(ASCII)/(HEX).

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 **GSM**(ASCII)/(HEX) after getting GNSS position successfully every time if cell information is available.

- **0b11** - Report the message **GSM**(ASCII)/(HEX) no matter whether it is successful to get GNSS position if cell information is available.

Other bits control whether the following events will trigger the report **GSM**(ASCII)/(HEX).

- **Bit 0** - for **RTL** (ASCII)/(HEX)
- **Bit 1** - for **LBC** (ASCII)/(HEX)
- **Bit 2** - for **FRI**(ASCII)/(HEX) / **ERI** (ASCII)/(HEX)
- **Bit 3** - Reserved
- **Bit 4** - for **TOW** (ASCII)/(HEX)
- **Bit 5 - 13** - Reserved

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

✧ *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 **GSS**(ASCII)/(HEX) to indicate "GNSS signal lost". If the GNSS signal is recovered or a successful fix is obtained again, the device will send the event report **GSS**(ASCII)/(HEX) to indicate the recovery. 0 means "Disable this feature".

Note

If the device is rebooted, it will not report **GSS**(ASCII)/(HEX) to indicate GNSS signal recovery even if it has reported **GSS**(ASCII)/(HEX) to indicate "GNSS signal lost" before reboot.

✧ *GNSS off Latency*

The time to turn off GNSS after engine off when <Power Saving Mode> is enabled.

3.2.3 DOG (Protocol Watchdog)

The **AT+GTDOG** command is used to reboot the device in a time-based manner or upon ignition to prevent the device from working improperly for a long time.

Example:
AT+GTDOG=gb100cg,1,60,30,0200,,1,,,60,60,60,,,0,0013$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	DOG	DOG
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0-2	0
	Ignition Frequency	<=3	10 - 120 (min)	60
	Interval	<=2	1 - 30 (day)	30
	Time	4	HHMM	0200
	Reserved	0		
	Report Before Reboot	1	0 | 1	1

Parts	Fields	Length	Range/Format	Default
	Reserved	0		
	Reserved	0		
	No Network Interval	<=4	0 | 5 - 1440(min)	60
	No Activation Interval	<=4	0 | 5 - 1440(min)	60
	Send Failure Timeout	<=4	0 | 5 - 1440(min)	60
	Reserved	0		
	Reserved	0		
	Reboot Device Type	1	0 | 1	0
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of the watchdog function.

- **0** - Disable.
- **1** - Reboot periodically according to the <Interval> and <Time> settings.
- **2** - Reboot when the ignition is turned on.

✧ *Ignition Frequency*

If the interval between the current ignition-on and last ignition-on reboot is greater than the value specified by this parameter when <Mode> is 2, the device will automatically reboot upon ignition on. The device will reboot automatically upon the second ignition-on for the first time use whatever the time interval from the first ignition-on is.

✧ *Interval*

The interval for rebooting the device. It is measured in days. Rebooting the device for the first time will ignore this interval.

✧ *Time*

The time at which the reboot operation is performed when <Interval> condition is met.

✧ *Report Before Reboot*

Whether to report the **DOG**(ASCII)/(HEX) message before reboot. 0 means "Do not report the **DOG**(ASCII)/(HEX) message", and 1 means "Report the **DOG**(ASCII)/(HEX) message". If this parameter is enabled, the device will initiate a real-time fix before sending the message with the current location information.

✧ *No Network Interval*

The interval for rebooting the device when there is no network signal. 0 means "Do not reboot the device".

✧ *No Activation Interval*

The interval for rebooting the device when the device is unable to be registered on the EGPRS/LTE network. 0 means "Do not reboot the device".

✧ *Send Failure Timeout*

The length of time (in minutes) before rebooting the device when the device fails to send a

message. 0 means "Do not reboot the device".

✧ *Reboot Device Type*

It is used to set the category that needs to be rebooted.

- **0** - Reboot device.
- **1** - Reboot RF-Radio Frequency, only valid for <No Network Interval>, <No Activation Interval> and <Send Failure Timeout>.

3.2.4 GAM (GNSS-Assisted Motion)

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.

Example:
AT+GTGAM=gb100cg,1,1,25,10,60,60,,,,,0006$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	GAM	GAM
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0 | 1	1
	Speed Mode	1	0 | 1	1
	Motion Speed Threshold	<=2	5 - 50(km/h)	25
	Motion Cumulative Time	<=3	10 - 100(s)	10
	Motionless Cumulative Time	<=3	10 - 250(s)	60
	GNSS Fix Failure Timeout	<=4	5 - 1800(s)	60
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *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 status measurement based on motion sensor state.

- **0** - Disable.
- **1** - Enable.

✧ *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.

3.2.5 HMC (Hour Meter Count)

The command **AT+GTHMC** is used to measure the accumulated use time of the device with each actuation of ignition on. When the device sends **FRI** (ASCII)/(HEX), **VGN** (ASCII)/(HEX) or **VGF** (ASCII)/(HEX) message, <Hour Meter Count> will be included in these reports.

Example:
AT+GTHMC=gb100cg,1,00000:00:00,,,,,,,,0018$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	HMC	HMC
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0 | 1	0
	Initial Hour Meter Count	11-13	00000:00:00 - 1193000:00:00	00000:00:00
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

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 turned on.

- **0** - Disable the hour meter count function.
- **1** - Difference Calculation Mode.

  The current <Hour Meter Count> reported in **+RESP:GTFRI**, **+RESP:GTVGN** and **+RESP:GTVGF** is equal to (=) <Hour Meter Count> + current <Initial Hour Meter Count> - last <Initial Hour Meter Count>.

✧ *Initial Hour Meter Count*

The initial value of <Hour Meter Count> ranges from 00000:00:00 to 1193000:00:00. It consists of three parts separated by ":", the first part is the hour digit and the length of it is between 5 to 7 bytes, the second part is the 2-byte minute digit, and the last part is the 2-byte second digit. When the ignition is turned on for the first time, the <Hour Meter Count> reported in **+RESP:GTFRI** , **+RESP:GTVGN** or **+RESP:GTVGF** will be increased based on this value.

3.2.6 HRM (HEX Report Mask)

The **AT+GTHRM** command consists of <+ACK Mask>, <+RSP Mask>, <+EVT Mask>, <+INF Mask>, <+HBD Mask>, <+CRD Mask> , <+DAT Mask>, <+CRI 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.

Example:
AT+GTHRM=gb100cg,,,7F,FC1FBF,FC1FBF,FD7F,EF,7F,7D,,10418F7,0018$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	HRM	HRM
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Reserved	0		
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	+ACK Mask	<=2	0 - FF	7F
	+RSP Mask	<=16	0 - FFFFFFFFFFFFFFFF	FC1FBF
	+EVT Mask	<=16	0 - FFFFFFFFFFFFFFFF	FC1FBF
	+INF Mask	<=16	0 - FFFFFFFFFFFFFFFF	FD7F
	+HBD Mask	<=2	0 - FF	EF
	+DAT Mask	<=8	0 - FFFFFFFF	7F
	+CRD Mask	<=4	0 - FFFF	7D
	Reserved	0		
	+CRI Mask	<=16	00000000 - FFFFFFFF	10418F7
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *+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	Extend Mask Flag
Bit 30	Reserved
...	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>

Mask Bit	Item
Bit 21	<Total Mileage>
Bit 20	<Current Mileage>
Bit 19	<Satellite in Use>
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>

✧ *+RSP Expansion Mask*

Bit 32 - Bit 63 of <+RSP Mask>, component mask of the expand information report. Each bit indicates which expand information is included when the device reports the message **+RSP** (HEX).

Mask Bit	Item
Bit 2 - Bit 31	Reserved
Bit 1	Enhanced <Satellite in Use>
Bit 0	<CSQ RSSI / CSQ BER>

Note

If Bit 1 of <+RSP Expansion Mask> is set to 1, Bit 19 of <+RSP Mask> will be forced to 0.

✧ *+EVT Mask*

Component mask of the event report message.

Mask Bit	Item
Bit 31	Extend Mask Flag
Bit 30	Reserved

Mask Bit	Item
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 in Use>
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 Expansion Mask*

Bit 32 - Bit 63 of <+EVT Mask>, component mask of the expand event report. Each bit indicates which expand information is included when the device reports the message **+EVT** (HEX).

Mask Bit	Item
Bit 2 - Bit 31	Reserved
Bit 1	Enhanced <Satellite in Use>

Mask Bit	Item
Bit 0	Reserved

Note

If Bit 1 of <+EVT Expansion Mask> is set to 1, Bit 19 of <+EVT Mask> will be forced to 0.

✧ *+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 **INF** (HEX).

Mask Bit	Item
Bit 15	+RESP:GTGSM
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*

Bit 16 - Bit 31 of <+INF Mask>, component mask of the expand information report. Each bit indicates which expand information is included when the device reports the message **+RESP:GTINF**.

Mask Bit	Item
Bit 15	<INF Expansion2 Mask>
Bit 14	+RESP:GTRSV
Bit 13	Reserved
Bit 12	+RESP:GTSCS
Bit 11	Reserved
Bit 10	Reserved
Bit 9	+RESP:GTBTI
Bit 8	Reserved
Bit 7	Reserved

Mask Bit	Item
Bit 6	Reserved
Bit 5	Reserved
Bit 4	Reserved
Bit 3	Reserved
Bit 2	Reserved
Bit 1	Reserved
Bit 0	+RESP:GTGSV

✧ *INF Expansion2 Mask*

Bit 32 - Bit 47 of <+INF Mask>, component mask of the expand information report. Each bit indicates which expand information is included when the device reports the message **+RESP:GTINF**.

Mask Bit	Item
Bit 7 - 15	Reserved
Bit 6	Reserved
Bit 5	Reserved
Bit 4	<Network Type>
Bit 3	Reserved
Bit 2	+RESP:GTBSV
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>

✧ *+DAT Mask*

Component mask of the data report message.

Mask Bit	Item
Bit 7 - 31	Reserved
Bit 6	<Count Number>
Bit 5	<Send Time>

Mask Bit	Item
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 7 - 15	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>

✧ *+CRI Mask*

Component mask of the compressed report message.

Mask Bit	Item
Bit 31	Extend Mask Flag
Bit 25 - 30	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 in Use>
Bit 18	<Motion Status>
...	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>

Mask Bit	Item
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>

✧ *+CRI Expansion Mask*

Bit 32 - Bit 63 of <+CRI Mask>, component mask of the expand compressed report. Each bit indicates which expand information is included when the device reports the message **+CRI** (HEX).

Mask Bit	Item
Bit 2 - Bit 31	Reserved
Bit 1	Enhanced <Satellite in Use>
Bit 0	Reserved

Note

If Bit 1 of <+CRI Expansion Mask> is set to 1, Bit 19 of <+CRI Mask> will be forced to 0.

3.2.7 OWH (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 in non-working hours, in all ASCII format reports except **JDR** (ASCII)/(HEX) and **JDS** (ASCII)/(HEX), the fields Latitude, Longitude, MCC, MNC, LAC, Cell ID will be empty, <Position Append Mask> will be 00 and the optional parameters next to it will not exist. 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 will be filled with 0.

Example:
AT+GTOWH=gb100cg,3,1F,0900,1200,1300,1800,,,,,,,,,,0012$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	OWH	OWH
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg

Parts	Fields	Length	Range/Format	Default
Body	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		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

A numeral to indicate the working mode of this function.

- **0** - Disable this function.
- **3** - Automatic mode.

  In this mode, the device will automatically check the current time against the working hours range. If it is outside of working hours, location information will be hidden. Otherwise, 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 working hours in a day.
- *Working Hours Start2, Working Hours End2*
  The second period of working hours in a day.

3.2.8 PDS (Preserving Device's States)

The command **AT+GTPDS** is used to preserve specified logic state for the device. The function works according to the <Mode> setting, and the logic state to be saved are selected according to the value of <Mask>.

Example:
AT+GTPDS=gb100cg,1,11,,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	PDS	PDS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0-2	0
	Mask	<=4	0 - FFFF	0
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

- *Password*
  The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".
- *Mode*
  The working mode of preserving special logic state of the device.
  - **0** - Disable this function.
  - **1** - Preserve specified logic state of the device according to the value of <Mask>.
  - **2** - Reset all the specified logic state listed in <Mask> after receiving the command, and then preserve the specified logic state according to the value of <Mask>.
- *Mask*
  Bitwise mask to configure the device state to be preserved.

Each bit represents a state.

- **Bit 0** - State of GEO
- **Bit 1** - Reserved
- **Bit 2** - Reserved
- **Bit 3** - Information of last known position
- **Bit 4** - State of ignition
- **Bit 5** - Reserved
- **Bit 6** - Reserved
- **Bit 7** - State of SPD
- **Bit 8** - State of SSR
- **Bit 9** - State of main power
- **Bit 10** - Reserved
- **Bit 11** - Reserved
- **Bit 12** - Reserved

3.2.9 PIN (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.

Example:
AT+GTPIN=gb100cg,1,1234,,,,,,0014$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	PIN	PIN
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Enable Auto-unlock PIN	1	0 | 1	1
	PIN	4 - 8	'0'–'9'	
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is

"gb100cg".

✧ *Enable Auto-unlock PIN*

Set it to 1 to enable the auto-unlock PIN function, and set it to 0 to disable this function.

✧ *PIN*

The code used to unlock the SIM PIN.

3.2.10 SLM (Sleep Mode Configuration)

The **AT+GTSLM** command is used to define many working modes to suit different working scenario for reducing power consumption. The message **+RESP:GTSLM** will be sent at high priority. The GNSS will be on before **+RESP:GTSLM** message.

Example:
AT+GTSLM=gb100cg,1,1,11500,12500,1,30,10,1,0000,0000,,,,0,0,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	SLM	SLM
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0-2	0
	Voltage Mode	1	0 | 1	1
	Sleep Voltage	<=5	0 - 32000(mV)	11500
	Wakeup Voltage	<=5	0 - 32000(mV)	12500
	Motion Mode	1	0 | 1	1
	Motionless Sleep Latency	<=3	0 - 300(min)	30
	Motion Wakeup Debounce	<=2	0 - 99(s)	10
	Sleep Period Mode	1	0 | 1	0
	Sleep Period Start	4	HHMM	0000
	Sleep Period End	4	HHMM	2300
	Ignition Mode	1	0 | 1	1
	Reserved	0		
	Reserved	0		
	Wakeup Interval	<=2	0 - 99(h)	0
	Report Items Mask	<=4	0 - FFFF	0
	SLM Report Mode	1	0 - 3	3
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

A numeral that indicates the working mode of the device. If this mode is not set to 0, the device will report the message **+RESP:GTSLM** when it enters into sleep or wakes up.

- **0** - Disable the power saving function.
- **1** - Sleep mode.
  In this mode, RF and GNSS module will stop working. If <Wakeup Interval> is not 0, the device will wake up periodically every <Wakeup Interval> hours. Current consumption in this mode is about 3.5mA @ 3.8V, 1.9mA @ 12V.
- **2** - Deep sleep mode.
  In this mode, Communication module and GNSS module will be powered off until next wakeup. If <Wakeup Interval> is not 0, the device will wake up periodically every <Wakeup Interval> hours. Current consumption in this mode is about 0.9mA @ 3.8V, 0.7mA @ 12V.

✧ *Voltage Mode*

Enable/disable the voltage detection function. If this function is enabled, the parameters <Sleep Voltage> and <Wakeup Voltage> will take effect.

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

✧ *Sleep Voltage*

A voltage threshold for the device to enter into sleep. The device will be allowed to sleep if the vehicle voltage is less than <Sleep Voltage>.

✧ *Wakeup Voltage*

A voltage threshold for device wakeup. The device will be waked up if the vehicle voltage is greater than <Wakeup Voltage>.

Note

The parameter <Sleep Voltage> must be less than <Wakeup Voltage>.

✧ *Motion Mode*

Enable/disable the motion detection function. If this function is enabled, the parameters <Motionless Sleep Latency> and <Motion Wakeup Debounce> will take effect.

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

✧ *Motionless Sleep Latency*

A time interval in minute for device stays in motionless state before entering into sleep. If the time is greater than <Motionless Sleep Latency>, the device will be allowed to sleep.

✧ *Motion Wakeup Debounce*

The duration time to confirm motion event.

✧ *Sleep Period Mode*

Enable/disable the sleep period function. If this function is enabled, the parameters <Sleep

Period Start> and <Sleep Period End> will take effect.

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

✧ *Sleep Period Start, Sleep Period End*

Used to indicate start and stop time for entering sleep mode in 24-hour time system. The device will be allowed to sleep if the RTC time is within the sleep period range, and it will be waked up if the RTC time is outside the sleep period range.

Note

To prevent the device from being unable to exit sleep due to enabling sleep period alone, the maximum sleep period can only be 23 hours and 50 minutes.

✧ *Ignition Mode*

Enable/disable the ignition detection function (virtual ignition). If this parameter is enabled, the device will be allowed to sleep if the vehicle ignition is off, and the device will be waked up if the vehicle ignition is on.

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

✧ *Wakeup Interval*

The interval for device wakeup from sleep. 0 means "Do not wakeup periodically". If <Wakeup Interval> is not 0, the device will wake up periodically every <Wakeup Interval> hours. Each time the device wakes up, a **+RESP:GTSLM** message will be reported to backend server, and then the device will enter into sleep again.

✧ *Report Items Mask*

Bitwise mask to configure the composition of **+RESP:GTSLM** message.

Mask Bit	Item
Bit 0	<External Power Voltage>
Bit 1	Reserved
...	Reserved
Bit 31	Reserved

Note

- The device will enter into sleep and report the **+RESP:GTSLM** message when all sleep conditions enabled by the corresponding detection are met.
- The device will be waked up and report the **+RESP:GTSLM** message when any wakeup condition enabled by the corresponding detection is met.

✧ *SLM Report Mode*

The mode of reporting type for **+RESP:GTSLM**.

- **Bit 0** - Report the enter sleep state message (Report Type 0 for **+RESP:GTSLM**).
- **Bit 1** - Report the exit sleep state message (Report Type 1 for **+RESP:GTSLM**).

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

3.2.11 TMA (Time Adjustment)

The command **AT+GTTMA** is used to remotely adjust the local time of the device. 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 for the local time based on the time zone and daylight-saving setting. This command will also be a trigger for the device to start GNSS. After a successful GNSS fix, the device will update the local time with the GNSS UTC time again.

Example:
AT+GTTMA=gb100cg,+,3,52,0,20090917203500,1,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	TMA	TMA
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Sign	1	+|-	+
	Hour Offset	<=2	0 - 12	0
	Minute Offset	<=2	0 - 59	0
	Daylight Saving Mode	1	0 | 1	0
	UTC Time	14	YYYYMMDDHHMMSS	
	Network Time Checking	1	0 | 1	1
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *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 Mode*

Enable/disable daylight saving time.

- **0** - Disable.
- **1** - Enable.

✧ *UTC Time*

UTC time used to adjust for the local time.

✧ *Network Time Checking*

A numeral to indicate whether to check GNSS UTC time with network time.

- **0** - Only correct device time when the device can't get GNSS UTC time.
- **1** - Always correct device time with network time.

3.2.12 WLT (Allowlist)

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

Example:
AT+GTWLT=gb100cg,0,1,2,13813888888,13913999999,,,,,0018$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	WLT	WLT
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Call Filter	1	0 - 7	0
	Start Index	<=2	1 - 10	
	End Index	<=2	1 - 10	
	Phone Number List	<=20*10		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Call Filter*

It configures the working mode of this function. If a bit is set to 1, only the phone numbers in allowlist will be valid for the corresponding feature. If a bit is set to 0, the corresponding allowlist will be ignored.

- **Bit 0** - Allowlist for location by call.
- **Bit 1** - Reserved.
- **Bit 2** - Allowlist for SMS. Gateway number will ignore the allowlist function.

✧ *Start Index, End Index*

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

✧ *Phone Number List*

A list of comma-separated phone numbers to be updated to the allowlist. The total number of the phone numbers is determined by <Start Index> and <End Index>. The format of the phone numbers includes area code and phone number. The area code is optional.

Note

If more phone numbers are needed, please adjust <Start Index> and <End Index> for appropriate setup. If some phone numbers in <Phone Number List> are empty, then the corresponding phone numbers will be deleted.

For example, to delete the 4th, 5th and 6th numbers of the <Phone Number List>, please set <Start Index> to 4 and set <End Index> to 6 and keep those three phone numbers of <Phone Number List> empty.

3.2.13 AVS (Accelerometer Virtual Ignition)

The command **AT+GTAVS** is used to configure parameters for detecting virtual ignition status based on motion status. It works when Accelerometer (motion status) virtual ignition mode is enabled by (AT+GTVMS).

Example:
AT+GTAVS=gb100cg,30,60,,,,000B$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	AVS	AVS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Rest Validity	<=3	1 - 255(s)	30
	Movement Validity	<=3	1 - 255(s)	60
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Rest Validity*

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

✧ *Movement Validity*

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

3.2.14 VVS (Voltage Virtual Ignition)

The command **AT+GTVVS** is used to configure parameters for detecting virtual ignition state by voltage. It works when Voltage Virtual Ignition mode is enabled by (AT+GTVMS).

Example:
AT+GTVVS=gb100cg,13500,600,10,1,10,000B$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	VVS	VVS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Ignition On Voltage	<=5	250 - 28000(mV)	13500
	Voltage Offset	<=4	200 - 2000(mV)	600
	Ignition On Debounce	<=3	5 - 255(x2s)	10
	Smart Voltage Adjustment	1	0 | 1	1
	Ignition Off Debounce	<=3	5 - 255(x2s)	10
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Ignition On Voltage*

The external power voltage in ignition on state. Different vehicles have different voltage in ignition on state. This parameter should be set very close to the original external power so that the device can detect ignition event more accurately.

✧ *Voltage Offset*

The offset from <Ignition On Voltage> used to determine ignition on or ignition off state.

If the voltage of the external power is higher than **<Ignition On Voltage> - <Voltage Offset>** and is maintained for <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 before updating virtual ignition on state according to the external power voltage. Unit: second.

✧ *Smart Voltage Adjustment*

Enable/disable smart voltage adjustment algorithm.

- **0** - Disable. The values of <Ignition On Voltage> and <Voltage Offset> will remain unchanged.
- **1** - Enable. The values of <Ignition On Voltage> and <Voltage Offset> will dynamically change according to the actual ignition on and off voltage.

✧ *Ignition Off Debounce*

The debounce time before updating the virtual ignition off state according to the external power voltage.

3.2.15 VMS (Virtual Ignition Mode Selection)

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

Example:
AT+GTVMS=gb100cg,7,03,03,1,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	VMS	VMS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Virtual Ignition Mode	1	0 | 2 | 4 | 7	0
	Virtual Ignition On Mask	2	00 - 03	03
	Virtual Ignition Off Mask	2	00 - 03	03
	Virtual Ignition On Logic	1	0 | 1	1
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Virtual Ignition Mode*

A numeral to define the working mode of virtual ignition state detection.

- **0** - Disable the virtual ignition detection function.
- **2** - Voltage virtual ignition detection mode.
  The ignition state is related to the voltage of the external power supply. Please use the command (AT+GTVVS) to configure the parameters.
- **4** - Accelerometer virtual ignition detection mode.
  Ignition state can be indicated by the motion state determined by <Rest Validity> and <Movement Validity> defined in the (AT+GTAVS) command. Stationary state indicates ignition off and moving state indicates ignition on.
- **7** - Combined detection mode.
  In this mode, ignition on/off trigger conditions can be selected using parameters <Virtual Ignition On Mask> and <Virtual Ignition Off Mask>.
  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 parameter <Virtual Ignition On Logic>.

- **Bit0 (01)** - Voltage virtual ignition detection
- **Bit1 (02)** - Motion status virtual ignition detection

✧ *Virtual Ignition Off Mask*

Bitwise mask to detect ignition off event. All bits matched are considered as ignition off event.

- **Bit0 (01)** - Voltage virtual ignition detection
- **Bit1 (02)** - Motion status virtual ignition detection

For example:

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

3.2.16 CMD (Command String Storage)

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

Example:
AT+GTCMD=gb100cg,1,0,AT+GTRTO=gb100cg,0,,,,,,000B$,,,,,0005$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT

Parts	Fields	Length	Range/Format	Default
	Command Word	3	CMD	CMD
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0 | 1	0
	Command ID	<=2	0 - 31	
	Command String	<=200	AT command	
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of storing command string.

- **0** - Delete the stored command.
- **1** - Add the stored command.

✧ *Command ID*

A numeral to identify the stored command.

✧ *Command String*

The whole content of the stored command.

3.2.17 UDF (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.

Example:
AT+GTUDF=gb100cg,0,0,FF,0,0,0,0,1,,,,,0005$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	UDF	UDF
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0-2	0

Parts	Fields	Length	Range/Format	Default
	Group ID	<=2	0 - 31	
	Input ID Mask	<=16	0 - FFFFFFFFFFFFFFFF	0
	Debounce Time	<=5	0 - 86400(s)	0
	Inzizo Mask	<=5	00000 - FFFFF	0
	Outzizo Mask	<=5	00000 - FFFFF	0
	Command ID Mask	<=8	0 - FFFFFFFF	0
	Command Ack Mode	1	0 | 1	0
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of the user defined function.

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

✧ *Group ID*

A numeral to identify the group of input events and stored commands to be executed.

✧ *Input ID Mask*

The 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)** - SelectID1 and ID2
- **Bit (00000017)** - Select ID1, ID2, ID3, and ID5

ID	Bit	Item
1	Bit 0	Power on finished
2	Bit 1	Ignition on
3	Bit 2	Ignition off
4	Bit 3	Attached to the GPRS network
5	Bit 4	Not attached to the GPRS network
6	Bit 5	Registered on the GSM network

ID	Bit	Item
7	Bit 6	Not registered on the GSM network
8	Bit 7	Network roaming
9	Bit 8	Network non-roaming
10	Bit 9	SIM card is locked
11	Bit 10	GNSS is on
12	Bit 11	GNSS is off
13	Bit 12	The device is stationary
14	Bit 13	The device is moving
15	Bit 14	External charge inserted
16	Bit 15	No external charge
17	Bit 16	The device is charging
18	Bit 17	The device is not charging
23	Bit 22	SIM card is inserted
24	Bit 23	SIM card is not inserted
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
37	Bit 36	Network jamming is detected
38	Bit 37	Network jamming is not detected
52	Bit 51	The device fixes GNSS successfully
53	Bit 52	The device fails to fix GNSS

✧ *Debounce Time*

The debounce time for input events before the specified stored commands are executed.

✧ *Inzizo Mask*

The bitwise mask to indicate the input events within the circular GEO-Fence.

ID	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

ID	Bit	Item
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*

The bitwise mask to indicate the input events outside the circular GEO-Fence.

ID	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

✧ *Command ID Mask*

The bitwise mask of the stored commands to be executed after the state of the group becomes TRUE (i.e. all the included input events occur).

✧ *Command Ack Mode*

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.

3.3 Bluetooth Settings

This section describes the commands related to the Bluetooth setting and Bluetooth accessories configuration. Please refer to the details below.

3.3.1 BTS (Bluetooth Setting)

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

Example:
AT+GTBTS=gb100cg,1,,GB100CG%IMEI,,3,0,0D03,0003,0,123456,,,,,,,,,400,240,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	BTS	BTS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0 | 1	1
	Reserved	0		
	Bluetooth Name	<=18	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_' '%'	GB100CG%IMEI
	Reserved	0		
	Discoverable Mode	1	0-3	3
	Discoverable Time	<=4	0 - 1440(min)	0
	Bluetooth Report Mask	4	0000 - FFFF	0D03
	Bluetooth Event Mask	4	0000 - FFFF	3
	PIN Code Mode	1	0 | 1	0
	PIN Code	4|6	'0'–'9'	123456
	Reserved	0		
	Reserved	0		
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Scan Interval	<=5	4 - 65535(x0.625ms)	400
	Scan Window	<=5	4 - 65535(x0.625ms)	240
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of the Bluetooth.

- **0** - Disable Bluetooth.
- **1** - Enable Bluetooth.

✧ *Bluetooth Name*

The name of the device for Bluetooth identification. The "%IMEI" in the Bluetooth broadcast name is replaced with "_" and IMEI number.

✧ *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 met.

✧ *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** - Reserved
- **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.

This mask is valid for **+RESP:GTBCS**, **+RESP:GTBDS** messages.

✧ *Bluetooth Event Mask*

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

- **Bit 0** - for **BCS** (ASCII)/(HEX)
- **Bit 1** - for **BDS** (ASCII)/(HEX)

✧ *PIN Code Mode*

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.

✧ *Scan Interval*

Frequency of scanning.

✧ *Scan Window*

The duration of each scan.

Note

The <Scan Interval> and <Scan Window> determine the scanning frequency and scanning time of the controller. When the <Scan Interval> and <Scan Window> are set to the same value, scanning continues. The <Scan Window> cannot be larger than the <Scan Interval>.

3.3.2 BAS (Bluetooth Accessory)

The command **AT+GTBAS** is used for device scanning or connecting Bluetooth accessories to obtain data such as humidity and temperature. To use this command, the parameter <Mode> in the command (AT+GTBTS) must be enabled.

Example:
AT+GTBAS=gb100cg,0,6,5,WTH301,7805412CF340,7FFF,30,2400,,0,0,10,2,300,0,20,30,2,300,,,,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	BAS	BAS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Index	1	0 - 9	0

Parts	Fields	Length	Range/Format	Default
	Accessory Type	<=2	0 | 6 | 12 | 13 | 15	0
	Accessory Model	1	0 | 4 | 5	0
	Accessory Name	<=20	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'	
	Accessory MAC	12	000000000000 - FFFFFFFFFFFF	FFFFFFFFFFFF
	Accessory Append Mask	<=8	0 - 7FFFF|7FFFFFFF	7FFF
	Reserved	0		
	Low Voltage Threshold	<=4	0 - 5000(mV)	2400
	Reserved	0		
	Accessory Parameters (Optional)			
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *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.
- **6** - Multi-functional beacon sensor.
- **12** - BLE TPMS sensor.
- **13** - Relay Bluetooth accessory.
- **15** - Movement-angle BLE sensor.

✧ *Accessory Model*

The model of the Bluetooth accessory which is defined in <Accessory Type>.

The following is supported now:

- The model of multi-functional beacon sensor (<Accessory Type> is 6):
  - **4** - WMS301 (Door sensor with embedded temperature and humidity sensor)
  - **5** - WTH301 (Temperature and humidity sensor)
- The model of TPMS sensor accessory (<Accessory Type> is 12):

  - **0** - MLD BLE TPMS (ATP100/ ATP102)
- The model of Relay sensor (<Accessory Type> is 13):
  - **0** - WRL300 sensor
- The model of Movement-angle BLE sensor (<Accessory Type> is 15):
  - **0** - WID320G (Used to check the motion/crash/tilt/fall status)

  Note

  Please use APP(NFC_Config_Tool_1.1.apk) to enable accessory broadcast and features.

✧ *Accessory Name*

The name of the Bluetooth accessory. For details about whether the accessory can be connected by name, please refer to Appendix.

✧ *Accessory MAC*

The MAC address of the Bluetooth accessory. If <Accessory MAC> of the Bluetooth accessory is valid and the MAC address of the Bluetooth accessory is unique, the device will use the MAC address to scan or connect Bluetooth accessories. If <Accessory MAC> is the default value, the device will search for the Bluetooth accessory by accessory name.

✧ *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 **ERI** (ASCII)/(HEX) instead of **FRI** (ASCII)/(HEX).

This mask is used to configure the accessory data fields to be reported in the **ERI** (ASCII)/(HEX) and **BAA** (ASCII)/(HEX). messages. To obtain the <Accessory Append Mask> supported by the accessory, refer to the (BLE Accessory Appendix).

If Bit14 is set to 1, the device will report <Relay state> but not report <Relay Config Result> in the message (+RESP:GTERI).

Mask Bit	Item	Description
Bit 0	<Accessory Name>	Accessory name
Bit 1	<Accessory MAC>	Accessory MAC
Bit 2	<Accessory Status>	Accessory Bluetooth connection status
Bit 3	<Accessory Battery Level>	Accessory battery level
Bit 4	<Accessory Temperature>	Accessory temperature
Bit 5	<Accessory Humidity>	Accessory humidity
Bit 6	Reserved	Reserved
Bit 7	Reserved	Reserved
Bit 8	Reserved	Reserved
Bit 9	<Tire pressure>	Tire pressure
Bit 10	<Timestamp>	Timestamp
Bit 11	<Enhanced Temperature>	Enhanced temperature
Bit 12	Reserved	Reserved
Bit 13	<Accessory Battery Percentage>	Accessory battery percentage

Mask Bit	Item	Description
Bit 14	<Relay Data>	Including <Relay Config Result>, <Relay State>
Bit 15	<Expansion Mask>	Expanded mask for Bit 16 - Bit 31
Bit 16	<Tri-axial Acceleration Data>	Tri-axial acceleration data
Bit 17	<Angle Values>	Angle values
Bit 18	<Sensor Event Mask>	Including <Event Mask>, <Tilt Event>, <Motion Event>, <Crash Event>, <Falling Event>
Bit 21	<Accessory RSSI>	Accessory RSSI
Bit 22 - Bit 30	Reserved	Reserved

✧ *Low Voltage Threshold*

It specifies the lower voltage limit. When the voltage of Bluetooth accessory is below this value, the device will report message **BAA** (ASCII)/(HEX) to the backend server. 0 means "Disable low voltage detection".

Note

The two functions of **AT+GTBAS** cannot be used at the same time.<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.

✧ *Accessory Parameters (Optional)*

Some parameters for Bluetooth accessories. For different Accessory Types, there are different definitions.

If the Accessory Type is **6** (Multi-functional beacon sensor), <Accessory Parameters (Optional)> will be unfolded as follows.

Fields	Length	Range/Format	Default
Temperature Mode	1	0 - 3	0
Low Temperature	<=3	-40 - 80 (℃)	0
High Temperature	<=3	-40 - 80 (℃)	10
Temperature Validity	<=2	1 - 10(s)	2
Temperature Send Interval	<=5	30 - 43200(s)	300
Humidity Mode	1	0 - 3	0
Low Humidity	<=3	0 - 100 (rh)	20
High Humidity	<=3	0 - 100 (rh)	30
Humidity Validity	<=2	1 - 10(s)	2
Humidity Send Interval	<=5	30 - 43200(s)	300

The device will report the **BAA** (ASCII)/(HEX) message to the backend server when the temperature and humidity meet 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 in centigrade.
- *High Temperature*
  It specifies the upper temperature limit in centigrade.
- *Temperature Validity*
  If the sensor detects that the ambient temperature meets the alarm condition, it will continuously check the temperature. If the temperature keeps meeting the alarm condition for <Temperature Validity> times, the temperature alarm will be triggered.
- *Humidity Mode*
  The working mode of the humidity alarm.
  - **0** - Disable humidity alarm.
  - **1** - Report humidity alarm if the current humidity is within the humidity range defined by <Low Humidity> and <High Humidity>.
  - **2** - Report humidity alarm if the current humidity is outside the humidity range defined by <Low Humidity> and <High Humidity>.
  - **3** - Report humidity alarm only once if the current humidity enters or exits the humidity range defined by <Low Humidity> and <High Humidity>. In this mode, <Humidity Send Interval> will be ignored.
- *Low Humidity*
  It specifies the lower humidity limit.
- *High Humidity*
  It specifies the upper humidity limit.
- *Humidity Validity*
  If the sensor detects that the ambient humidity meets the alarm condition, it will continuously check the humidity. If the humidity keeps reaching to the alarm condition for <Humidity Validity> time, the humidity alarm will be triggered.

If the Accessory Type is **12** (BLE TPMS sensor), this parameter will work as follows.

Fields	Length	Range/Format	Default
Reserved			
Tire Pressure Alarm Mode	1	0 - 3	0
Low Tire Pressure	<=3	0 - 500(kPa)	150
High Tire Pressure	<=3	0 - 500(kPa)	300
Validity	<=2	1 - 10	2

Fields	Length	Range/Format	Default
Alarm Send Interval	<=5	0 - 86400(s)	60
Available Validity Time	<=5	60 - 86400(s)	60

The device will report the **BAA** (ASCII)/(HEX) message to the backend server when the tire pressure keeps meeting alarm conditions.

- *Tire Pressure Alarm Mode*
  The working mode of the tire pressure alarm.
  - **0** - Disable tire pressure alarm.
  - **1** - Report tire pressure alarm if the current tire pressure is within the tire pressure range defined by <Low Tire Pressure> and <High Tire Pressure>.
  - **2** - Report tire pressure alarm if the current tire pressure is outside the tire pressure range defined by <Low Tire Pressure> and <High Tire Pressure>.
  - **3** - Report tire pressure alarm only once if the current tire pressure enters/exits the tire pressure range defined by <Low Tire Pressure> and <High Tire Pressure>. In this mode, <Alarm Send Interval> will be ignored.
- *Low Tire Pressure*
  The lower tire pressure limit.
- *High Tire Pressure*
  The upper tire pressure limit.
- *Validity*
  If the tire pressure keeps meeting the alarm condition for <Validity> times, the tire pressure alarm will be triggered.
- *Alarm Send Interval*
  After the <Validity> checking, the device will report tire pressure alarm every <Alarm Send Interval> times of tire pressure reading based on reading timer of the tire pressure sensor. If <Alarm Send Interval> is set to 0, the device will only report the tire pressure alarm once.
- *Available Validity Time*
  If the device does not detect the tire pressure sensor in the <Available Validity Time>, the <Accessory Status> in the message **+RESP:GTERI** report messages will be 0.

If the Accessory Type is **13** (Relay Bluetooth accessory), this parameter will work as follows.

Fields	Length	Range/Format	Default
Relay Event Notification	1	0 | 1	0
Password	<=6	'0'-'9' 'a'-'z' 'A'-'Z'	123456
New Password	<=6	'0'-'9' 'a'-'z' 'A'-'Z'	123456
Reserved			
Reserved			

- *Relay Event Notification*
  It configures whether to enable relay event notification function.
  - **0** - Disable.
  - **1** - Enable. If a new event occurs on the accessory, the device will report the **BAA** (ASCII)/(HEX) message.
- *Password*

It is the current password for the accessory device.

- *New Password*

  It is set to change the current password.

Note

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

3.3.3 BID (Bluetooth Beacon ID)

The command **AT+GTBID** is used for the device to scan Bluetooth beacon accessories and report the scanning results via **BID** (ASCII)/(HEX) messages. To use this function, the parameter <Mode> in the command (AT+GTBTS) must be 1.

Example:
AT+GTBID=gb100cg,0,1,0,000A,2400,,1,10,78054101F565,78054101F58D,78054101F55A,78054101F547,7805410FF00B,78054101F4E2,78054101F5C4,78054101E546,78054101E652,78054101E641,0,0,30,,,AC233F,,,,,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	BID	BID
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Index	1	0 - 2	0
	Mode	1	0-2	0
	Beacon ID Model	1	0 | 2 | 4 | 9	0
	Accessory Append Mask	<=4	0000 - FFFF	000A
	Low Voltage Threshold	<=4	0 - 5000(mV)	2400
	Reserved	0		
	Start Index	<=3	1 - 300	
	End Index	<=3	1 - 300	
	MAC List	<=12*75		
	Accessory Parameters(Optional)			
	OUI	6	000000 - FFFFFF	
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Index*

The index of the beacon Bluetooth accessory.

✧ *Mode*

The working mode of this function.

- **0** - Disable
- **1** - MAC or OUI
- **2** - UUID

Note

Mode 2 only valid when <Beacon ID Model> is ID ELA accessory or CARLOCK accessory and it is necessary to configure the corresponding UUID using the (AT+GTBFS) command.

✧ *Beacon ID Model*

The model of the beacon Bluetooth accessory. The following is supported now:

- **0** - WKF300
- **2** - ID ELA
- **4** - WID310
- **9** - CARLOCK

Note

When set to model 9, **+RESP:GTBFS** will replace **+RESP:GTBID**.

✧ *Accessory Append Mask*

Bitwise mask to configure the composition of Bluetooth accessory information in messages **BAA** (ASCII)/(HEX), **BID** (ASCII)/(HEX) .

- **Bit 0** - Reserved
- **Bit 1** - <Accessory MAC>
- **Bit 2** - Reserved
- **Bit 3** - <Accessory Battery Level>
- **Bit 4** - Reserved
- **Bit 5** - Reserved
- **Bit 6** - <Accessory Signal Strength>
- **Bit 7** - <Beacon Type> and <Beacon Data>

✧ *Low Voltage Threshold*

It specifies the lower voltage limit. When the voltage of the Bluetooth accessory falls below this value, the device will report the message **+RESP:GTBAA** to the backend 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 number of MAC addresses that will be updated. If either one is empty, there should be no <MAC List> following the empty value. A maximum of 75 MAC addresses can be updated each time.

✧ *MAC List*

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

Note

If more accessories are needed, please adjust <Start Index> and <End Index> for appropriate setup. If some MAC addresses in <MAC List> are empty, then the corresponding MAC addresses will be deleted.

For example, to delete the 4th, 5th and 6th MAC addresses of the <MAC List>, please set <Start Index> to 4 and set <End Index> to 6 and keep those three MAC addresses of <MAC List> empty.

The maximum number of MAC addresses for all indexes is 300.

✧ *Accessory Parameters(Optional)*

Some parameters for Bluetooth Beacon. For different Beacons, there are different definitions.

If Beacon ID Model is **0** (WKF300), the following parameters are used:

Fields	Length	Range/Format	Default
Push Button Event	1	0 | 1	0
Keyfob Detection Mode	1	0-2	0
Keyfob Detection Interval	<=3	30 - 600(s)	30
Reserved	0		
Reserved	0		

- *Push Button Event*

  If this parameter is set to 1 and the button on WKF300 is pushed, the device will report the message **BAA** (ASCII)/(HEX) to the backend server.

- *Keyfob Detection Mode*

  It specifies the mode of detecting Keyfob.

  – **0** - Disable Keyfob detection.

  – **1** - Scan only once after entering the ignition on and moving state.

  After entering ignition on and moving state, the device will scan Keyfob once for the time period specified by <Keyfob Detection Interval> and then send the message **BID** (ASCII)/(HEX) to report information of Keyfob. If more than 3 Keyfobs are detected, the message **+RESP:GTBID** contains information of the top 3 Keyfobs with the strongest signal.

  – **2** - Scan continuously after entering the ignition on and moving state.

  If the device detects Keyfob or change of available Keyfob, it will send the message **+RESP:GTBID** to report information of Keyfob. If more than 3 Keyfobs are detected, the message **+RESP:GTBID** contains information of the top 3 Keyfobs with the strongest signal.

- *Keyfob Detection Interval*

  The device scans Keyfob for the time period specified by this parameter.

If Beacon ID Model is **2** (ID ELA), the following parameters are used:

Fields	Length	Range/Format	Default
Alarm Mode	1	0 - 3	0
IDELA Detection Mode	1	0 - 3	0
IDELA Detection Interval	<=3	30 - 600(s)	30
Reserved	0		
Reserved	0		

- *Alarm Mode*

  It specifies the mode of alarm report.

  – **0** - Disable alarm.
  – **1** - Alarm when receiving Bluetooth broadcast.
  – **2** - Alarm when Bluetooth broadcast is not received.
  – **3** - Alarm when receiving Bluetooth broadcast or exiting Bluetooth broadcast.

- *IDELA Detection Mode*

  It specifies the mode of detecting ID ELA.

  – **0** - Disable detection.
  – **1** - Enable detection: Allow the device to scan only once.
  After entering ignition on and moving state, the device will scan IDELA one time for the time period specified by <IDELA Detect Interval> and then it will send the message **+RESP:GTBID** to report information of IDELA. If more than 15 IDELA are detected, the message **+RESP:GTBID** contains the information of the top 15 IDELA.
  – **2** - Enable detection: Allow the device to scan continuously.
  After entering ignition on and moving state, the device will keep scanning IDELA continuously. If the device detects IDELA or change of available IDELA, it will send the message **+RESP:GTBID** to report information of IDELA. If more than 15 IDELA are detected, the message **+RESP:GTBID** contains the information of the top 15 IDELA.
  – **3** - Enable detection: Allow the device to scan continuously.
  If the device detects IDELA or change of available IDELA, it will send the message **+RESP:GTBID** to report information of IDELA. If more than 15 IDELA are detected, the message **+RESP:GTBID** contains the information of the top 15 IDELA.

- *IDELA Detection Interval*

  The device scans IDELA for the time period specified by this parameter.

If Beacon ID Model is **4** (WID310), the following parameters are used:

Fields	Length	Range/Format	Default
Reserved	0		
Detection Mode	1	0 | 2 | 3	0
Detection Interval	<=3	30 - 600(s)	30
IGN Scan & Report Interval	<=5	0 | 10 - 86400(s)	60
IGF Scan & Report Interval	<=5	0 | 10 - 86400(s)	60

- *Detection Mode*

  The parameter which specifies the mode of detecting WID310.

- **0** - Disable detection.
- **2** - Enable detection: Allow the device to scan continuously.
  After entering ignition on and moving state, the device will keep scanning WID310 continuously. If the device detects WID310 or change of available WID310, it will send the **+RESP:GTBID** messages to report information of WID310. If more than 15 WID310 are detected, the message **+RESP:GTBID** contains the information of the top 15 WID310.
- **3** - Enable detection: Allow the device to scan continuously.
  The **+RESP:GTBID** message is sent to the backend server periodically according to the parameter <IGN Scan & Report Interval>/< IGF Scan & Report Interval>. If more than 15 WID310 are detected, the message **+RESP:GTBID** contains the information of the top 15 WID310.

- *Detection Interval*
  The device scans WID310 for the time specified by this parameter when <Detection Mode> is 2.
- *IGN Scan & Report Interval*
  The time interval for sending **+RESP:GTBID** messages when the engine is on and <Detection Mode> is 3.
- *IGF Scan & Report Interval*
  The time interval for sending **+RESP:GTBID** messages when the engine is off and <Detection Mode> is 3.

If Beacon ID Model is **9** (CARLOCK), the following parameters are used:

Fields	Length	Range/Format	Default
Reserved	0		
Detection Mode	1	0 | 3	0
Detection Interval	<=3	30 - 600 (s)	60
Lost Count	<=3	1 - 120	6
Reserved	0		

- *Detection Mode*
  It specifies the mode of detecting CARLOCK.
  - **0** - Disable detection.
  - **3** - Enable detection: Allow the device to scan continuously.
    If the device detects UUID or change of available UUID, it will send the message **BFS** (ASCII)/(HEX) to report information of CARLOCK accessory.
- *Detection Interval*
  The device will check whether the scanned iBeacon is lost accordingly.
- *Lost Count*
  The device will send the **+RESP:GTBFS** message when one iBeacon is not scanned within <Lost Count> * <Scan Interval> seconds.

✧ *OUI*

It is the first three bytes of Bluetooth address, which is composed of NAP and UAP. Only one Organization Unique Identifier (OUI) is allowed for each type of Bluetooth accessory.

For example, "AC233F" represents the Bluetooth iBeacon E6. The "AC23" is NAP, the "3F" is

UAP. If the device detects this OUI, the message **+RESP:GTBID** will be reported. If the value is empty, it means "Disable this function".

3.3.4 BTD (Bluetooth Accessory Data)

The command **AT+GTBTD** is used for the device to report message **BTD** ((ASCII)) to the backend server. This command is only valid for bluetooth accessory WID320G.

Example:
AT+GTBTD=gb100cg,,0,0,,7,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	BTD	BTD
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Reserved	0		
	Bind BAS Index	1	0 - 9	0
	Send Interval	<=5	0 - 86400(s)	0
	Reserved	0		
	Data Mask	<=8	0 - 7FFFFFFF	7
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

- *Password*
  The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".
- *Bind BAS Index*
  It is used to bind the specific configuration in (AT+GTBAS).
- *Send Interval*
  The interval for sending bluetooth accessory data. The value range is 0 - 86400. Unit: second.
- *Data Mask*
  This mask is used to configure the accessory data fields to be reported in the **+RESP:GTBTD** messages.

Bit	Item	Description
Bit 0	<Accessory Name>	Accessory Name
Bit 1	<Accessory MAC>	Accessory MAC
Bit 2	<Accessory Status>	Accessory Bluetooth connection Status

Bit	Item	Description
Bit 3	<Accessory Battery Level>	Accessory Battery Level
Bit 4	<Accessory Temperature>	Accessory Temperature
Bit 5	<Enhanced Temperature>	Enhanced Temperature
Bit 6	<Tri-axial Acceleration Data>	Tri-axial Acceleration Data
Bit 7	<Angle Values>	Angle Values
Bit 8	<Sensor Event Mask>	Including <Event Mask>, <Tilt Event>, <Motion Event>, <Crash Event>, <Falling Event>
Bit 9	<Accessory RSSI>	Accessory RSSI
Bit 19 - Bit 31	Reserved	Reserved

3.3.5 SVR (Stolen Vehicle Recovery)

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

Example:
AT+GTSVR=gb100cg,0,78054125E8D8,10,1,863574046024485,0,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	SVR	SVR
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0 | 1	0
	Ghost MAC Address	12	000000000000 - FFFFFFFFFFFF	

Parts	Fields	Length	Range/Format	Default
	Connect Interval	<=4	10 | 20 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 720 | 1440	10
	Connect Fail Count	<=2	1 - 10	1
	Match Connected IMEI	15	'0'–'9'	
	BTI Report Interval	<=4	0 - 1440	0
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of the Primary device's stolen vehicle recovery function.

- **0** - Disable.
- **1** - Enable this function as Primary device.

Note

If <Mode> in **AT+GTSVR** is set to 1, the broadcast service for (AT+GTBTS) will not work.

✧ *Ghost MAC Address*

The MAC address of the Ghost device which is used to pair with the Primary device.

✧ *Connect Interval*

The maximum amount of time allowed for the Ghost device to establish a connection with the Primary device. Unit: minute.

Note

The parameter <Connect Interval> for the Ghost device should be set to a value less than or equal to the <Connect Interval> set for the Primary device.

✧ *Connect Fail Count*

The maximum number of connection failures between the Primary device and the Ghost device.

✧ *Match Connected IMEI*

The IMEI of the Ghost device which is used to match with the Primary device.

✧ *BTI Report Interval*

It specifies the interval for reporting the **BTI** (ASCII)/(HEX) message regarding the status and Bluetooth information of the Ghost device.

0 means "Disable the **+RESP:GTBTI** report". Unit: minute.

Note

If the connection between the Primary device and the Ghost device fails, the message **+RESP:GTBTI** will not be reported.

3.3.6 BFS (Bluetooth Fields Settings)

The command **AT+GTBFS** is specifically used to configure Bluetooth fields scanned with the (AT+GTBID) command.

Example:
AT+GTBFS=gb100cg,0,,,0,0,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	BFS	BFS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Reserved	0		
	Reserved	0		
	Reserved	0		
	UUID Numbers	<=2	0 - 10	0
	UUID 1(Optional)	32	HEX	
	UUID 2(Optional)	32	HEX	
	UUID 3(Optional)	32	HEX	
	...			
	UUID 8(Optional)	32	HEX	
	UUID 9(Optional)	32	HEX	
	UUID 10(Optional)	32	HEX	
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

- *Password*
  The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".
- *UUID Numbers*
  The number of <UUID>.
- *UUID*
  When the parameter <Mode> of **AT+GTBID** is set to 2, the device detects Bluetooth accessories by UUID.

Note

If <UUID> is empty, the corresponding value will be deleted. The total number of valid values of <UUID> in all indexes cannot exceed 10.

3.4 Tracking Settings

This section describes the commands related to the location messages. Please refer to the details below.

3.4.1 FRI (Fixed Report Information)

The command **AT+GTFRI** is used to configure the parameters for fixed report **FRI** (ASCII)/(HEX) or **ERI** (ASCII)/(HEX).

Example:
AT+GTFRI=gb100cg,0,1,0,1,0000,0000,0,30,1000,1000,,0,600,00000000,,,0,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	FRI	FRI
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0-5	0
	Discard No Fix	1	0 | 1	1
	(Compressed Report)	1	0-2	0
	Period Mode	1	0 | 1	1
	Start Time	4	HHMM	0000
	End Time	4	HHMM	0000
	Check Interval	<=5	0 - 86400(s)	0
	Send Interval	<=5	1 - 86400(s)	30
	Distance	<=5	50 - 65535(m)	1000
	Mileage	<=5	50 - 65535(m)	1000
	Reserved	0		
	Corner Value	<=3	0 - 180	0
	IGF Report Interval	<=5	0 - 86400(s)	600
	ERI Mask	8	00000000 - FFFFFFFF	0
	Reserved	0		
	Reserved	0		
	Wrap Corner Point	1	0 | 1	0

Parts	Fields	Length	Range/Format	Default
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *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>.
- **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>.
- **4** - Optimum Report.
  The device simultaneously checks both time interval and path length between two adjacent position reports. 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 the path between the current position and the last position is greater than <Mileage>.
- **5** - Fixed Time or Mileage Report.
  It checks either time interval or path length between two adjacent reports. Device position will be reported if the calculated time interval between current time and time of last report is greater than <Send Interval>, or the length of path between the current position and the last position is greater than <Mileage>.

Note

1. For mode 2/3/4/5, the vehicle ignition signal should be connected to the specified digital input port of the device or enabling virtual ignition detection.
2. If the engine is off, the position report message will be sent to the backend server periodically according to the parameter <IGF Report Interval>.

✧ *Discard No Fix*

Enable/disable report when there is no GNSS fix.

- **0** - Enable.
- **1** - Disable.

✧ *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. The +CRI message 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 Mode*

Enable/disable the time range specified by <Start Time> and <End Time>. If the time range is enabled, the position reporting will be limited within the time range.

✧ *Start Time*

The start time of the fixed report. The valid format is "HHMM". The value range of "HH" is "00"-"23". The value range of "MM" is "00"-"59".

✧ *End Time*

The end time of the fixed report. The valid format and range are the same as those of <Start Time>.

✧ *Check Interval*

The interval for updating GNSS position. If the parameter value is 0, the device will update GNSS position according to the value of <Send Interval>. Make sure <Check Interval> is not greater than <Send Interval> so that position data is ready before sending time arrives.

✧ *Send Interval*

The interval for sending the position information. If <Report Mode> in (AT+GTSRI) is set to forced SMS mode, this parameter should not be less than 15 seconds, otherwise the device will send the position information via TCP short connection.

Note

Due to the limit of the maximum report message length, make sure the <Send Interval>/<Check Interval> ratio is less than or equal to 15.

✧ *Distance*

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

✧ *Mileage*

The specified length for sending the position information when <Mode> is 3/4/5. Unit: meter.

✧ *Corner Value*

A numeral indicating whether to report **+RESP:GTFRI** message based on change in the direction of device movement.

- **0** - Disable.
- **1 - 180** - The angle used to determine whether the device turns around a corner. If the change in the direction of device movement is greater than the specified value, the device is considered turning around a corner. Unit: degree.

Note

If FRI multi-point report occurs at the same time with 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 interval for acquiring and sending the position information when <Mode> is not 0 and <Power Saving Mode> in (AT+GTCFG) is set to 0 or 2 with engine off. If <IGF Report Interval> is less than 60 seconds, the GNSS will be always on.

✧ *ERI Mask*

When the device is connected with a peripheral, and the 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 5** - Reserved.
- **Bit 8** - For the <Bluetooth Accessory Data> field in **+RESP:GTERI**.
- **Bit 9** - Reserved.
- **Bit 20** - For the <CSQ RSSI|RSRP and CSQ BER> field in **+RESP:GTERI**. This mask only works in ASCII-formatted **+RESP:GTERI** message.

✧ *Wrap Corner Point*

A numeral to indicate whether to wrap corner point with other fixed GNSS points and wait to send **+RESP:GTFRI** message according to the value of <Mode>.

- **0** - Do not wrap corner point and send the corner point immediately when it is found.
- **1** - Wrap corner point and wait to send **+RESP:GTFRI** according to the value of <Mode>.

Note

If <Wrap Corner point> is set to 1, all the wrap corner points and normal points will be influenced by (AT+GTOWH) if it is used.

3.4.2 FFC (Frequency Change of FRI)

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

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

Example:
AT+GTFFC=gb100cg,0,1,0,30,500,500,300,0,0,,,0000$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT

Parts	Fields	Length	Range/Format	Default
	Command Word	3	FFC	FFC
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Priority	1	0 - 4	0
	Mode	1	0-4	0
	FRI Mode	1	0-5	0
	FRI IGN Report Interval	<=5	1 - 86400(s)	30
	FRI Report Distance	<=5	50 - 65535(m)	500
	FRI Report Mileage	<=5	50 - 65535(m)	500
	FRI IGF Report Interval	<=5	0 | 5 - 86400(s)	300
	FRI IGN Check Interval	<=5	0 - 86400(s)	0
	Corner Value	<=3	0 - 180	0
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Priority*

The priority of the event which triggers the change of fixed report parameters. 0 means "The highest priority".

✧ *Mode*

It specifies the trigger event for the fixed report parameter change.

- **0** - Disable the parameters of the specified priority.
- **1** - Change the fixed report parameters when the device enters any of the defined Geo-Fence.
- **2** - Change the fixed report parameters when the device enters known roaming state. Please refer to the (AT+GTRMD) command for more information.
- **3** - Change the fixed report parameters when the device enters unknown 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 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 interval for sending the position information when the ignition is on. Unit: second.

✧ *FRI Report Distance*

The specified distance for sending the position information when the mode is fixed distance report. Unit: meter.

✧ *FRI Report Mileage*

The specified path length for sending the position information when the mode is fixed mileage report or optimum report. Unit: meter.

✧ *FRI IGF Report Interval*

The interval for fixing and sending the position information when the ignition is off and <Power Saving Mode> in (AT+GTCFG) is set to 0 or 2. Unit: second.

✧ *FRI IGN Check Interval*

The interval for GNSS fix. Unit: second.

✧ *Corner Value*

A numeral indicating whether to report **+RESP:GTFRI** message based on change in the direction of device movement.

- **0** - Disable.
- **1 - 180** - The angle used to determine whether the device turns around a corner. If the change in the direction of device movement is greater than the specified value, the device is considered turning around a corner. Unit: degree.

3.5 Alarm Settings

This section describes the commands related to the alarm settings. Please refer to the details below.

3.5.1 CRA (Crash Detection)

The command **AT+GTCRA** is used to configure the parameters for crash detection. When the current acceleration in a certain direction exceeds the configured threshold, the device will report the **CRA** (ASCII)/(HEX) event message and data packets **CRD**(ASCII)/(HEX) to the backend server.

Example:
AT+GTCRA=gb100cg,1,50,50,50,0,500,500,,,,,0,0,2,2,0,0,30,30,,,,,,,0019$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	CRA	CRA
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg

Parts	Fields	Length	Range/Format	Default
Body	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 Mode	1	0 | 1	0
	Samples Before Crash	<=4	0 - 3200	500
	Samples After Crash	<=4	0 - 3200	500
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Report ACC Mode	1	0 | 1	0
	Report GNSS Mode	1	0 | 1	0
	CRA Debounce Time	1	0 - 9(x10ms)	2
	Sampling Frequency Mode	1	2-5	2
	Report Gyro Data	1	0 | 1	0
	Acceleration Direction Control	1	0 | 1	0
	GNSS Time Before Crash	<=3	0 - 120(x1s)	30
	GNSS Time After Crash	<=3	0 - 120(x1s)	30
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of the crash detection function.

- **0** - Disable.
- **1** - Enable. In this mode, no three-axis self-calibration is required.
- **2** - Enable. 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 the vehicle travels; the positive Y-axis is perpendicular to X-axis, and the direction conforms to the right-hand rule; and the 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 **ASC** (ASCII)/(HEX) event.

✧ *Threshold_X*

The acceleration threshold for crash in X direction. The smaller the parameter, the easier it is to detect crash events. If <Threshold_X> is 0, the device will not monitor crash event in X-axis. The unit is 0.1g.

✧ *Threshold_Y*

The acceleration threshold for crash in Y direction. The smaller the parameter, the easier it is to detect crash events. If <Threshold_Y> is 0, the device will not monitor crash event in Y-axis. The unit is 0.1g.

✧ *Threshold_Z*

The acceleration threshold for crash in Z direction. The smaller the parameter, the easier it is to detect crash events. If <Threshold_Z> is 0, the device will not monitor crash event in Z-axis. The unit is 0.1g.

✧ *Sampling Start Mode*

A numeral to indicate when to start sampling acceleration data.

- **0** - Start acceleration sampling after the device is powered on.
- **1** - Start acceleration sampling when ignition is on.

✧ *Samples Before Crash*

The number of recorded XYZ-axis acceleration samples before crash.

When <Report Gyro Data> is 0, this parameter represents the number of recorded XYZ-axis acceleration samples before crash. When <Report Gyro Data> is 1, this parameter represents the number of recorded XYZ-axis acceleration and gyroscope data samples before crash.

✧ *Samples After Crash*

The number of recorded XYZ-axis acceleration samples after crash.

When <Report Gyro Data> is 0, this parameter represents the number of recorded XYZ-axis acceleration samples after crash. When <Report Gyro Data> is 1, this parameter represents the number of recorded XYZ-axis acceleration and gyroscope data samples after crash.

✧ *Report ACC Mode*

A numeral which indicates whether to report the acceleration data to the backend server.

- **0** - Disable the acceleration report.
- **1** - Enable the acceleration report. The device will report 75 sets of tri-axial acceleration data to the backend server in the message **ACC** (ASCII)/(HEX).

✧ *Report GNSS Mode*

A numeral which indicates whether to report the GNSS information of <GNSS Time Before Crash> seconds before crash and <GNSS Time After Crash> seconds after crash to the backend server.

- **0** - Disable the GNSS information report.
- **1** - Enable the GNSS information report. The device will report the GNSS information of <GNSS Time Before Crash> seconds before crash and <GNSS Time After Crash> seconds after crash to the backend server in the message **+RESP:GTCRG**.

✧ *CRA Debounce Time*

The debounce time for crash event to avoid accidental triggering.

✧ *Sampling Frequency Mode*

This parameter defines the sampling frequency of data in the message **+RESP:GTCRD**.

Sampling Frequency Mode	Frequency(Hz)
2	100
3	200
4	400
5	800

✧ *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 which direction of the acceleration on X-axis and Y-axis is used 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.

✧ *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.

3.5.2 GEO (Geo-Fence)

The command **AT+GTGEO** is used to configure the parameters of circular Geo-Fence. Circular Geo-Fence is a virtual perimeter around a geographic area using a location-based service. When the terminal with geo-fencing enters or exits the area, a notification containing information about the terminal's location is generated that can be sent to the backend server.

Example:
AT+GTGEO=gb100cg,0,3,112.129273,32.839031,50,0,,,,,0,0,0000,0000,0,000A$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	GEO	GEO
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	ID	<=2	0 - 19	
	Mode	1	0-3	0
	Longitude	<=11	(-)xxx.xxxxxx	
	Latitude	<=10	(-)xx.xxxxxx	
	Radius	<=7	50 - 6000000(m)	50

Parts	Fields	Length	Range/Format	Default
	Check Interval	<=5	0 | 5 - 86400(s)	0
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Trigger Mode	<=2	0 | 21 | 22	0
	Trigger Report	1	0 | 1	0
	Start Time	4	HHMM	0000
	End Time	4	HHMM	0000
	State Mode	1	0 | 1	0
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *ID*

The ID of the circular Geo-Fence. A total of 20 zones (0 - 19) are supported.

✧ *Mode*

The working mode for the device to report the Geo-Fence message **GIN**(ASCII)/(HEX) or **GOT**(ASCII)/(HEX) to the backend server.

- **0** - Disable the zone's circular Geo-Fence function.
- **1** - Enter the zone. The device will send the message **+RESP:GTGIN** to the server when the vehicle enters the Geo-Fence.
- **2** - Exit the zone. The device will send the message **+RESP:GTGOT** to the server when the vehicle exits the Geo-Fence.
- **3** - Report **+RESP:GTGIN** and **+RESP:GTGOT** when entering and exiting the Geo-Fence respectively.

✧ *Longitude*

The longitude of a point which is defined as the center of the circular Geo-Fence. The unit is degree, and accuracy is 6 decimal places. West longitude is defined as negative starting with the sign "-" and east longitude is defined as positive without "+".

✧ *Latitude*

The latitude of a point which is defined as the center of the circular Geo-Fence. 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. Unit: meter.

✧ *Check Interval*

The interval for GNSS to check location information based on Geo-Fence alarms.

✧ *Trigger Mode*

A numeral to indicate the trigger mode of the Geo-Fence function.

- **0** - Disable automatic triggering.
- **21** - Automatic parking fence.
  Automatically set up 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 off. It will only send the alarm report when the device exits the Geo-Fence, and the Geo-Fence will be cancelled after the device exits the zone.
- **22** - Manual parking fence.
  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 off. It will only send the alarm report when the device exits the Geo-Fence. After the device exits the Geo-Fence, it will cancel the Geo-Fence and disable the trigger mode at the same time. If the driver wants to use this trigger mode again, he has to manually set the trigger mode again.

✧ *Trigger Report*
Whether to report the **GES** (ASCII)/(HEX) message when the specified trigger mode is activated or the Geo-Fence is cancelled.
- **0** - Disable the **+RESP:GTGES** report.
- **1** - Enable the **+RESP:GTGES** report.

✧ *Start Time*
The time to start monitoring when the device enters or exits the Geo-Fence. The valid format is "HHMM". The value range of "HH" is "00"-"23". The value range of "MM" is "00"-"59".

✧ *End Time*
The time to end monitoring when the device enters or exits the Geo-Fence. The valid format and range are the same as those of <Start Time>.

✧ *State Mode*
The mode for reporting the device's GEO state.
- **0** - Report when getting the GEO state for the first time.
- **1** - Do not report until the GEO state changes.

3.5.3 HBM (Harsh Behavior Monitoring)

The command **AT+GTHBM** is used to monitor the harsh driving behavior based on GNSS or motion sensor. The same harsh behavior within 30 seconds will only be reported once if only GNSS is used to measure harsh driving behavior.

Example:
AT+GTHBM=gb100cg,1,3,1,100,5,5,,60,10,10,,,30,30,,,,,,25,50,20,50,,,25,50,0,0010$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	HBM	HBM
	Leading Symbol	1	=	=

Parts	Fields	Length	Range/Format	Default
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0-5	0
	Behavior Duration	1	3 - 5	3
	Discard Unknown Event	1	0 | 1	1
	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 Threshold	<=3	10 - 100	25
	Cornering Duration	<=3	10 - 250 (x10ms)	50
	Acceleration Threshold	<=3	5 - 100	20
	Acceleration Duration	<=3	10 - 250 (x10ms)	50
	Reserved	0		
	Reserved	0		
	Brake Threshold	<=3	10 - 100	25
	Brake Duration	<=3	10 - 250(x10ms)	50
	Report Mode	1	0-2	0
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of the harsh behavior monitoring function.

- **0** - Disable this function.

- **1** - Enable this function: Detected by GNSS only.
  In this mode, 2 harsh behaviors are monitored, namely 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 <Behavior Duration> seconds is greater than the corresponding threshold, the device will report the **HBM** (ASCII)/(HEX) message to the backend server to indicate the harsh behavior.
- **2** - Enable this function: Detected by motion sensor only.
  In this mode, three types of harsh behavior can be detected, namely 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: Detected by motion sensor or GNSS.
- **4** - Enable this function: Detected by motion sensor and GNSS.
- **5** - Enable this function: Detected by XYZ-axis acceleration data only.
  In this mode, the XYZ-axis data will be converted in accordance with 3-axis self-calibration.
  If the value change of the positive X-axis (vehicle driving direction) is greater than <Acceleration Threshold> for the time of <Acceleration Duration>, the device will report the message **+RESP:GTHBM** to the backend server to indicate harsh acceleration.
  If the value change of opposite direction of positive X-axis is greater than <Brake Threshold> for the time of <Brake Duration>, the device will report the message **+RESP:GTHBM** to indicate harsh braking behavior.
  If the value change of the Y-axis (left and right direction of vehicle moving direction) is greater than <Cornering Threshold> for the time of <Cornering Duration>, the device will report the message **+RESP:GTHBM** to indicate harsh cornering behavior, and the message **HBE** (ASCII)/(HEX) will be reported when the harsh behavior is over.
  Note
  The device will not detect harsh behavior until it has already detected the first **ASC** (ASCII)/(HEX) event.

✧ *Behavior Duration*

The speed change within <Behavior Duration> is measured.

✧ *Discard Unknown Event*

It configures whether to discard the **+RESP:GTHBM** message that indicates unknown harsh behavior.

- **0** - Do not discard unknown harsh behavior message.
- **1** - Discard unknown harsh behavior message.

✧ *High Speed, Medium Speed*

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

  The threshold for the motion sensor to measure whether the device is in harsh cornering.

- *Cornering Duration*

  A time parameter to measure whether the device enters harsh cornering. If the driving behavior is maintained for a period of time longer than <Cornering Duration>, the 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

state.

✧ *Acceleration Duration*

A time parameter to measure whether the device enters harsh acceleration state. If the driving behavior is maintained for a period of time longer than <Acceleration Duration>, the harsh acceleration event will be triggered.

✧ *Brake Threshold*

The threshold for the motion sensor to measure whether the device is in harsh braking state.

✧ *Brake Duration*

A time parameter to measure whether the device enters harsh braking state. If the driving behavior is maintained for a period of time longer than <Brake Duration>, the harsh braking event will be triggered.

✧ *Report Mode*

Whether to report **+RESP:GTHBE** / **+RESP:GTHBM** to the backend server.

- **0** - Do not report **+RESP:GTHBE**, only report **+RESP:GTHBM**.
- **1** - Report **+RESP:GTHBE** and **+RESP:GTHBM**.
- **2** - Do not report **+RESP:GTHBM**, only report **+RESP:GTHBE**.

Note

The threshold for harsh driving should be smaller than the threshold for crash in the (AT+GTCRA) command.

3.5.4 IDL (Excessive Idling Detection)

The command **AT+GTIDL** is used to detect the engine excessive idling (vehicle stays stationary while ignition is on). virtual ignition detection must be enabled. If the vehicle enters the idle state, the device will report the event message **IDN** (ASCII)/(HEX) to the backend server. If the vehicle exits the idle state, the device will report the event message **IDF** (ASCII)/(HEX) to the backend server.

Example:
AT+GTIDL=gb100cg,0,2,1,0,,,,,,,,,,000F$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	IDL	IDL
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	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 | 25 - 9999(m)	0

Parts	Fields	Length	Range/Format	Default
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of this function.

- **0** - Disable.
- **1** - Enable.

✧ *Time to Idling*

If the vehicle is detected to be stationary with ignition on within the period specified by this parameter, it is considered to be idling.

✧ *Time to Movement*

After entering the idle state, if the vehicle moves again and the moving state is maintained for the time specified by this parameter or ignition off is detected, it is considered to exit the idle state.

✧ *Debounce Distance*

After entering the idle state, if the vehicle moves more than <Debounce Distance>, it is considered to exit the idle state.

3.5.5 JDC (Network Jamming Detection)

The command **AT+GTJDC** is used to configure the parameters for jamming detection. When the detection condition is met, the device will report the event message **JDR** (ASCII)/(HEX) or **JDS** (ASCII)/(HEX) to the backend server according to the <Mode> setting.

Example:
AT+GTJDC=gb100cg,2,15,70,,70,2,60,10,,,,,,001A$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	JDC	JDC
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0-2	0
	LTE Threshold1	<=2	0 - 20	15
	LTE Threshold2	<=3	0 - 130	70
	Reserved	0		
	2G Threshold1	<=2	0 - 99	70
	2G Threshold2	1	0 - 6	2
	Enter Jamming Duration	<=4	0 - 3600(s)	60
	Exit Jamming Duration	<=4	0 - 3600(s)	10
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of the jamming detection function.

- **0** - Disable jamming detection function.
- **1** - Enable jamming detection function.
  If jamming is detected, the device will report the **+RESP:GTJDR** message when it enters the jamming state.
- **2** - Enable jamming detection function.
  If jamming is detected, the device will report the **+RESP:GTJDS** message when it enters or exits the jamming state.

✧ *LTE Threshold1, LTE Threshold2*

The built-in LTE 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.

✧ *2G Threshold1, 2G Threshold2*

The built-in 2G jamming detection algorithm uses these two parameters to measure whether the device is currently being jammed. The smaller the parameter value, the more sensitive the detection.

- *Enter Jamming Duration*
  When the device detects jamming, it will trigger the "enter jamming" event based on the <Enter Jamming Duration>.
- *Exit Jamming Duration*
  When the device quits jamming, it will trigger the "quit jamming" event based on the <Exit Jamming Duration>.

Note

The device starts to judge jamming state only after it is disconnected from the network.

3.5.6 RMD (Roaming Detection)

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

Example:
AT+GTRMD=gb100cg,0,,,,,1,1,46003,,,2,2,46007,,,3,3,46001,,,3DEF,,,3DEF,,,,,,,,,,0001$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	RMD	RMD
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0 | 1	0
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Home Operator Start	<=2	1 - 10	
	Home Operator End	<=2	1 - 10	
	Home Operator List	<=6*10		
	Reserved	0		
	Reserved	0		
	Roaming Operator Start	<=3	1 - 100	
	Roaming Operator End	<=3	1 - 100	
	Roaming Operator List	<=6*100		
	Reserved	0		
	Reserved	0		
	Blocklist Operator Start	<=2	1 - 20	
	Blocklist Operator End	<=2	1 - 20	

Parts	Fields	Length	Range/Format	Default
	Blocklist 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		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of the roaming detection function.

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

✧ *Operator Start*

A numeral which indicates the first index of the allowlist operator numbers to be input.

For example, if the value is 1, the device will update the allowlist of operators from the first one. If the parameter is empty, there should be no allowlist number.

✧ *Operator End*

A numeral which indicates the last index of the allowlist operator numbers to be input.

For example, if the value is 2, the device will update the allowlist of operators until the second one. If the parameter is empty, there should be no allowlist number.

✧ *Home Operator List*

An allowlist of PLMN operator numbers. The numbers are composed of MCC and MNC, both of which consist of 3 digits. And the last digit of MNC can be omitted, for example, 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 with ",".

"MCCFF" type code is used to identify operators across a whole country, for example, "460FF" covers the mobile network operators across China.

✧ *Roaming Operator List*

It is mostly like <Home Operator List>, and the difference is that the operators in this list will be considered to be in "Known Roaming" state.

✧ *Blocklist Operator*

It is mostly like <Home Operator List>, and the difference is that the operators in this list will be considered to be in "Blocking Report" state. In this state, the device works properly but all reports will be buffered instead of being sent.

Note

Operators that are not in <Home Operator List>, <Roaming Operator List> or <Blocklist Operator> will be considered to be in "Unknown Roaming" state.

✧ *Known Roaming Event Mask*

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

- **Bit 0** - for **PNA** (ASCII)/(HEX)
- **Bit 1** - for **PFA** (ASCI)/(HEX)
- **Bit 2** - for **MPN** (ASCII)/(HEX)
- **Bit 3** - for **MPF** (ASCII)/(HEX)
- **Bit 5** - for **BPL** (ASCII)/(HEX)
- **Bit 6** - for **BTC** (ASCII)/(HEX)
- **Bit 7** - for **STC** (ASCII)/(HEX)
- **Bit 8** - for **STT** (ASCII)/(HEX)
- **Bit 10** - for **PDP** (ASCII)/(HEX)
- **Bit 11** - for the power on **RTL** (ASCII)/(HEX)
- **Bit 12** - for the ignition report **VGN** (ASCII)/(HEX) and **VGF** (ASCII)/(HEX)
- **Bit 13** - for the ignition on/off location reports **VGL** (ASCII)/ (HEX)
- **Bit 15** - for **PNR** (ASCII)/(HEX)
- **Bit 16** - for **PFR** (ASCII)/(HEX)

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

✧ *Unknown Roaming Event Mask*

It is mostly like <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.

3.5.7 SPD (Speed Alarm)

The command **AT+GTSPD** is used to set a speed range for the speed alarm function of the terminal. According to the working mode, the device will report the message **SPD** (ASCII)/(HEX) to the backend server when its moving speed is outside or within the range.

Example:
AT+GTSPD=gb100cg,1,0,0,60,300,,,,,0,,,,,,,,,,000C$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	SPD	SPD
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0-4	0
	Min Speed	<=3	0 - 400(km/h)	0
	Max Speed	<=3	0 - 400(km/h)	0
	Validity	<=4	0 - 3600(s)	60
	Send Interval	<=4	30 - 3600(s)	300
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Report ID	<=2	0 - 15	0
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of the speed alarm function.

- **0** - Disable speed alarm.
- **1** - Report speed alarm if the current speed is within the speed range specified by <Min Speed> and <Max Speed>.
- **2** - Report speed alarm if the current speed is outside the speed range specified by <Min Speed> and <Max Speed>.
- **3** - Report speed alarm only once if the current speed is within or outside the speed range specified by <Min Speed> and <Max Speed>. In this mode, <Send Interval> will be ignored.
- **4** - Report speed alarm if the current speed is within or outside the speed range specified by <Min Speed> and <Max Speed>. But the backend server will not receive the **+RESP:GTSPD** message that the speed is outside the speed range unless it first receives an alarm that the speed is in the speed range. In this mode, <Send Interval> will be ignored.

✧ *Min Speed*

The lower speed limit.

✧ *Max Speed*

The upper speed limit.

✧ *Validity*

If the speed meets the alarm condition and is maintained longer than <Validity>, the speed alarm will be triggered.

✧ *Send Interval*

The interval for sending the speed alarm message.

✧ *Report ID*

It indicates the type of speed alarm, and it is reported in the **+RESP:GTSPD** message.

3.5.8 SSR (Start/Stop Report)

The command **AT+GTSSR** is used to detect the state of vehicle. When the vehicle enters Start state, the device will report the event message **STR** (ASCII)/(HEX) to the backend server. When the vehicle exits the Start state and then enters Stop state, the device will report the event message **STP** (ASCII)/(HEX) to the backend server.

Example:
AT+GTSSR=gb100cg,1,2,1,5,30,0,0,,000F$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	SSR	SSR
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0-2	0
	Time to Stop	<=4	0 - 30(min)|0 - 1800(s)	2(min)
	Time to Start	<=3	0 - 5(min)|0 - 300(s)	1(min)
	Start Speed	<=2	1 - 10(km/h)	5
	Long Stop	<=5	0 - 43200(min)	0
	Time Unit	1	0 | 1	0
	Fast STP Mode	1	0 | 1	0
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of the Start/Stop 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.

Note

The GNSS chip works in "always on" mode when the device state is Sensor Rest (41) and Sensor Motion (42). If the GNSS chip does not work in "always on" mode, the Start/Stop state of the vehicle will be judged only based on the state of built-in sensor.

✧ *Time to Stop*

After entering the Start state, if the vehicle is stationary again and remains stationary for the time specified in this parameter, it is considered to exit the Start state.

✧ *Time to Start*

If the vehicle is moving with ignition on for the period specified by this parameter, it is considered to be in Start state.

✧ *Start Speed*

The start speed threshold to determine whether the vehicle is started or not. When it is detected by the built-in motion sensor that the vehicle is moving with ignition on, the device will start to check the speed from GNSS.

If the device speed is maintained at a level higher than <Start Speed> for the time longer than <Time to Start>, the vehicle is considered to be in Start state, and the event message

+RESP:GTSTR will be reported.

If the device speed stays at a level lower than or equal to <Start Speed> for the time longer than <Time to Stop>, the vehicle is considered to quit Start state and the event message **+RESP:GTSTP** will be reported.

If abnormal GNSS fix lasts more than 1 minute, the built-in motion sensor is used to detect the Start/Stop state only without checking the speed.

✧ *Long Stop*

After the vehicle enters Stop state and stays in Stop state for the time specified by this parameter, the **LSP** (ASCII)/(HEX) message will be reported. 0 means "Disable this parameter".

✧ *Time Unit*

It controls the time unit of <Time to Stop> and <Time to Start>.

- **0** - Unit: minute.
- **1** - Unit: second.

✧ *Fast STP Mode*

Whether to report **+RESP:GTSTP** message immediately when the engine is turned off.

- **0** - The event message **+RESP:GTSTP** will be reported when the engine is turned off and the time meets the <Time to Stop>.
- **1** - The event message **+RESP:GTSTP** will be reported immediately when the engine is turned off, but it only works when <Mode> is set to 1.

3.5.9 TOW (Tow Alarm)

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

Example:
AT+GTTOW=gb100cg,1,10,1,300,,,,,2,3,2,600,,,,,,,,000B$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	TOW	TOW
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	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(s)	300
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	Rest Duration	<=3	1 - 255(x15s)	2
	Motion Duration	<=2	1 - 10(x100ms)	3
	Motion Threshold	1	1 - 9	2
	Tow Distance	<=5	0 | 50 - 65535(m)	600
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

Enable/disable the tow alarm function.

- **0** - Disable.
- **1** - Enable.

✧ *Engine Off to Tow*

A time parameter used to measure whether the device is considered to be towed after the engine is turned off. If the motion sensor does not detect non-movement within the specified time after the engine is 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 enters a state called fake tow. If the device stays in fake tow longer than the time specified by <Fake Tow Delay>, it is considered to be towed.

✧ *Tow Interval*

The interval for sending the tow alarm message. If <Tow Interval> is less than 60 seconds, the GNSS will keep working.

✧ *Rest Duration*

A time parameter to measure whether the device enters stationary state. The state of the device will be changed to rest if the motion sensor detects stationary and the stationary state is maintained for a period longer than the time specified by the parameter <Rest Duration>.

✧ *Motion Duration*

A time parameter to measure whether the device enters moving state. The state of the device will be changed to motion if the motion sensor detects motion and the moving state is maintained for a period specified by the parameter <Motion Duration>.

✧ *Motion Threshold*

The threshold for the motion sensor to measure whether the device is moving. The smaller the value, the more sensitive the motion detection. Please note that the default value is the ideal setting for motion and static detection. Therefore, exercise caution when modifying threshold parameters; otherwise, motion and static detection may be affected.

✧ *Tow Distance*

A distance parameter to determine whether the device is considered to be towed after the engine is turned off. If the vehicle moves a distance greater than or equal to <Tow Distance> after engine is off, the device is considered to be towed and the message **+RESP:GTTOW** will be reported.

3.6 IO Applications

This section describes the commands related to Input and Output port settings.

3.6.1 EPS (External Power 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 meets the predefined alarm condition, the device will report an alarm message **EPS** (ASCII)/(HEX) to the backend server to notify the status of the external power supply.

To ensure that this function works properly, switch on the internal battery in case the voltage of the external power supply drops to a very low level.

Example:
AT+GTEPS=gb100cg,0,250,12000,0,0,,,,,0,0,0,0,0007$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	EPS	EPS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0-3	0
	Min Threshold	<=5	0 - 32000 (mV)	0
	Max Threshold	<=5	0 - 32000 (mV)	0
	Sample Period	<=2	0 | 1 - 12(x2s)	0
	Debounce Time	1	0 - 5 (x1s)	0
	Reserved	0		
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	Reserved	0		
	Reserved	0		
	Sync with FRI	1	0 | 1	0
	Voltage Margin Error	<=3	0 - 100(x10mV)	0
	Debounce Voltage Threshold	<=3	0 - 100(x100mV)	0
	MPN / MPF Validity Time	1	0 - 5(x1s)	0
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of the external power supply monitoring function.

- **0** - Disable.
- **1** - Enable. If the current voltage is within the range of (<Min Threshold>, <Max Threshold>), the **+RESP:GTEPS** alarm will be triggered.
- **2** - Enable. If the current voltage is outside the range of (<Min Threshold>, <Max Threshold>), the **+RESP:GTEPS** alarm will be triggered.
- **3** - Enable. If the current voltage is within or outside the range of (<Min Threshold>, <Max Threshold>), the **+RESP:GTEPS** alarm will be triggered.

✧ *Min Threshold*

The lower voltage limit of the external power supply to trigger the alarm.

✧ *Max Threshold*

The upper voltage limit of the external power supply to trigger the alarm.

✧ *Sample Period*

The time for sampling the external power supply.

✧ *Debounce Time*

The time for debouncing external power voltage to avoid false report caused by excessive voltage drop in a short period of 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 fixed report message.
- **1** - Report external power supply voltage with fixed report message.

✧ *Voltage Margin Error*

This parameter is used together with parameters <Min Threshold> and <Max Threshold>. It indicates the voltage margin error of <Min Threshold> and <Max Threshold>.

If the voltage value detected is within the <Voltage Margin Error> of <Min Threshold> or <Max Threshold>, it will not trigger the **+RESP:GTEPS** alarm report.

For example, if <Min Threshold> is set to 6000mV, <Max Threshold> is set to 12000mV, and <Voltage Margin Error> is set to ±100mV, the current voltage will not trigger **+RESP:GTEPS** alarm report when it meets the condition (5900mV < current voltage < 6100mV) or (11900mV < current voltage < 12100mV). This parameter improves the performance of **+RESP:GTEPS** alarm.

✧ *Debounce Voltage Threshold*

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

✧ *MPN / MPF Validity Time*

The validity time for detecting the device connected or disconnected from the main power supply. 0 means "Do not check the validity time".

If <MPN / MPF Validity Time> is not 0, and the device remains connected or disconnected from the main power supply for the time specified by this parameter, the device will report **MPN** (ASCII)/(HEX) or **MPF** (ASCII)/(HEX) to the backend server.

If <MPN / MPF Validity Time> is 0, the device will immediately report **MPN** (ASCII)/(HEX) or **MPF** (ASCII)/(HEX) to the backend server.

3.7 Accessories Applications

This section describes the commands related to the configuration accessories which is connected by uart port. Please refer to the details below.

3.7.1 DAT (Transparent Data)

The command **AT+GTDAT** is used to transmit data between the backend server and the equipment connected to the Bluetooth of the device. Data to the backend server is wrapped into the message **DAT** (ASCII)/(HEX) and sent to the backend server while data to the equipment is directly output to the

Bluetooth unrestricted by the @Track protocol. And all data is transparent to the device. Before using this command, the parameters of the Bluetooth should be set in the command (AT+GTBTS).

Example:
AT+GTDAT=gb100cg,0,,wferyhtrhtrh,0,,,,0017$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	DAT	DAT
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg

Parts	Fields	Length	Range/Format	Default
Body	Command Type	1	0 | 2 | 4 | 5	
	Reserved	0		
	Data	<= (200|1280)	ASCII String	
	Need ACK	1	0 | 1	
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gb100cg".

✧ *Command Type*

The command type which indicates how to send data.

- **0** - Send message to the backend server with **DAT (Short Format)** (ASCII)/(HEX).
- **2** - Send message to the backend server with **DAT (Long Format)** (ASCII)/(HEX).
- **4** - Send the raw data directly to the Bluetooth.
- **5** - Send the raw data directly to the Bluetooth without CRLF.

✧ *Data*

Data to be transferred between the backend server and the equipment connected to the secondary serial port or Bluetooth of the device. <Data> sent to the backend server cannot contain the character "$" when the value of <SACK Mode> in (AT+GTSRI) and (AT+GTQSS) is 1.

Note

The maximum length of the <Data> is 200 when the remote device sends data to the terminal device through Bluetooth.

✧ *Need ACK*

Whether to report **+ACK:GTDAT**.

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

3.7.2 UDT (User-defined Data Transfer)

The command **AT+GTUDT** is used to transfer data to the destination specified by <Mode>. Data to the destination is wrapped into the message **UDT** (ASCII) and sent to the destination.

Example:
AT+GTUDT=gb100cg,0,,0,0,,1,,00087FFF,,,,,,0000$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	UDT	UDT
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0 | 2	0
	Reserved	0		
	IGN Send Interval	<=3	0 | 5 - 250(s)	0
	IGF Sending Mode	1	0 | 1	0
	Reserved	0		
	Event Mask	<=8	00000000 - FFFFFFFF	1
	Reserved	0		
	Report Item Mask	<=8	00000000 - FFFFFFFF	0008EFFF
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Report BLE Output	1	0 | 1	
	Report BLE Mask	16	0000000000000000 - FFFFFFFFFFFFFFFF	0000000000000000
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

Enable/disable data transfer to the destination specified by <Mode> via the report message **+RESP:GTUDT**.

- **0** - Disable the data transfer.
- **2** - Enable data transfer to Bluetooth.

Note

To ensure the execution of mode 2, please set the parameter <Mode> in the (AT+GTBTS) command to 1.

✧ *IGN Send Interval*

The interval for sending related information when the ignition is on. The unit is second. 0 means "Disable the information transfer".

✧ *IGF Sending Mode*

Whether to send the related information when the ignition is off. If the device enters Ignition Off Rest state, it will work according to <IGF Report Interval> and <Mode> of (AT+GTFRI). But if the device enters Tow state, it will work according to <Tow Interval> and <Enable Tow> of

(AT+GTTOW).

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

✧ *Event Mask*

Bitwise mask to configure which event triggered will send **+RESP:GTUDT** to the destination specified by <Mode>.

- **Bit 0** - For activated GEO
- **Bit 1** - Reserved
- **Bit 2-31** - Reserved

✧ *Report Item Mask*

Bitwise mask to configure which information should be sent to the destination specified by <Mode>.

- **Bit 0** - for Full 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.
- **Bit 8** - for Mileage
- **Bit 9** - for HMC
- **Bit 10** - for GSV
- **Bit 11** - for GEO State
- **Bit 12** - Reserved
- **Bit 13** - for Motion Status
- **Bit 14** - for External Power VCC, Backup Battery Level, Charging
- **Bit 15** - for GEO Status Mask
- **Bit 18** - Reserved
- **Bit 19** - for Send Time, the time when the 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.
- **1** - Enable.

✧ *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	Message
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	+RESP:GTPNR
Bit 33	+RESP:GTPFR
Bit 34	+RESP:GTTOW
Bit 35	+RESP:GTLBC
Bit 36	+RESP:GTEPS
Bit 37	Reserved
Bit 38	Reserved

Bit	Message
Bit 39	+RESP:GTFRI
Bit 40	+RESP:GTGIN/+RESP:GTGOT
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
Bit 53	+RESP:GTHBE

3.8 OTA Update Service

This section describes the commands related to the OTA update service. Please refer to the details below.

3.8.1 FVR (Configuration File Version Record)

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

Example:
AT+GTFVR=gb100cg,name,0000,,,,,00000000000000000000000000000000,,,,,20190415172349,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	FVR	FVR
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Configuration Name	<=40	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'	
	Configuration Version	4	0000 - 9999	

Parts	Fields	Length	Range/Format	Default
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Digital Signature	32	'0'-'9' 'a'-'z' 'A'-'Z'	
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Generation Time	14	YYYYMMDDHHMMSS	
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

- *Password*
  The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gb100cg".
- *Configuration Name*
  The name of the configuration file.
- *Configuration Version*
  The version number of the configuration file. The first two characters indicate the major version number, and the last two characters indicate the minor version number.
- *Digital Signature*
  It is used to confirm the validity of subsequent commands.
- *Generation Time*
  The time when the configuration file is generated.

Note

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

3.8.2 UPC (Update Configuration)

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

Example:
AT+GTUPC=gb100cg,0,10,0,1,0,http://www.queclink.com/configure.ini,1,,0,00000000,,3,0001$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	UPC	UPC

Parts	Fields	Length	Range/Format	Default
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Max Download Retry	1	0 - 3	0
	Download Timeout	<=2	5 - 30(min)	10
	Download Protocol	1	0	0
	Report Mode	1	0 | 1	0
	Update Interval	<=4	0 - 8760(h)	0
	Download URL	<=100	Legal 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 - F	3
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

- *Password*

  The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gb100cg".

- *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 one 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. And it is set to 0.

- *Report Mode*

  A numeral to indicate whether to report the message **UPC** (ASCII)/(HEX) or **EUC** (ASCII)/(HEX) when the configuration is updated over the air.

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

- *Update Interval*

  The interval for updating the configuration over the air.

- *Download URL*

  It specifies the URL to download the configuration file. If <Download URL> ends with "/" which means the URL is just a path without file name, the <IMEI>.ini will be added as the default file name to complete the URL. If it is greater than 100 bytes in length, error will be returned.

- *Mode*

  A numeral that indicates the working mode of downloading configuration 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 <Report Mode> is 1.

- **0** - Report the message **UPC** (ASCII)/(HEX).
- **1** - Report the message **EUC** (ASCII)/(HEX) to include more information. If the <Protocol Format> in (AT+GTSRI) is set to HEX format, it is strongly recommended to enable this mode to avoid overflow if the value of parameter <Command ID> in **+RESP:GTUPC** is bigger than 255.

✧ *Identifier Number*

A numeral to identify the configuration update request. It will be included in the message **+RESP:GTEUC** to indicate the request it is related to.

✧ *Update Status Mask*

Bitwise mask to configure the status in which the device can update the configuration.

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

Note

✧ **1** - The maximum number of commands in configuration file is 255. If there are more than 255 commands in the configuration file, the device will fail to download the configuration file.

✧ **2** - Make sure there is only one command per line in the configuration file and there is a "\r\n" between each two commands.

✧ **3** - There should be no space before each command.

✧ **4** - The configuration file should be a plain text file.

3.8.3 UPD (Firmware Update)

The command **AT+GTUPD** is used to start and stop the firmware update remotely.

3.8.3.1 Start the Firmware Update

To start the firmware update, the backend server sends the **AT+GTUPD** (sub:0) command to the device. Upon receiving this command, the device is informed of where to download the update package and how to download the package.

Example:
AT+GTUPD=gb100cg,0,0,20,0,,,http://60.174.225.173:10050/GB100CG/deltabin/GB100CG_00307_00307.bin,,0,0,,0001$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT

Parts	Fields	Length	Range/Format	Default
	Command Word	3	UPD	UPD
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Sub Command	1	0	
	Max Download Retry	1	0 - 3	0
	Download Timeout	2	10 - 30(min)	20
	Download Protocol	1	0	0
	Download Username	<=6	'0'-'9' 'a'-'z' 'A'-'Z'	
	Download Password	<=6	'0'-'9' 'a'-'z' 'A'-'Z'	
	Download URL	<=100	legal URL	
	Reserved	0		
	Update Type	1	0 | 4	0
	Extended Status Report	1	0 | 1	0
	Identifier Number	8	00000000 - FFFFFFFF	
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

- *Password*

  The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gb100cg".

- *Sub Command*

  The sub command of **AT+GTUPD**. 0 means "Start the firmware update".

- *Max Download Retry*

  It specifies the maximum number of retries to download the update package upon download failure.

- *Download Timeout*

  It specifies the expiration timeout of one download. If the download expires, it is considered to be failure.

- *Download Protocol*

  The protocol used to download the package. Only HTTP is supported now. Set it to 0.

- *Download Username*

  If the file server uses authentication, the user name is specified here.

- *Download Password*

  If the file server uses authentication, the password is specified here.

- *Download URL*

  It specifies the URL to download the package.

- *Reserved*

  Reserved for future extension.

- *Update Type*

  It specifies the firmware type to be updated.

  - **0** - BB firmware update

- **4** - BLE firmware update

✧ *Extended Status Report*

A numeral to indicate the message type to be reported for firmware update status.

- **0** - Report the **UPD** (ASCII)/(HEX) message to indicate the firmware update status.
- **1** - Report the **EUD** (ASCII) message to indicate the firmware update status.

✧ *Identifier Number*

A numeral to identify the firmware update request. It will be included in the **+RESP:GTEUD** message to indicate the request it is related to.

✧ *Serial Number*

The exact serial number will be sent back to the platform in ACK. It is in hexadecimal format. It should begin from 0000 and increases by 1 every time. It rolls back after "FFFF".

Note

+RESP:GTEUD in hex format has the same message format as **+RESP:GTUPD**.

3.8.3.2 Stop the Firmware Update

Before the device finishes downloading the update package, the backend server could use the **AT+GTUPD** (sub:1) command to cancel the current firmware update. If the package is downloaded successfully, this command is ignored.

Example:
AT+GTUPD=gb100cg,1,,,,,0001$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	UPD	UPD
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Sub Command	1	1	
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Sub Command*

The Sub Command of **AT+GTUPD**. 1 means "Cancel the current firmware update process".

3.8.3.3 Firmware Update Process

3.8.3.3.1 Initiation of the Update Process

The backend server sends the **AT+GTUPD** (sub: 0) command to the device to initiate the update process. Along with this command, the backend server sends necessary information for the device to start the update process.

It is the backend server's duty to decide when and how to initiate the firmware update process to all the devices it controls. As the response message collector and the controller, the backend server has all the information it needs to start an update process including the current firmware versions of the devices it controls (retrieved with the (AT+GTRTO) command), the version of the latest available firmware and the location of the proper update packages.

3.8.3.3.2 Confirmation of the Update Process

Upon receiving the **AT+GTUPD** (sub: 0) command, the device will first check the current battery capacity. If the battery capacity cannot support the update process, it will report **+RESP:GTUPD** (code: 103) to notify the backend server that the update process is to be aborted because of low battery. If the battery capacity is ample, the device will send **+RESP:GTUPD** with confirmation information to the backend server. Then the update process proceeds to the next step.

If the update command is confirmed, the device will go into non-interactive mode. That is, the end user can no longer make phone call, and all incoming calls are rejected automatically until the update process finishes. In the meantime, the device will ignore all the commands received from the backend server if they are not related to the update process. Also the device will stop all the reports that are not related to the update process.

3.8.3.3.3 Download of the Update Package

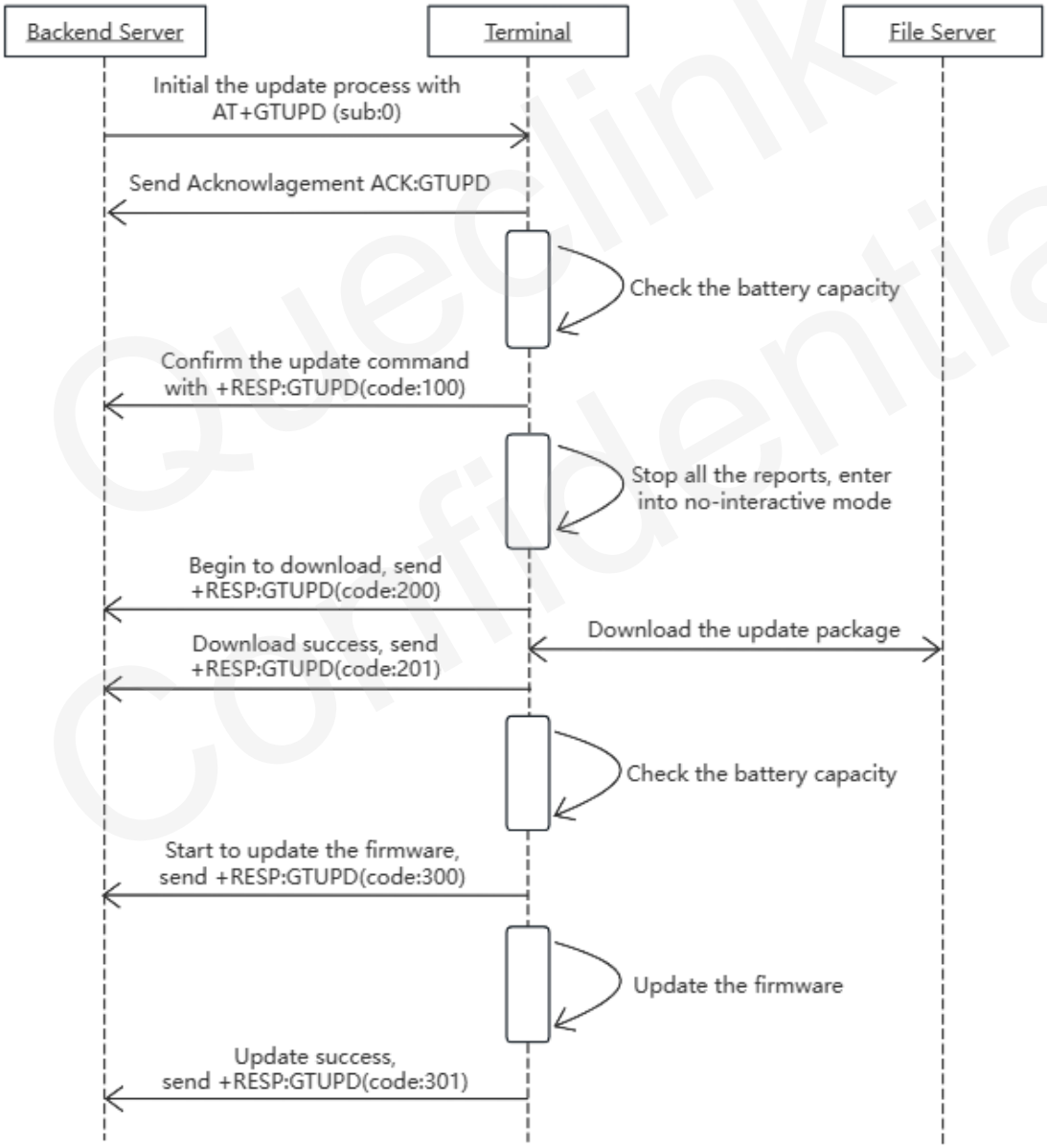
If the update command is confirmed, the device will use the information sent by the backend server to download the update package. If the download fails, the device will retry the specified times. If all attempts fail, the update process is aborted and the device will automatically reboot to go back to the normal working mode. If the download succeeds, the update process proceeds to the next step. Either way, the device will send **+RESP:GTUPD** with download information to the backend server.

Before the package is downloaded, the backend server could send the **AT+GTUPD** (sub: 1) command to cancel the current update process. This is the only chance to abort during the update process.

3.8.3.3.4 Update of the Firmware

After downloading the package successfully, the device will check the battery capacity again. If the battery cannot support the update process, the device will report **+RESP:GTUPD** (code: 303) to notify the backend server that the update process is to be aborted because of low battery. If the battery capacity is ample, the device will send **+RESP:GTUPD** (code: 300) to the backend server to indicate the start of the update. Then it uses the update package to update the firmware. After the update, whether it succeeds or fails, the device will reboot automatically. After the device boots up, it sends **+RESP:GTUPD** with update information to the backend server and works as usual.

3.8.3.3.5 An Example of Successful Update



3.9 Real Time Operation

This section describes the commands related to the runtime operations. Please refer to the details below.

3.9.1 RTO (Real Time Operation)

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

Example:
AT+GTRTO=gb100cg,3,,,,,,0015$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	RTO	RTO
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Sub Command	<=2	0-9 | B-E | 14 | 1C | 25 | 31 | 3A	
	Parameter 1			
	Parameter 2			
	Parameter 3			
	Parameter 4			
	Parameter 5			
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Ending Flag	1	$	$

- *Password*
  The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".
- *Sub Command*
  A HEX value which indicates the sub command of **AT+GTRTO**.
- *Parameter 1-5*
  Refer to the following description.

3.9.1.1 Sub Command

- **0** - GNSS. Get the GNSS related information via the message **GPS**(ASCII)/(HEX).

Parameter	Length	Range/Format	Default
Reserved	0		
Output Direction	1	0 | 3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **1** - RTL. Request the terminal to report its current position immediately via the message **RTL**(ASCII)/(HEX) .

Parameter	Length	Range/Format	Default
Reserved	0		
Output Direction	1	0 | 3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **2** - READ. Get the current configuration of the terminal via the message **ALM** (ASCII).

Parameter	Length	Range/Format	Default
AT Command	3 - 79	SRI	
Reserved	0		
Format Version	<=3	0 - 999	0
Reserved	0		
Reserved	0		

✧ **3** - REBOOT. Reboot the terminal.

Parameter	Length	Range/Format	Default
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

✧ **4** - RESET. Reset all parameters to factory settings.

Parameter	Length	Range/Format	Default
AT Command|Reset Level	3 - 79|1	SRI|0 - 1	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

✧ **5** - PWROFF. Power off the device.

Parameter	Length	Range/Format	Default
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

✧ **6** - CID. Get the ICCID of the SIM card which is being used by the terminal via the message **CID**(ASCII)/(HEX).

Parameter	Length	Range/Format	Default
Reserved	0		
Output Direction	1	0 | 3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **7** - CSQ. Get the current GSM signal level of the terminal via the message **CSQ**(ASCII)/(HEX) .

Parameter	Length	Range/Format	Default
Reserved	0		
Output Direction	1	0 | 3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **8** - VER. Get the version information of the device via the message **VER**(ASCII)/(HEX).

Parameter	Length	Range/Format	Default
Reserved	0		
Output Direction	1	0 | 3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **9** - BAT. Get the power supply and adapter status of the terminal via the message **BAT**(ASCII)/(HEX).

Parameter	Length	Range/Format	Default
Reserved	0		
Output Direction	1	0 | 3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **B** - TMZ. Get the time zone settings via the message **TMZ**(ASCII)/(HEX).

Parameter	Length	Range/Format	Default
Reserved	0		
Output Direction	1	0 | 3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **C** - GIR. Get cell information via the message **GSM**(ASCII)/(HEX).

Parameter	Length	Range/Format	Default
Reserved	0		
Output Direction	1	0 | 3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **D** - AIF. Get APN, ICCID, base station ID, RSSI, cell ID, IP and DNS server via the message **AIF**(ASCII).

Parameter	Length	Range/Format	Default
Reserved	0		
Output Direction	1	0 | 3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **E** - GSV/BSV/RSV. Request the device to report the GNSS satellites information via the message **GSV**(ASCII)/(HEX)/**RSV**(ASCII)/(HEX)/**BSV**(ASCII)/(HEX).

Parameter	Length	Range/Format	Default
Satellite Information Mask	2	00 - FF	
Output Direction	1	0 | 3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **14** - BLE. Commands for Bluetooth.

Parameter	Length	Range/Format	Default
Bluetooth Command	3	BTI	
Output Direction	1	0 | 3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **1C** - ATI. Get basic device information via the message **ATI**(ASCII).

Parameter	Length	Range/Format	Default
ATI Mask	8	00000000 - FFFFFFFF	
Output Direction	1	0 | 3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **25** - SCS. Get the self-calibration status of the acceleration data via the message **SCS**(ASCII)/(HEX) or clear the self-calibration status. It is used together with <SCS Action> below.

Parameter	Length	Range/Format	Default
SCS Action	1	0 - 1	
Output Direction	1	0 | 3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **31** - DELBUF. Delete all the buffered reports.

Parameter	Length	Range/Format	Default
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

✧ **3A** - RLY. Set the state of the WRL300.

Parameter	Length	Range/Format	Default
RLY Operation Mode	1	0 | 1	
Bind BAS Index	1	0 - 9	
Reserved	0		
Reserved	0		
Reserved	0		

3.9.1.2 Optional Parameters

Detailed explanation of the optional parameters.

✧ *AT Command*

- To get AT command configuration when <Sub Command> is set to **2**, please follow the

format in the following example.

For instance, to get the configuration of (AT+GTFRI), set **AT+GTRTO=gb100cg,2,FRI,,,,,0015$**, and get it via **ALM** (ASCII). To get more than one AT command configuration, the neighbouring commands are separated by the ASCII character ":".

For example, to get configuration of the commands (AT+GTFRI) , (AT+GTOWH) , (AT+GTSRI), set **AT+GTRTO=gb100cg,2,FRI:OWH:SRI,,,,,0015$**, and get it via **ALM**(ASCII). Supports up to 20 commands to query at the same time.

- Set <Sub Command> to **4** to specify the configuration to be reset. To specify a configuration, use the last three letters of the protocol command.

  For example, to reset configuration of the **AT+GTFRI** command, send the command **AT+GTRTO=gb100cg,4,FRI,,,,,000F$**. To reset more than one AT command configuration, the neighbouring commands are separated by the ASCII character ":".

  For example, to reset configuration of the commands **AT+GTFRI** , **AT+GTOWH** , **AT+GTSRI**, send the command **AT+GTRTO=gb100cg,4,FRI:OWH:SRI,,,,,0015$**. The buffered messages saved can be deleted with the command **AT+GTRTO=gb100cg,4,BUF,,,,,000F$**.

  Configuration of the commands (AT+GTBSI), (AT+GTSRI), (AT+GTQSS), (AT+GTMQT), (AT+GTCFG), (AT+GTTMA) and (AT+GTPIN) cannot be reset by this command.

✧ *Reset Level*

If <Sub Command> is **4**, this parameter works as follows.

- **0** - Light Reset. Reset all configuration parameters, except parameters configured by (AT+GTBSI), (AT+GTSRI), (AT+GTMQT), (AT+GTCFG), (AT+GTPIN) and (AT+GTTMA) .
- **1** - Heavy Reset. Reset all configuration parameters, except (AT+GTPIN) and the <New Password> of the (AT+GTCFG).

✧ *Satellite Information Mask*

If <Sub Command> is set to **E**, please get the satellite information message according to the following bitwise mask. The satellite information mask must be 2 bytes.

If it is less than 2 bytes, add 0 to the high bytes of the satellite information mask. If this field is reserved, the device will report **GSV**(ASCII)/(HEX) / **RSV**(ASCII)/(HEX)/ **BSV**(ASCII)/(HEX) .

Bit	Message Name	Description
Bit 2	+RESP:GTBSV	Report Beidou satellite information
Bit 1	+RESP:GTRSV	Report GLONASS satellite information
Bit 0	+RESP:GTGSV	Report GPS satellite information

✧ *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 devices via the message **BTI** (ASCII)/(HEX).

✧ *ATI Mask*

If <Sub Command> is set to **1C**, the basic information will be reported via the message **ATI** (ASCII) according to chosen <ATI Mask>.

- **ATI Mask Table**

Mask Bit	Item
Bit 0	Firmware Version
Bit 1 - Bit 3	Reserved for SW
Bit 4	BT Firmware Version
Bit 5	BT Boot Firmware Version
Bit 6 - Bit 7	Reserved for SW
Bit 8	Reserved
Bit 9	Reserved
Bit 10 - Bit 11	Reserved for MCU
Bit 12	Hardware Version
Bit 13 - Bit 15	Reserved for HW
Bit 16	Reserved
Bit 17	Reserved
Bit 18	Reserved
Bit 19	Sensor ID
Bit 20	Modem IMEI
Bit 21 - Bit 31	Reserved

✧ *SCS Action*

If <Sub Command> is set to **25**, Read or Clear action is controlled by this parameter.

- **0** - Read self-calibration status.
- **1** - Clear self-calibration status.

✧ *RLY Operation Mode*

If the sub command is **3A**, this parameter will work as follows.

- **0** - Disable relay of WRL300, switch relay pin from NC to COM.
- **1** - Enable relay of WRL300, switch relay pin from NO to COM.

✧ *Bind BAS Index*

It is used to bind the specific configuration in (AT+GTBAS) when the <Sub Command> is set to **3A**. The value is the same as the index in **AT+GTBAS**.

✧ *Output Direction*

It determines the destination that the response message of the RTO command will be reported to and is invalid for <Sub Command> 2(READ), 3(REBOOT), 4(RESET), 5(PWROFF),31(DELBUF), 3A(RLY).

- **0** - The message will be output to the backend server.
- **3** - If the command is received via SMS, the message will be output to the original SMS number; otherwise the message will be output to the backend server.

✧ *Format Version*

A numeral to indicate the format of the **+RESP:GTALM** message.

- **0** - Do not add cutoff characters to the message **+RESP:GTALM**.
- **1** - Add cutoff characters to the message **+RESP:GTALM**.
- **2-999** - Reserved.

3.9.2 SMS Location Request

This command can only be sent via SMS. The device will send SMS report with Google maps hyperlink and the current location to corresponding phone number or report **LBC** (ASCII)/(HEX) to the backend server immediately.

Item	Format
Command	Get Position

✧ *Command*

The detailed command string received via SMS.

"Get Position": This command is used to query the current location, Case is ignored.

3.9.3 RTP (Remote File Transfer)

The command **AT+GTRTP** is used to obtain files from the backend server.

Example:
AT+GTRTP=gb100cg,0,0,0,http://60.174.225.173:20581/GB100CG/deltabin/server2.crt,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	RTP	RTP
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Mode	1	0	
	Protocol Type	1	0	
	File Type	1	0-2	
	URL	<=100	ASCII (not including '=')	
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gb100cg".

✧ *Mode*

The working mode of file transfer.

- **0** - Download file.

✧ *Protocol Type*

The type of communication protocol used to obtain data from the backend server.

- **0** - HTTP.

✧ *File Type*

It defines the type of file to download from the server.

- **0** - CA certificate.
- **1** - Client certificate.
- **2** - Client key.

✧ *URL*

It specifies the URL to download the configuration file.

3.9.4 LTP (Local File Transfer)

The command **AT+GTLTP** is used to write the file to the device by subcontracting.

Example:
AT+GTLTP=gb100cg,,1,1,0,0,***Data***,***CRC***,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	LTP	LTP
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gb100cg
Body	Reserved	0		
	Mode	1	0 | 1	
	File Type	1	0-2	
	Current Number	<=3	0 - 100	
	Total Number	<=3	0 - 100	
	Data	<=512	HEX	
	CRC	<=4	0 - FFFF	
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is

"gb100cg".

- *Mode*

  The working mode of the file.

  - **0** - Delete file.
  - **1** - Write file.

- *File Type*

  It defines the type of file to download from the server.

  - **0** - CA certificate
  - **1** - Client certificate
  - **2** - Client key

- *Current Number*

  The location where the current data is written to the file.

- *Total Number*

  Total serial number of write file data.

- *Data*

  Data written to file.

- *CRC*

  CRC verification data of <Data> is used to determine whether the data is correct.

4 Report(Ascii)

This section defines the ASCII formats of the report messages. Due to the size limit of an SMS message (160 bytes), it is recommended to carefully set <Report Item Mask> in (AT+GTCFG) to limit the length of the report which contains GNSS position information in the case of SMS transmission. Otherwise the report will be truncated to fit the length of SMS message.

4.1 ACK (Acknowledgement)

The frame format of ACK is as follows:

Example:

The Option field is not included.

+ACK:GTXXX,8020070402,864292043426376,,0000,20200613114927,FFFF$

+ACK:GTXXX,8020070402,864292043426376,,0000,20200613114927,FFFF$

The Option field is included.

+ACK:GTGEO,8020070402,135790246811220,GB100CG,0,000A,20090214093254,11F0$

+ACK:GTCMD,8020070402,135790246811220,GB100CG,0,0005,20100310172830,11F0$

+ACK:GTUDF,8020070402,135790246811220,GB100CG,0,0005,20100310172830,11F0$

+ACK:GTBAS,8020070402,135790246811220,GB100CG,0,0005,20090214093254,11F0$

+ACK:GTBTD,8020070402,135790246811220,GB100CG,0,0005,20090214093254,11F0$

+ACK:GTRTO,8020070402,135790246811220,GB100CG,GPS,0015,20090214093254,11F1$

Parts	Fields	Length	Range/Format
Head	Header	4	+ACK
	Leading Symbol	1	:
	Command Word	5	'A'-'Z', '0'-'9'
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Option	N	Please see below.
Tail	Serial Number	4	0000-FFFF

Parts	Fields	Length	Range/Format
	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000-FFFF
	Tail	1	$

✧ *Command Word*

The "Command Word" in the configuration command. For example, it is **GTXXX**.

✧ *Full Protocol Version*

The protocol version that the device conforms to. It is separated into 3 parts. The first two or four characters represent the device type. As shown in the example above, 802007 means GB100CG. The second part consists of two characters that represent the major version number of the protocol, and the last part consists of two characters that indicate the minor version number of the protocol. Both version numbers are hex digits. For example, 0A01 means version 10.01.

✧ *Unique ID*

The International Mobile Equipment Identity for the terminal device.

✧ *Device Name*

The name of terminal device.

✧ *Option*

The Acknowledgement of commands that contain the Option field are as follows:

- **AT+GTGEO** - This field represents the GEO command ID.

Parts	Fields	Length	Range/Format
Body	GEO ID	<=2	0 - 19

- **AT+GTCMD** - This field represents the stored command ID.

Parts	Fields	Length	Range/Format
Body	Stored Command ID	<=2	0 - 31

- **AT+GTUDF** - This field represents the UDF group ID.

Parts	Fields	Length	Range/Format
Body	Group ID	<=2	0 - 31

- **AT+GTBAS** - This field represents the BAS index.

Parts	Fields	Length	Range/Format
Body	Index	1	0 - 9

- **AT+GTBTD** - This field represents the BTD index.

Parts	Fields	Length	Range/Format
Body	Index	1	0 - 9

- **AT+GTRTO** - This field represents the RTO sub-command ID.

Parts	Fields	Length	Range/Format
Body	Sub Command	<=6	Sub Command String

- For other commands, it is not included.

✧ *Serial Number*

The serial number in the configuration command.

- *Send Time*
  The local time when the frame is generated in the format **YYYYMMDDHHMMSS**.
  For example, "20191120135807" means 13:58:07 on November 20, 2019.
- *Count Number*
  A self-increasing count number in each acknowledgement message. It begins from "0000" and increases by 1 for each acknowledgement message. And it rolls back after "FFFF".

Note

1. The ACK frame only indicates that the terminal device has received the command, but does not mean that the command has been successfully executed; the terminal device will send a report to inform the backend server of the execution result of the command when necessary.
2. Only after both the commands (AT+GTBSI) and (AT+GTSRI) are properly set can the ACK messages and other report messages be received by the backend server.

4.2 Position Related Report

This section describes the format of positioning related messages. Please refer to the details below.

4.2.1 Generic Location Report

- **TOW** (Tow Alarm Information)
  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.
- **SPD** (Speed Alarm Information)
  If the speed alarm is enabled, the device will send the message **+RESP:GTSPD** to the backend server when the speed of the device within the alarm range is detected .
- **RTL** (Realtime Location Information)
  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.
- **DOG** (Watchdog Reboot Alarm)
  The protocol watchdog reboot message **+RESP:GTDOG**.
- **VGL** (Virtual Ignition Location Information)
  The location message **+RESP:GTVGL** for virtual ignition on/off.
- **HBM** (Harsh Behavior Alarm)
  If harsh behavior is detected, the message **+RESP:GTHBM** will be sent to the backend server.

Example:
+RESP:GTTOW,8020070402,135790246811220,GB100CG,,00,1,1,4.3,92,70.0,121.354335,31.222073,20230214013254,0460,0000,18d8,6141,01,15,2,2000.0,,,20230214093254,11F0$

+RESP:GTSPD,8020070402,135790246811220,GB100CG,,00,1,1,4.3,92,70.0,121.354335,31.2220

73,20230214013254,0460,0000,18d8,6141,01,15,2,2000.0,,,20230214093254,11F0$

+RESP:GTRTL,8020070402,135790246811220,GB100CG,,00,1,1,4.3,92,70.0,121.354335,31.222073,20230214013254,0460,0000,18d8,6141,01,15,2,2000.0,,,20230214093254,11F0$

+RESP:GTDOG,8020070402,135790246811220,GB100CG,,01,1,1,4.3,92,70.0,121.354335,31.222073,20230214013254,0460,0000,18d8,6141,01,15,4,2000.0,,,20230214093254,11F0$

+RESP:GTVGL,8020070402,864696060004173,GB100CG,,21,1,1,0.0,0,122.2,117.129350,31.839272,20230808023755,0460,0001,DF5C,05FE6667,01,15,1,0.0,,,20230808023755,0142$

+RESP:GTHBM,8020070402,135790246811220,GB100CG,,10,1,1,4.3,92,70.0,121.354335,31.222073,20230214013254,0460,0000,18d8,6141,01,15,4,2000.0,,,20230214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	TOW | SPD | RTL | DOG | VGL | HBM
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	0	
	Report ID / Report Type	2	X(0 - F)Y(0 - 9)
	Number	1	1
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	GNSS Trigger Type (Optional)	1	0-4
	Mileage	<=9	0.0 - 4294967.0 (km)

Parts	Fields	Length	Range/Format
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	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 as follows:

- 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 <Mode> in (AT+GTHBM) is set to 2, the value will always be 0 which indicates unknown speed.
- The value of <Virtual Ignition Mode> which indicates the trigger source of the message **+RESP:GTVGL**.
- The type of speed alarm which triggers the report message **+RESP:GTSPD**.
- For other messages, it will always be 0.

Report type has different meanings in different messages as follows:

- In the speed alarm message **+RESP:GTSPD**
  - 0 - Outside the predefined speed range
  - 1 - Within the predefined speed range
- In the protocol watchdog reboot message **+RESP:GTDOG**
  - 1 - Reboot device message for time based working mode
  - 2 - Reboot device message for ignition on working mode
  - 3 - Reserved
  - 4 - Reboot device message for network watchdog reboot
  - 5 - Reboot device message for EGPRS/GSM and LTE watchdog reboot
  - 6 - Reboot device message for send failure watchdog
  - 7 - Reboot RF message for network watchdog
  - 8 - Reboot RF message for EGPRS/LTE watchdog
  - 9 - Reboot RF message for send failure watchdog
- In the (virtual) ignition on/off message **+RESP:GTVGL**
  - 0 - Ignition on
  - 1 - Ignition off
- 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 driving behavior
- For other messages, it will always be 0.

✧ *Number*

The number of the GNSS positions 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 the range is from 000 to 999.

- *MNC*

  Mobile network code. It is 3 digits in length and the range is from 000 to 999.

- *LAC*

  Location area code in hex format.

- *Cell ID*

  The cell ID in hex format.

- *Position Append Mask*

  A bitwise numeral to control whether to include the corresponding fields in each position after <Cell ID>.

- *Satellites in Use*

  If bit 0 of <Position Append Mask> is enabled, this part will be displayed with the number of satellites in use for the current position.

- *GNSS Trigger Type*

  The trigger type of GNSS point has the following meanings.

  - **0** - Time point
  - **1** - Corner point
  - **2** - Distance point
  - **3** - Mileage point
  - **4** - Optimum point (time and mileage)

- *Mileage*

  The current total mileage.

4.2.2 FRI(Fixed Report Information)

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

Example:
+RESP:GTFRI,8020070402,864696060004173,GB100CG,11985,10,1,1,0.0,0,118.5,117.129306,31.839197,20230808033438,0460,0001,DF5C,05FE6667,03,15,0,123.5,00123:04:44,,,,100,210000,,,,20230808033438,01B3$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	FRI
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	External Power Voltage	<=5	0 - 32000 (mV)
	Report ID / Report Type	2	X(1-5)Y(0-6)
	Number	<=2	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	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	GNSS Trigger Type(Optional)	1	0-4
	Mileage	<=9	0.0 - 4294967.0 (km)
	Hour Meter Count	11-13	00000:00:00 - 1193000:00:00
	Reserved	0	
	Reserved	0	

Parts	Fields	Length	Range/Format
	Reserved	0	
	Backup Battery Percentage	<=3	0 - 100
	Device Status	6	000000 - FFFFFF
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *External Power Voltage*

The voltage of the external power supply. If the command (AT+GTEPS) is configured for the device to report the external power supply voltage periodically with fixed report, the device will send the current voltage along with the **+RESP:GTFRI** message to the backend server. If the **AT+GTEPS** command is not configured, this field will be empty.

✧ *Report ID / Report Type*

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

Report ID has several meanings as follows.

- **1** - Fixed time report
- **2** - Fixed distance report
- **3** - Fixed mileage report
- **4** - Fixed time and mileage report
- **5** - Fixed time or mileage report

Report Type has the following meanings.

- **0** - Normal fixed report.
- **1** - Normal corner report. If <Wrap Corner Point> is 0, this message indicates a turning point. If <Wrap Corner Point> is 1, this message indicates that the number of collected GNSS points reaches 15 or GNSS points collection stops.
- **2** - FFC fixed report. This message indicates that the device enters the state pre-configured by <Mode> in (AT+GTFFC), such as Geo-Fence state, roaming state, etc.
- **3** - FFC corner report. If <Wrap Corner Point> is 0, this message means a turning point in condition of FRI report frequency changes by (AT+GTFFC). If <Wrap Corner Point> is 1, it indicates the number of collected GNSS points reaches 15 or GNSS points collection stops.
- **4** - Mileage report when <Mode> in (AT+GTFRI) is set to 5.
- **5** - Reserved.
- **6** - Mileage report when <Mode> in (AT+GTFRI) is set to 5 and FFC works.

✧ *Number*

The number of the GNSS positions included in the report message. In the message **+RESP:GTFRI**, there may be one or several GNSS positions. If there are multiple positions in one **+RESP:GTFRI** message, the parameter between <Number> and <Mileage> will be

repeated.

✧ *Position Append Mask*

A bitwise numeral to control whether to include the corresponding fields in each position after <Cell ID>.

✧ *Satellites in Use*

If bit 0 of <Position Append Mask> is enabled, this part will be displayed with the number of satellites in use for the current position.

✧ *GNSS Trigger Type*

The trigger type of GNSS point has the following meanings.

- **0** - Time point
- **1** - Corner point
- **2** - Distance point
- **3** - Mileage point
- **4** - Optimum point (time and mileage)

✧ *Hour Meter Count*

If the hour meter count function is enabled by the command (AT+GTHMC), total hours the meter counts when the engine is on will be reported in this field. It consists of three parts separated by ":", the first part is the hour digit and the length of it is between 5 to 7 bytes, the second part is the 2-byte minute digit, and the last part is the 2-byte second digit. And it ranges from 00000:00:00 to 1193000:00:00. If the function is disabled, this field will be empty.

✧ *Backup Battery Percentage*

The current level of the backup battery in percentage.

✧ *Device Status*

The status of the device.

From left to right, the first two bytes indicate the current motion status of the device,

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.

Mask Bit	Item
...(Optional)	Reserved
Bit 16-23	Motion status of the device
...	Reserved

4.2.3 ERI(Expand Fixed Report Information)

If **+RESP:GTERI** is enabled, the device will send the message **+RESP:GTERI** to the backend server instead of **+RESP:GTFRI**.

Example:
+RESP:GTERI,8020070402,864696060004173,GB100CG,00000100,,10,1,1,0.0,0,115.8,117.129356,31.839248,20230808061540,0460,0001,DF5C,05FE6667,03,15,4,4.0,0000102:34:33,,,,100,210000,,1,0,06,12,0,001A42A2,0617,TMPS,08351B00043C,1,26,65,20231030085704,20231030085704,0017$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	ERI
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	ERI Mask	8	00000000 - FFFFFFFF
	External Power Supply	<=5	0 - 32000(mV)
	Report ID / Report Type	2	X(1-5)Y(0-6)
	Number	<=2	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	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	GNSS Trigger Type(Optional)	1	0 - 4
	Mileage	<=9	0.0 - 4294967.0 (km)
	Hour Meter Count	11-13	00000:00:00 - 1193000:00:00

Parts	Fields	Length	Range/Format
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Backup Battery Percentage	<=3	0 - 100
	Device Status	6	000000 - FFFFFF
	Reserved	0	
	Bluetooth Accessory Data (Optional)		
	CSQ RSSI(RSRP) and CSQ BER (Optional)		
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Position Append Mask*

A bitwise numeral to control whether to include the corresponding fields in each position after <Cell ID>.

✧ *Satellites in Use*

If bit 0 of <Position Append Mask> is enabled, this part will be displayed with the number of satellites in use for the current position.

✧ *Bluetooth Accessory Data(Optional)*

Fields	Length	Range/Format
Bluetooth Accessory Number	<=2	0 - 10
Index	2	0 - 9
Accessory Type	<=2	0 | 6 | 12 | 13 | 15
Accessory Model	1	0 | 2 | 4 | 5
Raw Data(Optional)	<=18	
Accessory Append Mask	<=4|8	0 - FFFF | 0 - 7FFFFFFF
Accessory Name(Optional)	<=20	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
Accessory MAC(Optional)	12	000000000000 - FFFFFFFFFFFF
Accessory Status(Optional)	1	0 - 1
Accessory Battery Level(Optional)	<=4	0 - 5000(mV)
Accessory Temperature(Optional)	<=3	-40 - 80(℃)
Accessory Humidity(Optional)	<=3	0 - 100%(rh)
Tire pressure(Optional)	<=3	0 - 500(kPa)
Timestamp(Optional)	14	YYYYMMDDHHMMSS

Fields	Length	Range/Format
Enhanced Temperature(Optional)	<=5	-40.00 - 80.00 (℃)
Accessory Battery Percentage(Optional)	<=3	0 - 100(%)
Relay State(Optional)	1	0 - 1
Tri-axial Acceleration Data (Optional)	12	(HEX)
Angle Values (Optional)	6	(HEX)
Event Mask (Optional)	1	(HEX)
Tilt Event (Optional)	4	(HEX)
Motion Event (Optional)	4	(HEX)
Crash Event (Optional)	4	(HEX)
Falling Event (Optional)	4	(HEX)
Accessory RSSI (Optional)	<=4	-128 - 127

✧ *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 raw data is read from Bluetooth accessory. It varies depending on <Accessory Type> and <Accessory Model>.

- **WRL300**

  It is a four-byte hexadecimal value. It indicates the current state of the relay.

- **WMS301/WTH301**

  It is a four-byte hexadecimal value. The lower 2 bytes of the hexadecimal value indicate temperature, the higher 2 bytes indicate humidity.

  Humidity is equal to the higher 2 bytes divided by 100, and the unit is rh. Temperature is equal to the lower 2 bytes divided by 100, in degree Centigrade.

- **ATP100/ATP102**

  It is a four-byte hexadecimal value.

  From left to right, the first byte is reserved(0x00).

  The second byte includes pressure value. Tire pressure is equal to the second byte multiply by 2.5.

  The third byte includes temperature and low power alarm. Temperature is equal to the third byte subtract by 40.

  The higher 4 bits of last byte includes the product model, and the lower 4 bits of last byte includes the firmware version.

✧ *Accessory Append Mask*

This parameter indicates which Bluetooth accessory data needs to be reported in the message. If Bit 15 is set to 0, only Bit 0 - Bit 14 are valid.

Mask Bit	Item	Description
Bit 15	<Expansion Mask>	Expansion Mask for Bit 16 - Bit 31
Bit 14	<Relay Data>	Including <Relay Config Result>, <Relay state>
Bit 13	<Accessory Battery Percentage>	Accessory Battery Percentage
Bit 11	<Enhanced Temperature>	Enhanced temperature
Bit 10	<Timestamp>	Timestamp
Bit 9	<Tire pressure>	Tire pressure
Bit 6	Reserved	Reserved
Bit 5	<Accessory Humidity>	Accessory Humidity
Bit 4	<Accessory Temperature>	Accessory Temperature
Bit 3	<Accessory Battery Level>	Accessory Battery Level
Bit 2	<Accessory Status>	Accessory Bluetooth Connection Status
Bit 1	<Accessory MAC>	Accessory MAC
Bit 0	<Accessory Name>	Accessory Name

If Bit 15 is set to 1, the mask will be expanded, and Bit 16 - Bit 31 are valid.

Mask Bit	Item	Description
Bit 31 - Bit 22	Reserved	Reserved
Bit 21	<Accessory RSSI>	Accessory RSSI
Bit 20	Reserved	Reserved
Bit 18	<Sensor Event Mask>	Including <Event Mask>, <Tilt Event>, <Motion Event>, <Crash Event>, <Falling Event>
Bit 17	<Angle Values>	Angle Values
Bit 16	<Tri-axial Acceleration Data>	Tri-axial Acceleration Data

Note

In the message bit 0 - bit 15 precedes bit 16- bit 31. Here is an example: <Accessory Append

Mask> = 0x881F0007, 0x881F indicates Bit 15 - Bit 0, 0x0007 indicates Bit 31 - Bit 16

✧ *Accessory Name*

The name of the Bluetooth accessory.

✧ *Accessory MAC*

The MAC address of the Bluetooth accessory.

✧ *Accessory Status*

It indicates the connection status of the Bluetooth accessory.

- **0** - Disconnected.
- **1** - Connected.

✧ *Accessory Battery Level*

It indicates the remaining level of the battery in Bluetooth accessory.

✧ *Accessory Temperature*

It indicates the temperature measured by Bluetooth accessory.

✧ *Accessory Humidity*

It indicates the humidity measured by the Bluetooth accessory.

✧ *Timestamp*

Timestamp of the tire pressure value collection.

✧ *Enhanced Temperature*

It instructs Bluetooth accessories to measure temperature with high precision.

Note

Temperature alarm uses integer value.

✧ *Accessory Battery Percentage*

Percentage of Bluetooth accessory's battery power.

✧ *Relay state*

The current state of the relay sensor.

✧ *Tri-axial Acceleration Data*

The values are coded on 16 bits (signed) in mg (+8g/-8g).

For example, **0xFFFE0005FF04**:

	X-axis		**Y-axis**		**Z-axis**	
HEX	D[0]	D[1]	D[2]	D[3]	D[4]	D[5]
Binary	0xFF	0xFE	0x00	0x05	0xFF	0x04

- **X-axis** - 0xFFFE => -2mg acceleration on X-axis
- **Y-axis** - 0x0005 => 5mg acceleration on Y-axis
- **Z-axis** - 0xFF04 => -252mg acceleration on Z-axis

✧ *Angle Values*

Angle values are coded on 8 bits(unsigned). The values are expressed in degree (0-180 degree) based on the direction of gravity.

For example, **0x5A5A00**:

	X-axis	**Y-axis**	**Z-axis**
HEX	D[0]	D[1]	D[2]
Binary	0x5A	0x5A	0x00

- **X-axis** - 0x5A => 90deg, X-axis state is horizontal
- **Y-axis** - 0x5A => 90deg, Y-axis state is horizontal

- **Z-axis** - 0x00 => 0deg, Z-axis state is vertical up

✧ *Event Mask*

This is event alarm mask.

- **Bit 0** - Tilt mask, it controls Angle Tilt zone.
- **Bit 1** - Motion mask, it controls motion state zone.
- **Bit 2** - Crash mask, it controls Crash value zone.
- **Bit 3** - Falling mask, it controls Falling value zone.

If tilt function is enabled, the tilt mask will be set to 1, otherwise it will be set to 0.

If motion function is enabled, the motion mask will be set to 1, otherwise it will be set to 0.

If crash function is enabled, the crash mask will be set to 1, otherwise it will be set to 0.

If falling function is enabled, the falling mask will be set to 1, otherwise it will be set to 0.

✧ *Tilt Event*

Tilt Event (state change) counter on the 15 (unsigned) MSB, Instantaneous state (1: tilt/0: normal) on LSB.

	Tilt[0]		**Tilt[1]**	
HEX	0	0	0	A
Binary	0000	0000	0000	1010

For example: **0x000A**

- **0** - Tilt state (normal)
- **0000 0000 0000 101** - Event counter value on 15 bits, count 5

✧ *Motion Event*

Motion Event (state change) counter on the 15 (unsigned) MSB, Instantaneous state (1: move/0: still) on LSB.

	Motion[0]		**Motion[1]**	
HEX	0	0	0	B
Binary	0000	0000	0000	1011

For example: **0x000B**

- **1** - Motion state (move)
- **0000 0000 0000 101** - Event counter value on 15 bits, count 5

✧ *Crash Event*

Crash Event (state change) counter on the 16 (unsigned) bits.

	Crash[0]		**Crash[1]**	
HEX	0	0	0	A
Binary	0000	0000	0000	1010

For example: **0x000A**

- **0000 0000 0000 1010** - Event counter value on 16 bits, count 10

✧ *Fall Event*

Fall Event (state change) counter on the 16 (unsigned) bits.

	Falling[0]		**Falling[1]**	
HEX	0	0	0	A
Binary	0000	0000	0000	1010

For example: **0x000A**

- **0000 0000 0000 1010** - Event counter value on 16 bits, count 10

✧ *Accessory RSSI*

Signal strength RSSI value for the Bluetooth accessory.

✧ *CSQ RSSI(RSRP) and CSQ BER*

If Bit 16 of the <ERI Mask> is set to 1, this field will be included in the **+RESP:GTERI** report. Otherwise, it will not be included.

Fields	Length	Range/Format
CSQ RSSI|RSRP	<=3	0 - 31 | 99 | 0 - 97 | 255
Sensor Number	<=2	0 - 7 | 99

- *CSQ RSSI/RSRP*

  The signal strength level.

  For 2G/3G network:

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

For 4G network:

CSQ RSRP	Signal Strength (dBm)
0	<-140
1	-140
2 - 96	-139 - -44
97	>= -44
255	Unknown

✧ *CSQ BER*

The quality of the GSM signal. The range is 0-7, and 99 is for unknown strength of signal.

Note

The word "Optional" means the item is controlled by the parameter <ERI Mask> of the (AT+GTFRI) command.

4.2.4 EPS(External Power Supply Monitoring)

✧ +RESP:GTEPS

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

Example:
+RESP:GTEPS,8020070402,135790246811220,GB100CG,13500,00,1,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,01,15,2000.0,20090214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	EPS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	External Power Voltage	<=5	0 - 32000(mV)
	Report ID / Report Type	2	X(0)Y(0 | 1)
	Number	1	1
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	Mileage	<=9	0.0 - 4294967.0 (km)
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *External Power Voltage*

The value of the external power supply voltage .

When the voltage meets the alarm condition as set by the command (AT+GTEPS) , the device will send the current voltage with the **+RESP:GTEPS** message 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.

- Report ID has different meanings as follows:
  - The value of Report ID for the report message **+RESP:GTEPS** is 0.
- Report type has the following meanings:
  - **0** - Outside the predefined range.
  - **1** - Within the predefined range.

✧ *Number*

The number of the GNSS positions included in the report message. Generally, it is 1.

4.2.5 LBC(Location By Call Alarm)

If the parameter <Location Request Mask> 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 SMS.

Example:
+RESP:GTLBC,8020070402,135790246811220,GB100CG,13275605061,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,01,1,20090214093254,008E$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	LBC
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Call Number	<=20	phone number
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72

Parts	Fields	Length	Range/Format
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Call Number*

The phone number of the incoming call which triggers the report message.

4.2.6 GES(Parking-Fence Information)

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

Example:
+RESP:GTGES,8020070402,864696060004173,GB100CG,,01,21,500,5,1,1,0.0,0,98.1,117.129366,31.839314,20230808070315,0460,0001,DF5C,05FE6667,01,15,4.0,20230808070316,0064$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	GES
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	0	
	Report ID / Report Type	<=3	X(0 - 13)Y(0 - 1)
	Trigger Mode	<=2	0 | 21 | 22
	Radius	<=7	50 - 6000000(m)
	Check Interval	<=5	0|5 - 86400(s)
	Number	1	1
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX

Parts	Fields	Length	Range/Format
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	Mileage	<=9	0.0 - 4294967.0(km)
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Report ID/Report Type*

It is a hexadecimal value represented by three ASCII bytes. The first two bytes indicates Report ID and the last byte indicates Report Type.

- Report ID

  The ID of Geo Fence in HEX format.
- Report Type
  - **0** - The current Parking-Fence is inactive.
  - **1** - The current Parking-Fence is active.

4.2.7 GIN|GOT(Geo-Fence Information)

✧ **+RESP:GTGIN**

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

✧ **+RESP:GTGOT**

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

Example:

+RESP:GTGIN,8020070402,866775051509693,GB100CG,,0,1,00000001,,,,,1,2,0.0,128,87.2,117.129397,31.838586,20240129091900,0460,0001,DF5C,05FE6667,01,12,0.0,20240129171901,B3B3$

+RESP:GTGOT,8020070402,866775051509693,GB100CG,,0,1,00000001,,,,,1,2,0.0,128,87.2,117.129397,31.838586,20240129092014,0460,0001,DF5C,05FE6667,00,0.0,20240129172014,B3BF$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	GIN | GOT
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF

Parts	Fields	Length	Range/Format
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	0	
	ID Report Format	1	0
	Parameter 1		
	Parameter 2		
	Parameter 3		
	Parameter 4		
	Parameter 5		
	Reserved	0	
	Number	1	1
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	Mileage	<=9	0.0 - 4294967.0 (km)
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *ID Report Format*

A numerical value to indicate the format of GEO ID. The following five parameters have different definitions for each format.

- **0:** Mask Format.

  Each Geo ID will be indicated as a bit of <Area Mask>.

Fields	Length	Range/Format
Area Type	1	0 | 1
Area Mask 1	8	00000000 - 000FFFFF
Reserved	0	

Fields	Length	Range/Format
Reserved	0	
Reserved	0	

✧ *Area Type*

This message is for circular area. 1 means "Circular".

✧ *Area Mask*

For circular area, it indicates the report message is for a single circle or multiple circles overlapping.

- **Bit 0** - For Circular ID 0
- **Bit 1** - For Circular ID 1
- ...
- **Bit 99** - For Circular ID 99

For example, if the Area Mask is 03, it indicates entering or exiting events of GEO-ID0 and GEO-ID1 occur at the same time.

4.2.8 SLM (Sleep Mode Configuration)

If <Mode> in **AT+GTSLM** is not set to 0, **+RESP:GTSLM** will be reported according to the setting.

Example:
+RESP:GTSLM,8020070402,001068000000006,GB100CG,,10,1,1,0.0,0,136.6,117.129285,31.839890,20231113034203,0460,0000,550B,085BE2AE,01,15,6.1,0001,11986,20231113114204,91FB$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	SLM
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	0	
	Report ID / Report Type	2	X(0-2)Y(0-2)
	Number	1	1
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx

Parts	Fields	Length	Range/Format
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	Mileage	<=9	0.0 - 4294967.0(km)
	Report Items Mask	<=4	0 - FFFF
	External Power Voltage (Optional)	<=5	0 - 32000(mV)
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Report ID / Report Type*

It indicates the sleep mode of the report and the type of the message.

- *Report ID*
  - **0** - Disable sleep mode
  - **1** - Normal sleep mode
  - **2** - Deep sleep mode
- *Report Type*
  - **0** - Enter sleep state
  - **1** - Exit sleep state
  - **2** - Wakeup by interval

✧ *Report Items Mask*

Please refer to <Report Item Mask> in the command (AT+GTSLM).

4.2.9 Google Maps Hyperlink

If the Google Maps hyperlink reporting feature in parameter <Location Request Mask> of the command (AT+GTCFG) is enabled, the device will send its current position to the mobile phone which makes the call request or SMS request via SMS with a Google Maps hyperlink.

Example:
LBC: GB100CG
http://maps.Google.com/maps?q=31.222073,121.354335
F1 D2009/01/01 T00:00:00 B0 I1 V0.0

Parts	Fields	Length	Range/Format
Body	Device Name	<=20	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Google Maps Hyperlink Header	30	http://maps.google.com/maps?q=
	Latitude	<=10	(-)xx.xxxxxx
	Longitude	<=11	(-)xxx.xxxxxx
	GNSS Fix	<=3	F[F0 - F50]
	GNSS UTC Time	20	DYYYY/MM/DDTHH:MM:SS
	Battery Percentage	<=4	B[B0 - B100]
	Ignition Status	2	I[0 | 1]
	Speed	<=6	V0.0 - V999.9(km/h)

- *Google Maps Hyperlink*
  A string of a Google Maps hyperlink.
- *GNSS Fix*
  The accuracy of the location information. F0 means "No GNSS fix".
- *Battery Percentage*
  The percentage of the backup battery.
- *Ignition Status*
  The status of ignition. 0 means "Ignition off", and 1 means "Ignition on".
- *Speed*
  The current speed. Unit: km/h.

4.2.10 GSM(Cells Information)

The report for the information of the serving cell and the neighboring cells.

Example:
+RESP:GTGSM,8020070402,867564050606638,FRI,0460,0000,DF5C,0DD0833A,47,,0460,0000,DF5C,02A90916,35,,0460,0000,DF5C,02A90902,29,,0460,0000,DF5C,02A90911,28,,0460,0000,DF5C,05DA7D2A,,37,0460,0000,DF5C,02A90907,30,,0460,0000,550B,085BE2AA,14,00,20231019172350,B2A2$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	GSM
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
Body	Fix Type	3	RTL | LBC | TOW | FRI | GIR | ERI |
	MCC1	4	0XXX

Parts	Fields	Length	Range/Format
	MNC1	4	0XXX
	LAC1	4	XXXX
	Cell ID1	4|8	XXXX/XXXXXXXX
	RX Level1	<=3	0 - 31 | 99 | 0 - 97 | 255
	Reserved	0	
	MCC2	4	0XXX
	MNC2	4	0XXX
	LAC2	4	XXXX
	Cell ID2	4|8	XXXX/XXXXXXXX
	RX Level2	<=3	0 - 31 | 99 | 0 - 97 | 255
	Reserved	0	
	MCC3	4	0XXX
	MNC3	4	0XXX
	LAC3	4	XXXX
	Cell ID3	4|8	XXXX/XXXXXXXX
	RX Level3	<=3	0 - 31 | 99 | 0 - 97 | 255
	Reserved	0	
	MCC4	4	0XXX
	MNC4	4	0XXX
	LAC4	4	XXXX
	Cell ID4	4|8	XXXX/XXXXXXXX
	RX Level4	<=3	0 - 31 | 99 | 0 - 97 | 255
	Reserved	0	
	MCC5	4	0XXX
	MNC5	4	0XXX
	LAC5	4	XXXX
	Cell ID5	4|8	XXXX/XXXXXXXX
	RX Level5	<=3	0 - 31 | 99 | 0 - 97 | 255
	Reserved	0	
	MCC6	4	0XXX
	MNC6	4	0XXX
	LAC6	4	XXXX
	Cell ID6	4|8	XXXX/XXXXXXXX
	RX Level6	<=3	0 - 31 | 99 | 0 - 97 | 255
	Reserved	0	
	MCC	4	0XXX

Parts	Fields	Length	Range/Format
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX/XXXXXXXX
	RX Level	<=3	0 - 31 | 99 | 0 - 97 | 255
	Reserved	2	00
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Fix Type*

A string to indicate the type of GNSS fix for which this cell information is used.

- **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 sub command "**C**" in the (AT+GTRTO) command.
- **ERI** - This cell information is for ERI request.

✧ *MCC(i)*

MCC of the neighboring cell i (i is the index of the neighboring cell).

✧ *MNC(i)*

MNC of the neighboring cell i.

✧ *LAC(i)*

LAC in hex format of the neighboring cell i.

✧ *Cell ID(i)*

Cell ID in hex format of the neighboring cell i.

✧ *RX Level(i)*

The signal strength of the neighboring cell i. This parameter is a 6-bit value coded in 1 dB steps:

For 2G/3G network:

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

For 4G network:

CSQ RSRP	Signal Strength (dBm)
0	<-140
1	-140
2 - 96	-139 - -44
97	>= -44

CSQ RSRP	Signal Strength (dBm)
255	Unknown

- *MCC*
  MCC of the serving cell.
- *MNC*
  MNC of the serving cell.
- *LAC*
  LAC in hex format of the serving cell.
- *Cell ID*
  Cell ID in hex format of the serving cell.
- *RX Level*
  The signal strength of the serving cell.

Note

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

4.3 Device Information Reports

This section describes the message related to device generic information. Please refer to the details below.

4.3.1 INF(Device Information)

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.

Example:
+RESP:GTINF,8020070402,135790246811220,GB100CG,16,898600810906F8048812,16,0,1,12000,0,4.40,0,0,,,20230214013254,,,,,,+0800,0,20230214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	INF
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI

Parts	Fields	Length	Range/Format
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Motion Status	2	11 | 12 | 21 | 22 | 41 | 42 | 1A | 16
	ICCID	20	
	CSQ RSSI|RSRP	<=3	0 - 31 | 99 | 0 - 97 | 255
	CSQ BER	<=2	0 - 7 | 99
	External Power Supply	1	0 | 1
	External Power Voltage	<=5	0 - 32000(mV)
	Network Type	<=2	0-3
	Backup Battery Voltage	4	0.00 - 4.50 (V)
	Charging	1	0 | 1
	LED State	1	0 | 1
	Reserved	0	
	Reserved	0	
	Last Fix UTC Time	14	YYYYMMDDHHMMSS
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Time Zone Offset	5	+|-HHMM
	Daylight Saving	1	0 | 1
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	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/RSRP*

  The signal strength level.

  For 2G/3G network:

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

  For 4G network:

CSQ RSRP	Signal Strength (dBm)
0	<-140
1	-140
2 - 96	-139 - -44
97	>= -44
255	Unknown

- *CSQ BER*

  The quality of the GSM signal. The range is 0-7, and 99 is for unknown strength of signal.

- *External Power Supply*

  Whether the external power supply is connected.

  - **0** - Not connected.
  - **1** - Connected.

- *External Power Voltage*

  The voltage of the external power supply.

- *Network Type*

  The type of the mobile network the device is currently registered on.

  - **0** - Unregistered
  - **1** - EGPRS
  - **2** - Reserved
  - **3** - LTE

- *Backup Battery Voltage*

  The voltage of the backup battery. The value of this field is valid only 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.

- *LED State*

  A numeral to indicate the working status of all LED lights.

  - **0** - All LED lights are turned off.

- **1** - At least one of the LED lights is on.

✧ *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.

4.4 RTO Reports

This section describes the feedback messages of runtime operations. Please refer to the details below.

4.4.1 GPS(GNSS Information)

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**.

Example:
+RESP:GTGPS,8020070402,135790246811220,GB100CG,,,,003F,,20230524051345,20230524051346,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	GPS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	0	
	Reserved	0	
	Reserved	0	
	Report Item Mask	4	0000 - FFFF
	Reserved	0	
	Reserved	0	
	Last Fix UTC Time	14	YYYYMMDDHHMMSS
Tail	Send Time	14	YYYYMMDDHHMMSS

Parts	Fields	Length	Range/Format
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Report Item Mask*

Please refer to <Report Item Mask> of the command (AT+GTCFG).

4.4.2 ALM(Command Configuration Information)

After the device receives the command (AT+GTRTO) to read the configurations, it will send corresponding configuration information to the backend server via the message **+RESP:GTALM** according to the configuration mask. This message is only sent via GPRS even if the report mode is forced SMS mode, and it does not support HEX format.

Example:
+RESP:GTALM,8020070402,866775051629715,GB100CG,1,1,1,BSI,cmnet,cmnet_name,cmnet_password,3gnet,3gnet_name,3gnet_password,1,,,\^,20231218071618,71C5$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	ALM
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Format Version	<=3	0 - 999
	Total Packets	<=2	1 - 99
	Current Packet	<=2	1 - 99
	BSI	3	BSI
	APN	<=64	
	APN User Name	<=30	
	APN Password	<=30	
	Backup APN	<=64	
	Backup APN User Name	<=30	
	Backup APN Password	<=30	
	Network Mode	1	0 - 3
	Reserved	0	
	Reserved	0	
	Cutoff Character(Optional)	2	\^

Parts	Fields	Length	Range/Format
	...		
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

- *Total Packets*
  The total number of **+RESP:GTALM**.
- *Current Packet*
  The sequence number of the current message.
- *Cutoff Character(Optional)*
  It is controlled by the parameter <Format Version> in (AT+GTRTO). If <Format Version> is 1, these two characters are appended to the end of each command configuration, otherwise this field will not exist.

4.4.3 CID(ICCID Information)

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**.

Example:
+RESP:GTCID,8020070402,864696060004173,GB100CG,89860118801541301090,20230810112751,04EA$

Parts	Fields	Length	Range/Format
Head	Header	3	+RESP:GT
	Message Name	3	CID
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' - '_'
Body	ICCID	20	'0' - '9', 'a' - 'z' 'A' - 'Z'
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.4.4 CSQ(Network Signal Information)

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**.

Example:
+RESP:GTCSQ,8020070402,135790246811220,GB100CG,16,0,20090214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	CSQ
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	CSQ RSSI|RSRP	<=3	0 - 31 | 99 | 0 - 97 | 255
	CSQ BER	<=2	0 - 7 | 99
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *CSQ RSSI/RSRP*

The signal strength level.

For 2G/3G network:

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

For 4G network:

CSQ RSRP	Signal Strength (dBm)
0	<-140
1	-140
2 - 96	-139 - -44
97	>= -44
255	Unknown

✧ *CSQ BER*

The quality of the GSM signal. The range is 0-7, and 99 is for unknown strength of signal.

4.4.5 VER(Firmware Version Information)

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

Example:
+RESP:GTVER,8020070402,135790246811220,GB100CG,802007,0100,0101,20090214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	VER
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Device Type	6	802007
	Software Version	4	0000 - FFFF
	Hardware Version	4	0000 - FFFF
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

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

4.4.6 BAT(Battery Information)

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**.

Example:
+RESP:GTBAT,8020070402,135790246811220,GB100CG,1,12000,,4.40,0,0,20230524052049,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BAT

Parts	Fields	Length	Range/Format
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	External Power Supply	1	0 | 1
	External Power Voltage	<=5	0 - 32000(mV)
	Reserved	0	
	Backup Battery Voltage	4	0.00 - 4.50 (V)
	Charging	1	0 | 1
	LED State	1	0 | 1
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.4.7 TMZ(Time Zone Information)

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

Example:
+RESP:GTTMZ,8020070402,866775051508042,GB100CG,+0000,0,0,20220630032656,2B45$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	TMZ
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Time Zone Offset	5	+|-HHMM
	Daylight Saving	1	0 | 1
	Network Time Checking	1	0 - 1
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.4.8 AIF(Basic Device Information)

After the device receives the command (AT+GTRTO) to get the basic device information, it will send the information via the message **+RESP:GTAIF** to the backend server.

Example:
+RESP:GTAIF,8020070402,866775051629715,GB100CG,cmnet,cmnet_name,cmnet_password,3gnet,3gnet_name,3gnet_password,898600e0123955608398,24,0,B7B1,10.57.5.91,211.138.180.4,211.138.180.5,,,,,20231218061747,714A$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	AIF
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	APN	<=64	
	APN User Name	<=30	
	APN Password	<=30	
	Backup APN	<=64	
	Backup APN User Name	<=30	
	Backup APN Password	<=30	
	ICCID	20	
	CSQ RSSI|RSRP	<=3	0 - 31 | 99 | 0 - 97 | 255
	CSQ BER	<=2	0 - 7 | 99
	Cell ID	4|8	XXXX/XXXXXXXX
	IP Address	<=15	0.0.0.0
	Main DNS	<=15	0.0.0.0
	Backup DNS	<=15	0.0.0.0
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *CSQ RSSI/RSRP*

The signal strength level.

For 2G/3G network:

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

For 4G network:

CSQ RSRP	Signal Strength (dBm)
0	<-140
1	-140
2 - 96	-139 - -44
97	>= -44
255	Unknown

- *CSQ BER*

  The quality of GSM signal. Its range is from 0 to 7, and 99 indicates unknown signal strength.
- *Cell ID*

  The serving cell ID in HEX format.
- *IP Address*

  The IP address of the device.
- *Main DNS*

  The main DNS server.
- *Backup DNS*

  The backup DNS server.

4.4.9 GSV(GPS Satellite Information)

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

Example:
+RESP:GTGSV,8020070402,359464036001111,GB100CG,11,30,24,31,30,32,28,32,29,12,0,14,17,16,18,20,0,22,24,24,0,25,0,20230524052627,000F$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	GSV
	Leading Symbol	1	,

Parts	Fields	Length	Range/Format
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	SV Count	<=2	0-24
	SV ID	<=3	>=0
	SV Power	<=2	>=0
	...		
	SV ID	<=3	>=0
	SV Power	<=2	>=0
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

- *SV Count*
  The count of satellites found by GPS.
- *SV ID*
  Satellite ID. If there is no satellite, the field is filled with zero.
- *SV Power*
  Satellite power. If there is no satellite, the field is filled with zero.

4.4.10 RSV(GLONASS Satellite Information)

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

Example:
+RESP:GTRSV,8020070402,867995030082104,GB100CG,6,3,43,16,25,22,11,25,39,29,40,31,40,20190417011932,000E$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	RSV
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	SV Count	<=2	0 - 24
	SV ID	<=3	>=0
	SV Power	<=2	>=0

Parts	Fields	Length	Range/Format
	...		
	SV ID	<=3	>=0
	SV Power	<=2	>=0
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

- *SV Count*

  The count of satellites found by GLONASS.

- *SV ID*

  Satellite ID. If there is no satellite, this field is filled with zero.

- *SV Power*

  Satellite power. If there is no satellite, this field is filled with zero.

4.4.11 BSV(Beidou Satellite Information)

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

Example:
+RESP:GTBSV,8020070402,359464036001111,GB100CG,11,30,24,31,30,32,28,32,29,12,0,14,17,16,18,20,0,22,24,24,0,25,0,20230524052627,000F$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BSV
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	SV Count	<=2	0 - 24
	SV ID	<=3	> =0
	SV Power	<=2	> =0
	...		
	SV ID	<=3	> =0
	SV Power	<=2	> =0
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

- *SV Count*
  The count of satellites found by Beidou.
- *SV ID*
  Satellite ID. If there is no satellite, the field is filled with zero.
- *SV Power*
  Satellite power. If there is no satellite, the field is filled with zero.

4.4.12 ATI(Version Information)

After the device receives the command (AT+GTRTO) to get the basic device information, it will send the information to the backend server via the message **+RESP:GTATI**.

Example:
+RESP:GTATI,8020070402,867564050607529,GB100CG,00181031,0114,0101,0104,0103,67,867564050607529,20231025052302,000C$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	ATI
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	ATI Mask	<=8	00000000 - FFFFFFFF
	Firmware Version	4	'0' - '9' 'a' - 'z' 'A' - 'Z
	Hardware Version	4	'0' - '9' 'a' - 'z' 'A' - 'Z
	BT Firmware Version	4	'0' - '9' 'a' - 'z' 'A' - 'Z
	BT Boot Firmware Version	4	'0' - '9' 'a' - 'z' 'A' - 'Z
	Sensor ID	2	'0'-'9' 'a'-'z' 'A'-'Z'
	Modem IMEI	15	IMEI
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

- *ATI Mask*
  This mask is set by the (AT+GTRTO) command and used to control parameter fields in the **+RESP:GTATI** message.
- *Firmware Version*
  The firmware version of the device. The first two characters represent the branch number, the middle two characters represent the major version and the last two characters represent the minor version. For example, **000101** means version **R00A01V01**.

- *Hardware Version*
  The hardware version of the device. The first two characters represent the major version and the last two characters represent the minor version. For example, **0101** means version **1.01**.
- *BT Firmware Version*
  The Bluetooth firmware version. The first two characters represent the major version and the last two characters represent the minor version. For example, **010A** means the version **1.10**.
- *BT Boot Firmware Version*
  The Bluetooth Boot firmware version. The first two characters represent the major version and the last two characters represent the minor version. For example, **010A** means the version **1.10**.
- *Sensor ID*
  It indicates the sensor type used by the device.
- *Modem IMEI*
  The Modem IMEI of the terminal device.

4.4.13 BTI(Bluetooth Peripheral Information)

After the device receives the command (AT+GTRTO) to get the Bluetooth peripheral information and the list of connected peripherals, it will send the information to the backend server via the message **+RESP:GTBTI**. If the connection between the Primary device and the Ghost device is successful, the battery percentage of the Ghost device will be reported periodically via the message **+RESP:GTBTI** according to the <BTI Report Interval> in (AT+GTSVR).

Example:
+RESP:GTBTI,8020070402,867564050607529,GB100CG,GB100CG%IMEI,78054135A5EE,1,1,,047F0E329540,0,,,,,,,,,20231031105801,2774$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BTI
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	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

Parts	Fields	Length	Range/Format
	Role	1	0 | 1
	Real-Time State	1	0 - 1
	Ghost Battery Percentage	3	0 - 100
	Ghost Status	4	0000 - FFFF
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Bluetooth State*

The connection status of the Bluetooth when the device is the Primary device.

- **0** - The Bluetooth is not connected.
- **1** - The Bluetooth is connected.

✧ *Connected Device Number*

The number of the connected peripheral device. If there is more than one device connected, the information for the parameters <Connected Device Name>, <Connected Device Mac> and <Role> will be displayed repeatedly.

✧ *Connected Device Name*

The name of the connected peripheral device.

✧ *Connected Device Mac*

The Mac address of the connected peripheral device.

✧ *Role*

The role type of the peripheral device.

- **0** - Ghost device
- **1** - Primary device

✧ *Real-Time State*

It indicates the data type of <Ghost Battery Percentage> and <Ghost Status> read from the Ghost device.

- **0** - Historical data
- **1** - Real-time data

✧ *Ghost Battery Percentage*

The current capacity of the backup battery in percentage.

Note

The parameter <Connected Device Name> will be empty if the terminal device is the Primary device.

✧ *Ghost Status*

Bitwise mask to define status of the Ghost device. 0 indicates "The corresponding abnormal status is not detected", and 1 indicates "The corresponding abnormal status is detected".

- **Bit 0** - Reserved
- **Bit 1** - GNSS fix failure
- **Bit 2** - Detected fake cell
- **Bit 3** - Battery low warning
- **Bit 4** - Fail to get RTC time
- **Bit 5** - SIM card error
- **Bit 6** - GSM unavailable
- **Bit 7** - GPRS unavailable
- **Bit 8** - Fail to connect to the backend server
- **Bit 9 - Bit 14** - Reserved
- **Bit 15** - Communication error between BLE and BB

Note

The parameters <Real-Time State>, <Ghost Battery Percentage> and <Ghost Status> are empty if <Mode> in the command (AT+GTSVR) is 0 .

4.4.14 SCS(Acceleration Calibration Information)

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.

Example:
+RESP:GTSCS,8020070402,865585040006649,GB100CG,2,-0.06,0.88,-0.48,-0.97,0.05,0.22,0.22,0.48,0.85,20230524132442,1F59$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	SCS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Self Calibration Status	1	0-2
	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

Parts	Fields	Length	Range/Format
	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
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	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.

4.5 Event Reports

This section describes the message related to certain events. Please refer to the details below.

4.5.1 Generic Event Report

- PNA: Power-on Report
- PFA: Power-off Report
- PDP: GPRS Connection Establishment Report

Example:
+RESP:GTPNA,8020070402,135790246811220,GB100CG,20230524052727,11F0$

+RESP:GTPFA,8020070402,135790246811220,GB100CG,20230524052727,11F0$

+RESP:GTPDP,8020070402,135790246811220,GB100CG,20230524052727,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	PNA | PFA | PDP
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.5.2 MPN | MPF | BTC

- MPN(Main Power Connection)
  The report for connecting the main power supply.
- MPF(Main Power Disconnection)
  The report for disconnecting the main power supply.
- BTC(Battery Starts Charging)
  Report when backup battery starts charging.

Example:
+RESP:GTMPN,8020070402,867564050606638,GB100CG,0,0.0,149,88.0,117.129128,31.839228,20231020023810,0460,0001,DF5C,027A4F1F,01,15,20231020103811,581B$

+RESP:GTMPF,8020070402,867564050606638,GB100CG,0,0.0,6,100.9,117.129163,31.839223,20231020035655,0460,0001,DF5C,027A4F1F,01,15,20231020115656,591B$

+RESP:GTBTC,8020070402,867564050606638,GB100CG,0,0.0,6,100.9,117.129163,31.839223,20231020035704,0460,0001,DF5C,027A4F1F,01,15,20231020115705,5920$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	MPN | MPF | BTC

Parts	Fields	Length	Range/Format
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX/XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.5.3 JDR(Network Jamming Indication Notification)

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

Example:
+RESP:GTJDR,8020070402,867564050606638,GB100CG,3,0,0.4,180,122.0,117.129808,31.839390,20231022082006,0460,0000,691D,6141,01,13,20231022175211,02B0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	JDR
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'

Parts	Fields	Length	Range/Format
Body	Jamming Net	1	1-3
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Jamming Net*

The network mode.

- **1** - EGPRS/GSM
- **2** - LTE-Cat1
- **3** - EGPRS/GSM and LTE

4.5.4 JDS(Network Jamming Indication Notification)

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

Example:
+RESP:GTJDS,8020070402,867564050606638,GB100CG,1,3,0,1.7,335,91.8,117.129867,31.839012,20231022083422,0460,0001,DF5C,0DD0833A,01,15,20231022180423,02C4$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	JDS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF

Parts	Fields	Length	Range/Format
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Jamming Status	1	1 | 2
	Jamming Net	1	1-3
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Jamming Status*

The current jamming status of the device.

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

✧ *Jamming Net*

Please refer to the message **+RESP:GTJDR** for details.

Note

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

4.5.5 STC(Battery Stops Charging)

Report when backup battery stops charging.

Example:
+RESP:GTSTC,8020070402,867564050606638,GB100CG,,0,0.0,6,100.9,117.129163,31.839223,20231020035652,0460,0001,DF5C,027A4F1F,01,15,20231020115653,591A$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	STC
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	0	
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.5.6 BPL(Backup Battery Low Alarm)

Example:
+RESP:GTBPL,8020070402,867564050607560,GB100CG,3.69,1,0.0,359,105.2,117.129305,31.839527,20231023105509,0460,0001,DF5C,027A4F1F,01,15,20231023185510,006C$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BPL

Parts	Fields	Length	Range/Format
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Backup Battery Voltage	<=4	0.00 - 4.50 (V)
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.5.7 STT(Device Status Notification)

Report when the device motion status changes.

Example:
+RESP:GTSTT,8020070402,867564050606638,GB100CG,22,0,0.0,6,100.9,117.129163,31.839223,20231020050412,0460,0001,DF5C,027A4F1F,01,15,20231020130413,5962$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	STT
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'

Parts	Fields	Length	Range/Format
Body	Motion Status	2	11 | 12 | 21 | 22 | 41 | 42 | 16
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	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.

4.5.8 VGN(Virtual Ignition-on Report)

Example:
+RESP:GTVGN,8020070402,867564050606638,GB100CG,00,2,322,0,0.0,3,64.3,117.129078,31.839133,20231020051822,0460,0001,DF5C,027A4F1F,01,15,0000044:23:07,201.3,20231220131845,5997$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	VGN
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	2	00
	Report Type	1	2 | 4 | 7
	Duration of Ignition Off	<=6	0 - 999999(s)
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	Hour Meter Count	11 - 13	00000:00:00 - 1193000:00:00
	Mileage	<=9	0.0 - 4294967.0 (km)
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Report Type*

This parameter indicates the trigger source of the ignition event.

- **2** - External power voltage mode (virtual ignition detection)
- **4** - Accelerometer mode (virtual ignition detection)
- **7** - Combined detection mode. In this mode, ignition on/off trigger conditions can be selected using parameters <Virtual Ignition On Mask> and <Virtual Ignition Off Mask> in the command (AT+GTVMS).

Note

<Virtual Ignition off Mask> must contain <Virtual Ignition On Mask> to prevent logic errors.

✧ *Duration of Ignition Off*

Duration since last time the ignition is off. If it is greater than 999999 seconds, it is 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. It is formatted with 5 to 7 hour digits, 2 minute digits and 2 second digits. If the function is disabled, this field will be empty.

4.5.9 VGF(Virtual Ignition-off Report)

Example:
+RESP:GTVGF,8020070402,867564050607511,GB100CG,00,2,349,1,0.1,194,111.5,117.129287,31.839198,20231122081220,0460,0001,DF5C,027A4F1F,01,15,0000001:39:46,0.0,20231122161220,0E57$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	VGF
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	2	00
	Report Type	1	2 | 4 | 7
	Duration of Ignition On	<=6	0 - 999999(s)
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	Hour Meter Count	11 - 13	00000:00:00 - 1193000:00:00

Parts	Fields	Length	Range/Format
	Mileage	<=9	0.0 - 4294967.0 (km)
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Duration of Ignition On*

Duration since last time the ignition is turned on. If it is greater than 999999 seconds, it is 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. It is formatted with 5 to 7 hour digits, 2 minute digits and 2 second digits. If the function is disabled, this field will be empty.

4.5.10 IDF(Exit Idle State)

Report when the vehicle exits the idle state.

Example:
+RESP:GTIDF,8020070402,135790246811220,GB100CG,22,300,0,4.3,92,70.0,121.354335,31.222073,20230214013254,0460,0000,18d8,6141,05,1,220100,2000.0,20230214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	IDF
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Motion Status	2	11 | 12 | 1A | 16 | 22
	Duration of Idling Status	<=6	0 - 999999 (s)
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX

Parts	Fields	Length	Range/Format
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	Mileage	<=9	0.0 - 4294967.0 (km)
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Motion Status*

The current motion status when the vehicle exits the idle state.

✧ *Duration of Idling Status*

The period of time during which the vehicle stays in idle state. If it is greater than 999999 seconds, it will be reported as 999999 seconds.

4.5.11 GSS(GNSS Signal Status)

Example:
+RESP:GTGSS,8020070402,867564050607511,GB100CG,1,11,21,,1,0.0,97,40.8,117.255147,31.817880,20231114080338,0460,0001,DF5C,027A4F1F,01,11,20231114160339,C2A3$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	GSS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	GNSS Signal Status	1	0 | 1
	Satellite Number	<=2	0 - 24
	Motion Status	2	11 | 12 | 21 | 22 | 41 | 42 | 16 | 1A
	Reserved	0	
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx

Parts	Fields	Length	Range/Format
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *GNSS Signal Status*

- **0** - GNSS signal is lost or GNSS fix fails
- **1** - GNSS signal is recovered and GNSS fix is successful

✧ *Satellites in Use*

The number of satellites 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.
- **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.

4.5.12 STR | STP | LSP | IDN

✧ STR: Enter Start State
✧ STP: Enter Stop State
✧ LSP: Enter Long Stop State
✧ IDN: Enter Idle State

Example:
+RESP:GTSTR,8020070402,867564050606638,GB100CG,,,0,49.3,187,44.0,117.209817,31.85526

2,20231017054516,0460,0001,DF5C,027A4F1F,01,15,206.7,20231017134516,5E31$

+RESP:GTSTP,8020070402,867564050606638,GB100CG,,,0,65.4,84,22.8,117.227840,31.818392,20231017055130,0460,0001,DF5C,027A4F1F,01,0,19.9,20231017135329,1083$

+RESP:GTLSP,8020070402,867564050606638,GB100CG,,,0,0.0,188,57.5,117.206825,31.836330,20231017053310,0460,0001,DF5C,027A4F1F,01,6,110.5,20231017133425,1157$

+RESP:GTIDN,8020070402,867564050607529,GB100CG,,,0,0.0,0,80.7,117.129312,31.839252,20231026075352,0460,0000,550B,085BE2AA,01,15,100.1,20231026172353,009B$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	STR | STP | LSP | IDN
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	0	
	Reserved	0	
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	Mileage	<=9	0.0 - 4294967.0 (km)
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.5.13 RMD(Roaming State Report)

If the GSM roaming state of the device changes, the current roaming state will be reported in the **+RESP:GTRMD** message.

Example:
+RESP:GTRMD,8020070402,867564050607529,GB100CG,1,0,0.0,354,101.3,117.129343,31.839320,20231027074415,0460,0000,550B,085BE2AA,01,2,20231027171438,00AD$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	RMD
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Roaming State	1	0 - 3
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Roaming State*

A numeral to indicate the roaming state.

- **0** - Home
- **1** - Known roaming
- **2** - Unknown roaming
- **3** - Blocking report

4.5.14 SVR(Stolen Vehicle Recovery)

Stolen vehicle recovery message reported by the Primary device.

Example:
+RESP:GTSVR,8020070402,866775051512598,GB100CG,1,78054125E8F7,700000000000000000000000,,1,0.0,0,56.8,117.129404,31.839378,20221201021215,0460,0000,550B,30A5,01,12,20221201021216,003D$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	SVR
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	SVR Working State	1	0-2
	Ghost MAC Address	12	000000000000 - FFFFFFFFFFFF
	SVR Appending Information	<=30	
	Reserved	0	
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *SVR Working State*

It indicates the status in which the **+RESP:GTSVR** alert message is generated.

- **0** - Primary loses connection with Ghost.
- **1** - Primary regains connection with Ghost normally.
- **2** - Primary fails to match Ghost during installation phase.

✧ *SVR Appending Information*

It indicates additional Bluetooth information.

4.5.15 RTP(Remote File Transfer)

Report file transfer information.

Example:
+RESP:GTRTP,8020070402,862170019025640,GB100CG,0,0,1,100,20231207063729,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	RTP
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Mode	1	0
	Protocol Type	1	0
	File Type	1	0-2
	Code	3	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Mode*

The working mode of file transfer.

- **0** - Download file

✧ *Protocol Type*

The type of communication protocol used to obtain data from the backend server.

- **0** - HTTP

✧ *File Type*

It defines the type of file to download from the server.

- **0** - CA certificate
- **1** - Client certificate
- **2** - Client key

✧ *Code*

It indicates the download information.

- **100** - The update command is starting.

- **101** - The update command is refused by the device.
- **200** - The device starts to download the file.
- **201** - The device finishes downloading the file successfully.
- **202** - The device fails to download the file.
- **301** - The device finishes updating the file successfully.
- **302** - The device fails to update the file.

4.5.16 PNR(Power-on Reason)

This message indicates the reason for power on.

Example:
+RESP:GTPNR,8020070402,863835020303983,GB100CG,0,,,,,20150407094557,0633$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	PNR
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Power On Reason	1	0-3 | 6
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Power On Reason*

It indicates the reason for power on.

- **0** - Normal power on
- **1** - FOTA reboot
- **2** - RTO reboot
- **3** - Watchdog reboot
- **6** - Configuration upgrade reboot

4.5.17 PFR(Power-off Reason)

This message indicates the reason for power off.

Example:
+RESP:GTPFR,8020070402,863835020303983,GB100CG,0,,,,,20150407094557,0633$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	PFR
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Power Off Reason	1	0-3
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Power Off Reason*

It indicates the reason for power off.

- **0** - RTO power off
- **1** - Low battery voltage
- **2** - RTO reboot
- **3** - Watchdog reboot

4.5.18 CRA(Crash Alarm)

Example:
+RESP:GTCRA,8020070402,866775051514750,GB100CG,08,3,0.0,0,2.1,117.129271,31.839842,20220906121042,0460,0000,550B,30A5,05,1,220100,20220906121043,0057$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	CRA
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'

Parts	Fields	Length	Range/Format
Body	Crash Counter	2	0 - FF
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Crash Counter*

It indicates the crash sequence, combining the report of **+RESP:GTCRA** and **+RESP:GTCRD** into one crash event. It rolls from 0x00 to 0xFF.

4.5.19 BCS(Bluetooth Connection Report)

Example:
+RESP:GTBCS,8020070402,867564050606638,GB100CG,,0,0.0,10,73.0,117.129350,31.838862,20231020054409,0460,0001,DF5C,027A4F1F,01,15,0D03,GB100CG,94DEB87C49CB,0,1,48D054374052,,,,,20231020134409,59D9$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BCS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	0	
	GNSS Accuracy	<=2	0 - 50

Parts	Fields	Length	Range/Format
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	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	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	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

4.5.20 BDS(Bluetooth Disconnection Report)

Example:
+RESP:GTBDS,8020070402,867564050607560,GB100CG,,1,0.0,359,98.9,117.129135,31.839270,20231023110813,0460,0000,550B,085BE2AA,01,15,0D03,GB100CG,78054135A5F2,0,0,047F0E329540,0,,,,20231023190813,008F$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BDS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	0	
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	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
	Reason	1	0
	Reserved	0	
	Reserved	0	

Parts	Fields	Length	Range/Format
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	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

✧ *Reason*

This parameter indicates the reason of Bluetooth disconnection.

- **0x00** - Normal disconnection.

4.5.21 ASC(Acceleration Calibration Alarm)

The report for calibration data.

Example:
+RESP:GTASC,8020070402,867564050606638,GB100CG,0.82,0.58,0.01,-0.57,0.81,0.07,0.03,-0.06,0.99,0,0.6,185,50.1,117.129197,31.839195,20231019125426,0460,0001,DF5C,027A4F1F,01,15,20231019205427,B58C$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	ASC
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	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

Parts	Fields	Length	Range/Format
	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 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	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**.

4.5.22 HBE(Acceleration Information for HBM)

If harsh behavior is over in Mode 5 of the (AT+GTHBM) command, this message will be sent to the backend server.

Example:
+RESP:GTHBE,8020070402,867564050607560,GB100CG,,2,2,1,0.9,359,99.6,117.129038,31.8390

02,20231024104500,0460,0000,550B,085BE2AA,01,15,000B0046004E,0000FFCA0039,65,0.0,20231024104501,AF9C$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	HBE
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	0	
	Self Calibration Status	1	0-2
	Harsh Behavior Type	1	0-4
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	0000 - FFFF|00000000 - FFFFFFFF
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	Max Acceleration Data	12	'0'-'9' 'a'-'f'
	Average Acceleration Data	12	'0'-'9' 'a'-'f'
	Harsh Behavior Duration	<=6	0 - 999999(x10ms)
	Mileage	<=9	0.0 - 4294967.0 (km)
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Max Acceleration Data*

A string made up of 12 characters. It is a set of the maximal values of each axis collected during the occurrence of the harsh driving behavior.

The first 4 characters of these 12 characters represent X axis acceleration data, the middle 4 characters represent Y axis acceleration data and the last 4 characters are for Z axis

acceleration data.

The ASCII "0001" indicates HEX value 0x0001, so it means the acceleration is 1. The ASCII "fffd" indicates HEX value 0xFFFD which is the compliment of -3, so it means the acceleration is -3. This value is only valid in Mode 5 of the (AT+GTHBM) command.

✧ *Average Acceleration Data*

There are 12 characters in a group of acceleration data. It is the average value of acceleration data which triggers this harsh behavior report.

The first 4 characters of these 12 characters represent X axis acceleration data, the middle 4 characters represent Y axis acceleration data and the last 4 characters are for Z axis acceleration data.

The ASCII "0001" indicates HEX value 0x0001, so it means the acceleration is 1. The ASCII "fffd" indicates HEX value 0xFFFD which is the compliment of -3, so it means the acceleration is -3. This value is only valid in Mode 5 of the (AT+GTHBM) command.

✧ *Harsh Behavior Duration*

The duration of the harsh behavior event. This value is only valid in Mode 5 of the (AT+GTHBM) command.

✧ *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.

✧ *Harsh Behavior Type*

The type of the harsh behavior.

- **0** - Harsh braking behavior.
- **1** - Harsh acceleration behavior.
- **2** - Harsh cornering behavior.
- **3** - Harsh braking and cornering behavior.
- **4** - Harsh acceleration and cornering behavior.

4.5.23 BAA(Bluetooth Accessory Alarm)

Example:
+RESP:GTBAA,8020070402,867995030131778,gb100cg,00,6,0,00,001F,TD_100109,FD6D3DE6D704,1,350,17,0,0,20151210084039,0,2,0,0,105.6,0,54.8,117.129384,31.839299,20191119013822,0460,0000,550B,B1E2,01,1,20191119013823,03F8$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BAA
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI

Parts	Fields	Length	Range/Format
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Index	<=2	(HEX) 0 - 9 | 0xFF
	Accessory Type	<=2	0 | 3 | 6 | 12 | 13 | 15
	Accessory Model|Beacon ID Model	1	0 | 2 | 4 | 5
	Alarm Type	2	0-4 | 7-9 | E-15 | 19-1E
	Append Mask	4|8	0000 - 7FFF | 00000000 - FFFF7FFF
	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 Battery Level(Optional)	<=4	0 - 5000(mV)
	Accessory Temperature(Optional)	<=3	-40 - 80(℃)
	Accessory Humidity(Optional)	<=3	0 - 100%(rh)
	Tire Pressure(Optional)	<=3	0 - 500(kPa)
	Timestamp(Optional)	14	YYYYMMDDHHMMSS
	Enhanced Temperature(Optional)	<=5	-40.00 - 80.00(℃)
	Accessory Battery Percentage(Optional)	<=3	0 - 100(%)
	Relay Config Result(Optional)	1	0 - 4
	Relay State(Optional)	1	0 - 1
	Tri-axial Acceleration Data (Optional)	12	HEX
	Angle Values (Optional)	6	HEX
	Event Mask (Optional)	2	HEX
	Tilt Event (Optional)	4	HEX
	Motion Event (Optional)	4	HEX
	Crash Event (Optional)	4	HEX
	Falling Event (Optional)	4	HEX
	Accessory RSSI (Optional)	<=4	-128 - 127
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx

Parts	Fields	Length	Range/Format
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Index*

The index of the Bluetooth accessory.

- The index of the Bluetooth accessory defined in (AT+GTBAS) which triggers the **+RESP:GTBAA** message.

For WKF300, it is 0xFF. For other Beacon, it is 0xFE.

✧ *Accessory Type*

The type of the Bluetooth accessory which is defined in the <Index>.

- **0** - No Bluetooth accessory
- **3** - Bluetooth beacon accessory
- **6** - Beacon Multi-functional sensor
- **12** - BLE TPMS sensor
- **13** - Relay sensor
- **15** - Movement-angle BLE sensor

✧ *Accessory Model / Beacon ID Model*

The model of the Bluetooth accessory which is defined in (AT+GTBAS) or the model of the Bluetooth beacon accessory which is defined in (AT+GTBID).

✧ *Alarm Type*

The type of the alarm which is generated by the Bluetooth accessory specified by <Accessory Type> and <Accessory Model> in the command (AT+GTBAS).

- **0** - The voltage of the Bluetooth accessory is low.
- **1** - Temperature alarm: The current temperature value is lower than <Low Temperature> set in the command **AT+GTBAS**.
- **2** - Temperature alarm: The current temperature value is higher than <High Temperature> set in the command **AT+GTBAS**.
- **3** - Temperature alarm: The current temperature value is within the range defined by <Low Temperature> and <High Temperature> set in the command **AT+GTBAS**.
- **4** - Push button event for WKF300 is detected.
- **7** - Humidity alarm: The current humidity value is lower than <Low Humidity> set in the command **AT+GTBAS**.

- **8** - Humidity alarm: The current humidity value is higher than <High Humidity> set in the command **AT+GTBAS**.
- **9** - Humidity alarm: The current temperature value is within the range defined by <Low Humidity> and <High Humidity> set in the command **AT+GTBAS**.
- **0E** - Tire pressure alarm: The current Tire pressure value is lower than <Low Tire pressure> set in the **AT+GTBAS** command.
- **0F** - Tire pressure alarm: The current Tire pressure value is higher than <High Tire pressure> set in the **AT+GTBAS** command.
- **10** - Tire pressure alarm: The current Tire pressure value is within the range defined by <Low Tire pressure> and <High Tire pressure> set in the command **AT+GTBAS**.
- **11** - No available Bluetooth accessory is detected.
- **12** - An available Bluetooth accessory is detected.
- **13** - Door open.
- **14** - Door closed.
- **15** - Relay event notification.
- **19** - Tilt event.
- **1A** - Motion event(Both MOV BLE and WID320G will report event).
- **1B** - Crash event.
- **1C** - Fall event.
- **1D** - Tilt normal event.
- **1E** - Still event.

✧ *Append Mask*

Bitwise mask defined in the command (AT+GTBAS) or (AT+GTBID) to indicate the reported Bluetooth accessory data fields.

- **Bit 0** - <Accessory Name>
- **Bit 1** - <Accessory MAC>
- **Bit 2** - <Accessory Status>
- **Bit 3** - <Accessory Battery Level>
- **Bit 4** - <Accessory Temperature>
- **Bit 5** - <Accessory Humidity>
- **Bit 9** - <Tire Pressure>
- **Bit 10** - <Time stamp>
- **Bit 13** - <Accessory Battery Percentage>
- **Bit 14** - <Relay Data>, including <Relay Config Result>, <Relay State>
- **Bit 15** - <Expansion Mask>, if Bit 15 is set to 1, Bit 16 - Bit 31 will be valid.
- **Bit 16** - <Tri-axial Acceleration Data>
- **Bit 17** - <Angle Values>
- **Bit 18** - <Sensor Event Mask>, including <Event Mask>, <Tilt Event>, <Motion Event>, <Crash Event>, <Falling Event>

Note

In the message bit 0 - bit 15 precedes bit 16 - bit 31. Here is an example: <Accessory Append Mask> = 0x081F0007, 0x081F indicates bit 15 - bit 0, 0x0007 indicates bit 31 - bit 16.

✧ *Accessory Name*

The name of the Bluetooth accessory.

- *Accessory MAC*

  The MAC address of the Bluetooth accessory.
- *Accessory Status*

  A numeral to indicate whether the accessory is available.
  - **0** - The accessory is not available.
  - **1** - The accessory is available.
- *Accessory Battery Level*

  The battery voltage of the Bluetooth accessory.
- *Accessory Temperature*

  Temperature data for the Bluetooth accessory.
- *Enhanced Temperature*

  High-precision temperature data of Bluetooth accessories.
- *Accessory Humidity*

  Humidity data for the Bluetooth accessory.
- *Timestamp*

  Timestamp of the tire pressure value collection.
- *Accessory Battery Percentage*

  Percentage of Bluetooth accessory's battery power.
- *Relay State*

  The current state of the WRL300 sensor.
- *Relay Config Result*

  The number representing the response result of the relay, which is controlled and reported by Bit14 of the (AT+GTBAS) parameter <Accessory Append Mask>.
  - **0** - Configuration updated successfully.
  - **1** - Error in connecting.
  - **2** - The current password is incorrect.
  - **3** - Password update error.
  - **4** - Relay open or close error.
- *Tri-axial Acceleration Data*

  The values are coded on 16 bits (signed) in mg (+8g/-8g).

  For example, **0xFFFE0005FF04**:

	X-axis		**Y-axis**		**Z-axis**	
HEX	D[0]	D[1]	D[2]	D[3]	D[4]	D[5]
Binary	0xFF	0xFE	0x00	0x05	0xFF	0x04

  - **X-axis** - 0xFFFE => -2mg acceleration on X-axis
  - **Y-axis** - 0x0005 => 5mg acceleration on Y-axis
  - **Z-axis** - 0xFF04 => -252mg acceleration on Z-axis
- *Angle Values*

  Angle values are coded on 8 bits(unsigned). The values are expressed in degree (0-180 degree) based on the direction of gravity.

  For example, **0x5A5A00**:

	X-axis	**Y-axis**	**Z-axis**
HEX	D[0]	D[1]	D[2]

	X-axis	Y-axis	Z-axis
Binary	0x5A	0x5A	0x00

- **X-axis** - 0x5A => 90deg, X-axis state is horizontal
- **Y-axis** - 0x5A => 90deg, Y-axis state is horizontal
- **Z-axis** - 0x00 => 0deg, Z-axis state is vertical up

✧ *Event Mask*

This is event alarm mask.

- **Bit 0** - Tilt mask, it controls Angle Tilt zone.
- **Bit 1** - Motion mask, it controls motion state zone.
- **Bit 2** - Crash mask, it controls Crash value zone.
- **Bit 3** - Falling mask, it controls Falling value zone.

If tilt function is enabled, the tilt mask will be set to 1, otherwise it will be set to 0.

If motion function is enabled, the motion mask will be set to 1, otherwise it will be set to 0.

If crash function is enabled, the crash mask will be set to 1, otherwise it will be set to 0.

If falling function is enabled, the falling mask will be set to 1, otherwise it will be set to 0.

✧ *Tilt Event*

Tilt Event (state change) counter on the 15 (unsigned) MSB, Instantaneous state (1: tilt/0: normal) on LSB.

	Tilt[0]		Tilt[1]	
HEX	0	0	0	A
Binary	0000	0000	0000	1010

For example: **0x000A**

- **0** - Tilt state (normal)
- **0000 0000 0000 101** - Event counter value on 15 bits, count 5

✧ *Motion Event*

Motion Event (state change) counter on the 15 (unsigned) MSB, Instantaneous state (1: move/0: still) on LSB.

	Motion[0]		Motion[1]	
HEX	0	0	0	B
Binary	0000	0000	0000	1011

For example: **0x000B**

- **1** - Motion state (move)
- **0000 0000 0000 101** - Event counter value on 15 bits, count 5

✧ *Crash Event*

Crash Event (state change) counter on the 16 (unsigned) bits.

	Crash[0]		Crash[1]	
HEX	0	0	0	A
Binary	0000	0000	0000	1010

For example: **0x000A**

- **0000 0000 0000 1010** - Event counter value on 16 bits, count 10.

✧ *Fall Event*

Fall Event (state change) counter on the 16 (unsigned) bits.

	Falling[0]		Falling[1]	
HEX	0	0	0	A
Binary	0000	0000	0000	1010

For example: **0x000A**

- **0000 0000 0000 1010** - Event counter value on 16 bits, count 10

✧ *Accessory RSSI*

Signal strength RSSI value for the Bluetooth accessory.

4.5.24 BID(Bluetooth Beacon ID Report)

Example:
+RESP:GTBID,8020070402,867488060284402,GB100CG,1,2,00CA,780541295AF5,2935,-57,1,FDA50693A4E24FB1AFCFC6EB07647825,2A94,283B,00CA,1,0.0,0,47.0,117.129132,31.839405,20230613111241,0460,0001,DF5C,027A4F1F,01,12,20230613191242,08FF$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BID
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Number	<=2	0 - 3 | 0 - 15
	Beacon ID Model	1	0 | 2 | 4
	Accessory Append Mask	4	0000 - FFFF
	Accessory MAC (Optional)	12	'0' - '9' 'A' - 'F'
	Accessory Battery Level (Optional)	<=4	0 - 5000(mV)
	Accessory Signal Strength (Optional)	<=4	-120 - 0
	Beacon Type (Optional)	1	0 - 2
	Beacon Data (Optional)	<=100	
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx

Parts	Fields	Length	Range/Format
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Number*

The number of the Bluetooth beacon accessories.

- **WKF300** - The maximum value is 3.
- **IDELA** - The maximum value is 15.
- **WID310** - The maximum value is 15.

✧ *Beacon ID Model*

The model of the Bluetooth beacon accessory which is defined in (AT+GTBID).

✧ *Accessory 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 Battery Level>
- **Bit 4** - Reserved
- **Bit 5** - Reserved
- **Bit 6** - <Accessory Signal Strength>
- **Bit 7** - <Beacon Type> and <Beacon Data>

✧ *Accessory MAC*

The MAC address of the Bluetooth accessory.

✧ *Accessory Battery Level*

The voltage of Bluetooth accessory.

✧ *Accessory Signal Strength*

The signal strength of Bluetooth accessory.

✧ *Beacon type*

Types of beacons.

- **0** - "ID" Format
- **1** - "iBeacon" Format
- **2** - "Eddystone" Format

✧ *Beacon Data*

Select the data format according to <Beacon Type>:

- If <Beacon Type> is 0, the data format is as follows:

Fields	Length	Range/Format
ID_Mfr_Data	12	(HEX)

- If <Beacon Type> is 1, the data format is as follows:

Fields	Length	Range/Format
UUID	32	(HEX)
Major	4	(HEX)
Minor	4	(HEX)

- If <Beacon Type> is 2, the data format is as follows:

Fields	Length	Range/Format
NID	20	(HEX)
BID	12	(HEX)

4.5.25 BFS(Bluetooth Fields Setting Report)

Example:
+RESP:GTBFS,8020070402,867488060284402,GV500CG,C2030300144D,842A076CF4C34F5798755DA246302FAC,0014,0002,55,1,0.0,0,47.0,117.129132,31.839405,20230613111241,0460,0001,DF5C,027A4F1F,01,12,20230613191242,08FF$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BFS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Number	<=2	0 - 10
	MAC	12	(HEX)
	UUID	32	(HEX)
	Major	4	(HEX)
	Minor	4	(HEX)
	Battery Level	2	(HEX)
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)

Parts	Fields	Length	Range/Format
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Battery Level*

The remaining battery level of beacon in percentage.

4.6 Data Flow Reports

This section describes the message related to certain data needs to be sent. Please refer to the details below.

4.6.1 BTD (Bluetooth Accessory Data Report)

If **+RESP:GTBTD** is enabled, the device will send the message **+RESP:GTBTD** to the backend server.

Example:
+RESP:GTBTD,8020070402,862170010196747,GB100CG,0,0,0,000001FF,GB100CG_name,GB100CGmac,1,0,4,0.00,FFFE0005FF04,5A5A00,0,000A,000B,000A,000A,000B,,,20120725122928,004A$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BTD
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Index	2	00 - 09
	Accessory Type	<=2	0 | 15

Parts	Fields	Length	Range/Format
	Accessory Model	1	0
	Data Mask	<=8	0-7FFFFFFF
	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 Battery Level(Optional)	<=4	0 - 5000(mV)
	Accessory Temperature(Optional)	<=3	-40 - 80(℃)
	Enhanced Temperature(Optional)	<=5	-40.00 - 80.00(℃)
	Tri-axial Acceleration Data (Optional)	12	HEX
	Angle Values (Optional)	6	HEX
	Event Mask (Optional)	1	HEX
	Tilt Event (Optional)	2	HEX
	Motion Event (Optional)	4	HEX
	Crash Event (Optional)	4	HEX
	Fall Event (Optional)	4	HEX
	Accessory RSSI (Optional)	<=4	-128 - 127
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Index*

The Index of the Bluetooth accessory.

✧ *Accessory Type*

The type of the Bluetooth accessory.

✧ *Accessory Model*

The model of the Bluetooth accessory.

✧ *Accessory Name*

The name of the Bluetooth accessory.

✧ *Accessory MAC*

The MAC address of the Bluetooth accessory.

✧ *Accessory Status*

It indicates the connection status of Bluetooth accessory.

- **0** - Disconnected.
- **1** - Connected.

✧ *Accessory Battery Level*

It indicates the remaining level of the battery in Bluetooth accessory.

✧ *Accessory Temperature*

It indicates the temperature measured by Bluetooth accessory.

✧ *Tri-axial Acceleration Data*

Values are coded on 16 bits(signed). The values are expressed in mg (+8g/-8g). For example:0xFFFE0005FF04:

	X-axis		Y-axis		Z-axis	
HEX	D[0]	D[1]	D[2]	D[3]	D[4]	D[5]
Binary	0xFF	0xFE	0x00	0x05	0xFF	0x04

- X-axis: 0xFFFE => -2mg acceleration on X-axis
- Y-axis: 0x0005 => 5mg acceleration on Y-axis
- Z-axis: 0xFF04 => -252mg acceleration on Z-axis

✧ *Angle Values*

Angle values are coded on 8 bits(unsigned). The values are expressed in degree (0-180 degree) based in gravity direction. For example:0x5A5A00:

	X-axis	Y-axis	Z-axis
HEX	D[0]	D[1]	D[2]
Binary	0x5A	0x5A	0x00

- X-axis: 0x5A => 90deg, x-axis state is horizontal
- Y-axis: 0x5A => 90deg, y-axis state is horizontal
- Z-axis: 0x00 => 0deg, z-axis state is vertical up

✧ *Event Mask*

This is event alarm mask, please refer to the following mask define:

- **Bit 0** - Tilt mask, it controls Angle Tilt zone.
- **Bit 1** - Motion mask, it controls motion state zone.
- **Bit 2** - Crash mask, it controls Crash value zone.
- **Bit 3** - Falling mask, it controls Falling value zone.

If tilt function enables, the tilt mask will be set 1, otherwise it will be set 0. If motion function enables, the motion mask will be set 1, otherwise it will be set 0. If crash function enables, the crash mask will be set 1, otherwise it will be set 0. If falling function enables, the falling mask will be set 1, otherwise it will be set 0.

✧ *Tilt Event*

Tilt Event (state change) counter on the 15 (unsigned) MSB, Instantaneous state (1: tilt/0: normal) on LSB.

	Tilt[0]		Tilt[1]	
HEX	0	0	0	A
Binary	0000	0000	0000	1010

For example: 0x000A

- 0: tilt state (state normal)
- 0000 0000 0000 101: event counter value on 15 bits, count 5.

✧ *Motion Event*

Motion Event (state change) counter on the 15 (unsigned) MSB, Instantaneous state (1: move/0: still) on LSB.

	Motion[0]		Motion[1]	
HEX	0	0	0	B
Binary	0000	0000	0000	1011

For example: 0x000B

- 1: motion state (state move)
- 0000 0000 0000 101: event counter value on 15 bits, count 5.

✧ *Crash Event*

Crash Event (state change) counter on the 16 (unsigned).

	Crash[0]		Crash[1]	
HEX	0	0	0	A
Binary	0000	0000	0000	1010

For example: 0x000A

- 0000 0000 0000 1010: event counter value on 16 bits, count 10.

✧ *Fall Event*

Fall Event (state change) counter on the 16 (unsigned).

	Falling[0]		Falling[1]	
HEX	0	0	0	A
Binary	0000	0000	0000	1010

For example: 0x000A

- 0000 0000 0000 1010: event counter value on 16 bits, count 10.

✧ *Accessory RSSI*

Signal strength RSSI value for the Bluetooth accessory.

4.6.2 CRG(Crash GNSS Data Packet)

The **+RESP:GTCRG** message contains GNSS information before/after the crash. When crash is detected, GNSS information before the crash will be reported to the backend server. And the device will continue to record GNSS information after the crash and report the packed data to the backend server.

Example:
+RESP:GTCRG,8020070402,135790246811220,GB100CG,1,10,1,1,19.1,165,54.8,121.390739,31.164275,20160202060648,10,1,24.8,176,51.3,121.390733,31.164220,20160202060649,3,1,14.0,173,47.3,121.390729,31.164224,20160202060650,4,1,8.5,173,46.4,121.390737,31.164227,20160202060651,5,1,8.1,194,46.1,121.390725,31.164225,20160202060652,6,1,12.3,229,46.6,121.390690,31.164227,20160202060653,7,1,17.6,258,43.9,121.390635,31.164223,20160202060654,8,1,6.8,268,43.8,121.390672,31.164269,20160202060655,9,1,2.2,229,44.8,121.390701,31.164282,20160202060656,10,1,2.8,229,44.3,121.390709,31.164306,20160202060657,20160202060658,01A8$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	CRG
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Data Type	1	0 | 1
	GNSS Validity Number	<=2	0 - 20
	GNSS Point Index	<=3	1
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	...		
	GNSS Point Index	<=3	120
	GNSS Accuracy	<=2	0|1 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Data Type*

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. A message can report up to 20 points. By default, two messages will be reported if the number is 30.

✧ *GNSS Point Index*

The index of total GNSS point before/after the crash.

4.6.3 CRD(Crash Data Packet)

The **+RESP:GTCRD** message contains up to 15 seconds of tri-axial acceleration data before and after the crash. 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.

Example:

+RESP:GTCRD,8020070402,359231038715676,GB100CG,00,00,3,1,00010001005500010002005100000000005500000000100520001000100560001000100530000000000054000000001005100010000005400000000100530001000100550001000000530001000100540000000030051000000001005300001ffff005300000000100530001000000520000000000054000300010053000 2ffff00530001000100520000000020051000100030053000100000053000 1ffff00540000000010052000000003005500020001005300010000005200010001005500010001005400 01ffff00530000000020053000000002005 6ffff0000005300000000000520001000000520001000200520002000100540000000010054ffff0002 00520000000010051000 1ffff00530002ffff00540001fffe00520001ffff00530000000020052000000002 005200020001005200010001005600010001005200 01ffff00530001000200560001ffff005100010 001005500010000005100020002005300000000000550001000000520001000100550001000100 53ffffffff00520000ffff00520001000200530002000100540001000000550001000200530001000000 530000000100530001000100520000ffff0051000100000052000200000052000 2ffff00520001000 200530000000020054000000000005400 01fffe00530001ffff005200010001005200010001005300 01000100520000,20120330120443,005C$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	CRD
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Crash Counter	2	00 - FF
	Data Type	2	00 - FF
	Total frame	<=2	1 - 64
	Frame Number	<=2	1 - 64
	Data	<=1200	'0'-'9' 'a'-'f'
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Crash Counter*

It indicates the sequence number of the crash event. The report of **+RESP:GTCRA** and

+RESP:GTCRD are combined into one crash event. It rolls from 0x00 to 0xFF.

✧ *Data Type*

A hexadecimal parameter to indicate the time of the data (before crash or after crash) and crash direction (+X, -X, +Y, -Y, +Z, -Z or several of them).

Bits	Description	Range
Bit 0	0: Before crash 1: After crash	0 - 1
Bit 1	0: X-axis crash not detected 1: X-axis crash detected	0 - 1
Bit 2	0: X-axis positive direction 1: X-axis negative direction	0 - 1
Bit 3	0: Y-axis crash not detected 1: Y-axis crash detected	0 - 1
Bit 4	0: Y-axis positive direction 1: Y-axis negative direction	0 - 1
Bit 5	0: Z-axis crash not detected 1: Z-axis crash detected	0 - 1
Bit 6	0: Z-axis positive direction 1: Z-axis negative direction	0 - 1
Bit 7	0: Acceleration data 1: Acceleration data and gyroscope data	0 - 1

✧ *Total Frame*

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*

There are 1200 ASCII characters in one message at most which includes acceleration samples in 1 second at most. There are 12 characters in a group. The first 4 characters of these 12 characters represent X axis acceleration data, the middle 4 characters represent Y axis acceleration data and the last 4 characters represent Z axis acceleration data. The ASCII "0001" is equal to 0x0001 in hex format, and the ASCII "afff" is equal to 0xAFFF in hex format. They are two's complement.

✧ *Example*

- +RESP:GTCRD,8020070402,359231038715676,,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,8020070402,359231038715676,,1,3,3,...ffffff10052,20120330115736,005A$

  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;

Note

Acceleration of gravity (+g) is the 82 in decimal format and - g is -82. The linearized acceleration data 1312 represents +16g and -1312 represents -16g.

4.6.4 ACC(Acceleration Data Packet)

The device will report 75 sets of tri-axial acceleration data to the backend server in the message **+RESP:GTACC**. The device will report the message every 3 seconds, and record 25 XYZ-axis acceleration data per second.

Example:
+RESP:GTACC,8020070402,864292043426376,GB100CG,FFFE0000007EFFFE0000007EFFFE0000007FFFFF0000007EFFFF0000007EFFFE0000007FFFFE0000007EFFFE0000007EFFFF0000007FFFFE0000007EFFFF0000007EFFFE0000007EFFFE0000007FFFFE0000007EFFFE0000007FFFFE0000007FFFFF0000007EFFFFFFFF007EFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007EFFFF0000007EFFFE0000007EFFFE0000007FFFFE0000007EFFFE0000007EFFFF0000007DFFFE0000007EFFFE0000007EFFFFFFFF007DFFFE0000007EFFFE0000007FFFFE0000007EFFFE0000007EFFFE0000007FFFFE0000007EFFFE0000007EFFFF0000007EFFFE0000007FFFFE0000007EFFFE0000007EFFFF0000007EFFFF0000007EFFFE0000007EFFFE0000007EFFFF0000007EFFFE0000007EFFFE0000007FFFFE0000007EFFFEFFFF007EFFFE0000007EFFFF0000007EFFFF0000007DFFFE0000007EFFFE0000007EFFFE0000007DFFFE0000007FFFFE0000007FFFFE0000007EFFFF0000007EFFFE0000007EFFFE0000007EFFFFFFFF007E,,,,20200623030020,863C$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	ACC
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Data	12*75	'0'-'9' 'a'-'f'
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Data*

There are 12*75 ASCII characters in the message with 12 characters in a group. The first 4 characters of these 12 characters represent X axis acceleration data, the middle 4 characters represent Y axis acceleration data and the last 4 characters are for Z axis acceleration data. The ASCII "0001" represents HEX value 0x0001, so it means the acceleration is 1. The ASCII

"fffd" represents HEX value 0xFFFD which is the complement of -3, so it means the acceleration is -3.

✧ *Example*

- **+RESP:GTACC**,8020070402,864292043426376,,000100010055…,,,,20200623030021,863D$
  This is the earliest 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:GTACC**,8020070402,864292043426376,,ffffff10052…,,,,20200623030022,863E$
  This is the latest XYZ-axis acceleration data:
  Conversion to hex format: X (axis acceleration data) = 0xFFFF; Y = 0xFFF1; Z = 0x0052;
  Decimal format: X (axis acceleration data) = -1; Y = -15; Z = 82;

Note

Acceleration of gravity (+g) is 82 in decimal format and - g is -82. The linearized acceleration data 1312 represents +16g and -1312 represents -16g.

4.7 Data Transmission

This section describes the format of the data transmission messages. Please refer to the details below.

4.7.1 DAT(Transparent Data Transmission)

The device supports transparent data transfer between the backend server and the peripheral device connected to its Bluetooth. The device supports bi-directional data transmission. In both directions, the data is transparent to the device.

a) Transfer data 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 Bluetooth. According to <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) Transfer data 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 the device and the device will pick out the raw data and send it to the Bluetooth. The peripheral device can thus get the data from Bluetooth.

4.7.1.1 Short Format

Example:
+RESP:GTDAT,8020070402,135790246811220,GB100CG,data,20111222122137,0017$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	DAT
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Data to the Backend Server	<=1280	ASCII Code
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.7.1.2 Long Format

Example:
+RESP:GTDAT,8020070402,135790246811220,GB100CG,3,,,1645026150,0,0.5,0,29.4,121.39092
3,31.164295,20111222022935,0460,0000,1806,2142,01,1,,,,,20111222022938,001A$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	DAT
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Report Type	1	0-4
	Reserved	0	
	Reserved	0	
	Data to the Backend Server	<=1280	ASCII String
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359

Parts	Fields	Length	Range/Format
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Report Type*

It indicates where the data comes from.

- **0** - Reserved
- **1** - (AT+GTDAT) from serial port
- **2** - (AT+GTDAT) from Bluetooth
- **3** - (AT+GTDAT) from over the air
- **4** - (AT+GTDAT) triggered by events in (AT+GTUDF)

Note

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

4.7.2 UDT(UART Data Transfer)

If the parameter <Mode> in (AT+GTUDT) is enabled, or a GEO-Fence event occurs, the device will send the message **+RESP:GTUDT** at the sending interval to the destination specified by <Mode> in (AT+GTUDT).

Example:
+RESP:GTUDT,8020070402,0112,0101,,867564050606638,GB100CG,0,,1,1,0.0,169,64.2,117.129268,31.839148,20231020102825,0460,0001,DF5C,027A4F1F,01,15,201.5,,00049:10:46,,,13,,,,,,21,11977,4.12,0,00000,,,,20231020182825,0005$

Parts	Fields	Length	Range/Format
Head	Header	3	+RESP:GT
	Message Name	3	UDT
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Firmware Version	4	0000 - FFFF
	Hardware Version	4	0000 - FFFF
	Reserved	0	
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' - '_'
Body	Report Type	1	0 | 1
	Report ID	<=2	0 - FF
	Number	1	1
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Satellites in Use (Optional)	<=2	0 - 72
	Mileage	<=9	0.0 - 4294967.0 (km)
	Reserved		
	Hour Meter Count	11 - 13	HHHHH:MM:SS
	Reserved	0	
	Reserved	0	
	GSV Number	<=3	0 - 255
	GEO-Fence State	1	0 | 1
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	

Parts	Fields	Length	Range/Format
	Reserved	0	
	Motion Status	2	11 | 12 | 16 | 1A | 41 | 42 | 21 | 22
	External Power VCC	<=5	0 - 32000 (mV)
	Backup Battery Level	<=4	0.00 - 4.50 (V)
	Charging	1	0 - 1
	GEO Status Mask	5	00000 - FFFFF
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	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.
- *GSV Number*

  The number of satellites GNSS finds.
- *GEO-Fence State*

  The activated GEO-Fence state. 0 means "Outside the GEO-Fence", and 1 means 'Inside the GEO-Fence".
- *GEO Status Mask*

  GEO status mask. Bit 0 to Bit 19 represent the status of GEO 0 to 19 respectively. 0 means "Outside the GEO-Fence" or "The status is unknown", and 1 means "Inside the GEO-Fence".

4.8 Update Configuration

This section describes the message related to firmware and configuration upgrade. Please refer to the details below.

4.8.1 UPC(Configuration Update Notification)

The report for over-the-air configuration update.

Example:
+RESP:GTUPC,8020070402,135790246811220,GB100CG,0,100,http://www.GB100CG.com/configure.ini,20150201000000,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	UPC
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Command ID	<=3	
	Result	3	100-103 | 200-202 | 300-302 | 305 | 306
	Download URL	<=100	Complete URL
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Command ID*

The command ID in the update configuration file. It is always 0 before the device starts to update the configuration (<Result> <= 300). It indicates the total number of the commands when <Result> is 301. It indicates the ID of the command which has wrong format when <Result> is 302.It is empty when <Result> is greater than 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** - Reserved.
- **305** - The update process is interrupted by abnormal reboot.
- **306** - The update process is interrupted by MD5 verification error.

✧ *Download URL*

The complete URL to download the configuration. It includes the file name.

4.8.2 UPD(Firmware Upgrade Report)

The report for over-the-air configuration update.

4.8.2.1 Update Confirmation

The device sends update confirmation information to the backend server if:

- ✧ The update command is confirmed by the device.
- ✧ The update command is refused by the device.
- ✧ The update process is cancelled by the backend server or refused because of an incorrect URL.
- ✧ The update command is refused because the battery is low.

Example:
+RESP:GTUPD,8020070402,135790246811220,GB100CG,100,,20090101000000,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	UPD
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Code	3	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

- ✧ *code*
  It indicates the confirmation information.
  - **1x0** - The update command is confirmed by the device.
  - **1x1** - The update command is refused by the device.
  - **1x2** - The update process is cancelled by the backend server or refused because of an incorrect URL.
  - **1x3** - The update process is refused because the external power supply is not inserted.

Note

x here means <Update Type> defined in the command (AT+GTUPD).

4.8.2.2 Package Download

The device sends package download information to the backend server if:

- ✧ The device starts to download the package.
- ✧ The device finishes downloading the package successfully.

✧ The device fails to download the package.

Example:
+RESP:GTUPD,8020070402,135790246811220,GB100CG,200,1,20090101000000,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	UPD
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Code	3	
	Download Times	1	1 | 2 | 3 | 4
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Code*

It indicates the download information.

- **2x0** - The device starts to download the package.
- **2x1** - The device finishes downloading the package successfully.
- **2x2** - The device fails to download the package.

✧ *Download Times*

The count number of the package download.

Note

x here means <Update Type> defined in the command **AT+GTUPD**.

4.8.2.3 Firmware Update

The device sends firmware update information to the backend server if:

✧ The device starts to update the firmware.
✧ The device finishes updating the firmware successfully.
✧ The device fails to update the firmware.
✧ The update process does not start because the battery is low.

Example:
+RESP:GTUPD,8020070402,135790246811220,GB100CG,300,,20090101000000,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	UPD
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Code	3	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Code*

It indicates the update information.

- **3x0** - The device starts to update the firmware.
- **3x1** - The device finishes updating the firmware successfully.
- **3x2** - The device fails to update the firmware.
- **3x3** - The update process does not start because the battery is low.
- **3x4** - Serial Number does not match, firmware upgrade fails.

Note

x here means <Update Type> defined in the command **AT+GTUPD**.

4.8.3 EUC(Extended Configuration Update Report)

Example:
+RESP:GTEUC,8020070402,135790246811220,GB100CG,1,301,http://www.GB100CG.com/configure.ini,ABCDABCD,,,,,20150201000000,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	EUC
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Command ID	<=3	
	Result	3	100-103 | 200-202 | 300-302 | 305 | 306

Parts	Fields	Length	Range/Format
	Download URL	<=100	Complete URL
	Identifier Number	8	00000000 - FFFFFFFF
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	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 or 306. It indicates wrong format of command ID when the response code is 302. It is empty when the response code is 304 or 305.

✧ *Result*

A numeral to indicate whether the configuration is updated successfully.

- **100** - The update command is starting.
- **101** - The update command is confirmed by the device.
- **102** - The update command is refused by the device.
- **103** - The update process is refused because the battery is low.
- **200** - The device starts to download the package.
- **201** - The device finishes downloading the package successfully.
- **202** - The device fails to download the package.
- **300** - The device starts to update the device configuration.
- **301** - The device finishes updating the device configuration successfully.
- **302** - The device fails to update the device configuration.
- **303** - Reserved.
- **304** - Reserved.
- **305** - The update process is interrupted by abnormal reboot.
- **306** - The update process is interrupted by MD5 verification error.

✧ *Download URL*

The complete URL to download the configuration. It includes the file name.

✧ *Identifier Number*

Please refer to the parameter <Identifier Number> in the command (AT+GTUPC).

4.8.4 EUD(Extended Firmware Update Report in ASCII Format)

4.8.4.1 Update Confirmation

The device will send update confirmation information to the backend server if:

- ✧ The device confirms this update command.
- ✧ The device refuses this update command.
- ✧ The backend server cancels this update process.
- ✧ The device refuses this request because the battery is low.

Example:
+RESP:GTEUD,8020070402,135790246811220,GB100CG,100,,00000000,,,,,20090101000000,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	EUD
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Code	3	
	Reserved	0	
	Identifier Number	8	00000000 - FFFFFFFF
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

- ✧ *Code*

  It indicates the confirmation information.

  - **1x0** - The device confirms this update command.
  - **1x1** - The device refuses this update command.
  - **1x2** - The backend server cancels this update process.
  - **1x3** - The device refuses this request because the battery is low.

Note

x here means <Update Type> defined in the command (AT+GTUPD).

4.8.4.2 Package Download

The device will send the package download information to the backend server if:

- ✧ The device starts to download the package.
- ✧ The device downloads the package successfully.
- ✧ The device fails to download the package.

Example:
+RESP:GTEUD,8020070402,135790246811220,GB100CG,200,1,00000000,,,,,20090101000000,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	EUD
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Code	3	
	Download Times	1	1 | 2 | 3 | 4
	Identifier Number	8	00000000 - FFFFFFFF
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Ending Flag	1	$

- ✧ *Code*

  It indicates the download information.
  - **2x0** - The device starts to download the package.
  - **2x1** - The device downloads the package successfully.
  - **2x2** - The device fails to download the package.
- ✧ *Download Times*

  The count number of the package download.

Note

x here means <Update Type> defined in the command **AT+GTUPD**.

4.8.4.3 Firmware Update

The device will send the firmware update information to the backend server if:

- ✧ The device starts to update firmware.
- ✧ The device updates the firmware successfully.
- ✧ The device fails to update the firmware.
- ✧ The firmware update is cancelled because the battery is low.

Example:
+RESP:GTEUD,8020070402,135790246811220,GB100CG,300,,00000000,,,,,20090101000000,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	EUD
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Code	3	
	Reserved	0	
	Identifier Number	8	00000000 - FFFFFFFF
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Ending Flag	1	$

- ✧ *Code*

  It indicates the update information.

  - **3x0** - The device starts to update the firmware.
  - **3x1** - The device updates the firmware successfully.
  - **3x2** - The device fails to update the firmware.
  - **3x3** - The device cancels the firmware update because the battery is low.
  - **3x4** - Serial Number does not match, firmware upgrade fails.

Note

x here means <Update Type> defined in the command **AT+GTUPD**.

4.9 SACK (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.

Example:
+SACK:11F0$

Parts	Fields	Length	Range/Format
Head	Header	5	+SACK
Tail	Count Number	4	0000-FFFF
	Tail	1	$

✧ *Count Number*

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

4.10HBD (Heartbeat Data)

4.10.1 Heartbeat Report

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

Example:
+ACK:GTHBD,8020070402,135790246811220,GB100CG,20100214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	4	+ACK
	Leading Symbol	1	:
	Command Word	5	'A'-'Z', '0'-'9'
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000-FFFF
	Tail	1	$

- *Command Word*
  Corresponding to the "Command Word" in the configuration command. For example, it is **"GTHBD"**.
- *Full Protocol Version*
  The protocol version that the device conforms to. It is separated into 3 parts. The first two characters represent the device type. As shown in the example above, 802007 means GB100CG. The second part includes two characters which indicate the major version number of the protocol and the last part includes two characters which indicate the minor version number of the protocol. Both version numbers are hex digits. For example, 0A01 means version 10.01.
- *Unique ID*
  The International Mobile Equipment Identity of the terminal device.
- *Device Name*
  The name of terminal device.
- *Send Time*
  The local time when the frame was generated, in "YYYYMMDDHHMMSS" format.
  For example, "20191120135807" indicates 13:58:07 on November 20, 2019.
- *Count Number*
  A self-increasing count number in each acknowledgement message. It begins from "0000" and increases by 1 for each acknowledgement message. And it rolls back after "FFFF".

4.10.2 Heartbeat Acknowledgement

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

Example:
+SACK:GTHBD,8020070402,11F0$

Parts	Fields	Length	Range/Format
Head	Header	5	+SACK
	Leading Symbol	1	:
	Command Word	5	'A'-'Z', '0'-'9'
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
Tail	Count Number	4	0000-FFFF
	Tail	1	$

- *Command Word*
  Corresponding to the "Command Word" in the configuration command. For example, it is **GTHBD**.
- *Full Protocol Version*
  The protocol version that the device conforms to. It is separated into 3 parts. The first two characters represent the device type. As shown in the example above, 802007 means

GB100CG. The second part includes two characters which indicate the major version number of the protocol and the last part includes two characters which indicate the minor version number of the protocol. Both version numbers are hex digits. For example, 0A01 means version 10.01.

✧ *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.

4.11Buffer Report

4.11.1 Overview

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.
✧ PDP activation for the TCP or UDP connection fails.
✧ Establishment of the TCP connection with the backend server fails.

These messages will be sent to the backend server when connection to the server is recovered again. The buffered reports are saved to the built-in non-volatile memory in case the device is reset. The terminal can buffer up to 10,000 messages (160 bytes per message).

Example:
+BUFF:GTFRI,8020070402,863286020684354,GB100CG,,10,1,1,0.0,0,0.5,121.392413,31.164143,20160804044602,0460,0000,1877,03A3,00,104.8,,,,100,210100,,,,20140804044611,2E78$

4.11.2 Description Information

Detailed information about buffer report is listed below.

✧ Only +RESP messages excluding **+RESP:GTPDP** and **+RESP:GTALM** 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 remains unchanged.
✧ Buffered messages will be sent only via GPRS by TCP or UDP protocol. They cannot be sent via SMS. If the current report 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 the real-time messages if <Buffer Mode> in (AT+GTSRI) is set to 1.
✧ The buffered messages will be sent before the real-time messages if <Buffer Mode> in (AT+GTSRI) is set to 2.

- All messages will be saved and sent in the order they are generated if <Buffer Mode> in AT+GTSRI is set to 5, but the messages which are configured in <High Priority Report Mask> will be reported first.

5 Report(Hex)

This section defines the HEX formats of the report messages. Please refer to the details below.

5.1 ACK (Acknowledgement)

The frame format of **+ACK** is as follows:

Example:
2B41434B017F26802007030503114742313030434700 00FFFF07E80B070A113B002E99870D0A

2B41434B047F26802007030503114742313030434700 00FFFF07E80B070A1215003041000D0A

2B41434B0B7F26802007030503114742313030434700 00FFFF07E80B070A12240032E4720D0A

2B41434B107F26802007030503114742313030434700 1CFFFF07E80B070A1232003496720D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+ACK
	Message Type	1	
	Report Mask	1	00 - FF
Body	Length	1	
	Device Type	3	802007
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	ID	1	
	Serial Number	2	0000 - FFFF
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Message Type*

The ID of the command that the device receives.

Command	ID
AT+GTBSI	0
AT+GTSRI	1
AT+GTQSS	2

Command	ID
AT+GTCFG	4
AT+GTTOW	5
AT+GTEPS	6
AT+GTTMA	10
AT+GTFRI	11
AT+GTGEO	12
AT+GTSPD	13
AT+GTRTO	16
AT+GTUPD	21
AT+GTPIN	22
AT+GTDAT	23
AT+GTOWH	24
AT+GTDOG	25
AT+GTJDC	27
AT+GTIDL	28
AT+GTHBM	29
AT+GTHMC	30
AT+GTWLT	34
AT+GTHRM	35
AT+GTFFC	36
AT+GTSSR	38
AT+GTPDS	45
AT+GTCRA	46
AT+GTUDT	50
AT+GTRMD	53
AT+GTCMD	61
AT+GTUDF	62
AT+GTGAM	65
AT+GTUPC	70
AT+GTASC	79
AT+GTFVR	81
AT+GTSVR	82
AT+GTBTS	89
AT+GTVVS	91
AT+GTAVS	92
AT+GTOWL	97

Command	ID
AT+GTVMS	102
AT+GTBAS	103
AT+GTBID	109
AT+GTMQT	138
AT+GTTLS	139
AT+GTRTP	141
AT+GTSLM	149
AT+GTBTD	153
AT+GTBFS	176

✧ *Report Mask*

Please refer to <+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	13	57	90	24	68	11	22	0
HEX	0D	39	5A	18	44	0B	16	00

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

Device Name	q	u	e	c	l	i	n	k
HEX	71	75	65	63	6C	69	6E	6B

✧ *ID*

- **AT+GTGEO** - This field represents the GEO command ID.
- **AT+GTCMD** - This field represents the stored command ID.
- **AT+GTUDF** - This field represents the UDF group ID.
- **AT+GTBAS** - This field represents the BAS index.
- **AT+GTRTO** - This field represents the RTO sub-command ID.
- **AT+GTXXX** - For other commands, it is 0.

✧ *Serial Number*

The serial number in the configuration command.

✧ *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.

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

- *Count Number*
  A self-increasing count number in each acknowledgement message. It begins from "0000" and increases by 1 for each acknowledgement message. And it rolls back after "FFFF".
- *Checksum*
  2 bytes. This is an 16-bit CRC checksum, and it is generated by a CRC algorithm with the properties displayed in (CRC-16 Calculation). The CRC16 checksum of data between the fields of <Message Header> and <Checksum> (exclude <Message Header> and <Checksum>).

Note

The +ACK frame only indicates that the terminal device has received the command, but does not mean that the command has been successfully executed; the terminal device will send a report to inform the backend server of the execution result of the command when necessary.

5.2 Position Related Report

This section describes the format of positioning related messages. Please refer to the details below.

5.2.1 Generic Location Report

- **TOW** (Tow Alarm Information)
  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.
- **SPD** (Speed Alarm Information)
  If the speed alarm is enabled, the device will send the message **+RESP:GTSPD** to the backend server when the speed of the device within the alarm range is detected.
- **RTL** (Realtime Location Information)
  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.
- **DOG** (Watchdog Reboot Alarm)
  The protocol watchdog reboot message **+RESP:GTDOG**.
- **VGL** (Ignition Location Information)
  The location message **+RESP:GTVGL** for virtual ignition on and ignition off.
- **HBM** (Harsh Behavior Alarm)
  If harsh behavior is detected, the message **+RESP:GTHBM** will be sent to the backend server.
- **EPS** (External Power Alarm)
  If the external power supply monitoring is enabled by the command (AT+GTEPS), the device will send the message **+RESP:GTEPS** to the backend server when the voltage of the external power supply enters the alarm range.

Example:

2B5253500100FC1FBF00618020070305031056 4B4005061A4905642FF9160C000101000000005B003606FBCEA001E60AC407E80A1106262204600001DF5C0DD0833A00000000000000000000000000000000000000000000007E80B0501271C010A52D10D0A

2B5253500400FC1FBF00618020070305030D562E60060001160964344322 1C010101000002015 9009806FB3F0201E5D53407E80A1D0A131E04600000550B085BE2AA00000000000000000090000 2700000013040B07E80A1D0A131E0CF36BD10D0A

2B5253500900FC1FBF00618020070305030F564B4005060A1A07642F732213010101003802005 0004206FC6DC601E61D3F07E80A11062C1104600001DF5C027A4F1F000008020000003C080000 0000000000000007E80A110E2C12031A03320D0A

2B5253500B00FC1FBF00618020070305030D562E600600011609642FBC211B000101000001004 F005106FB401501E5D45807E80A1E07313804600000550B085BE2AA00000000000000C8070000 0900000012112107E80A1E0F3137005784CC0D0A

2B5253500C00FC1FBF00618020070305031156 4B400506076104642D402119010101000000012 2005406FB410001E5D43207E80B0507390004600000550B085BE2AA00000000000000000000000 0000000000000007E80B050F390104F6C2120D0A

2B5253500F00FC1FBF00618020070305030E564B4005061A5F0854300E2221000101004404010 D004306FA38D801E6062407E80B040527030460000056190 10E666C00000903000000A2030013 0000000005220007E80B04052704038159390D0A

2B5253501A00FC1FBF00618020070305030D562E60060001160964000012 1A210101000002004 F005306FB3FDA01E5D48C07E80A1E072D2004600000550B085BE2AA00000000000000C807000 0120000012110F07E80A1E0F2D1F004163590D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+RSP
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	RSP Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	Battery Level	1	0 - 100

Parts	Fields	Length	Range/Format
	External Power Voltage	2	0 - 32000
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Report ID | Report Type	1	
	Number	1	1 - 15
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359
	Altitude	2	
	Longitude	4	
	Latitude	4	
	GNSS UTC Time	7	YYYYMMDDHHMMSS
	MCC	2	0000 - FFFF
	MNC	2	0000 - FFFF
	LAC	2	0000 - FFFF
	Cell ID	4	00000000 - FFFFFFFF
	Reserved|GNSS Trigger Type(Optional)	1	00|00 - 04
	Current Mileage	3	0.0 - 65535.0(km)
	Total Mileage	5	0.0 - 4294967.0(km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	CSQ RSSI|RSRP	1	0 - 31 | 99 | 0 - 97 | 255
	CSQ BER	1	0 - 7 | 99
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Message Type*

The ID of a specific location report message.

Message	ID
+RESP:GTTOW	1
+RESP:GTLBC	3

Message	ID
+RESP:GTEPS	4
+RESP:GTFRI	7
+RESP:GTSPD	9
+RESP:GTRTL	11
+RESP:GTDOG	12
+RESP:GTHBM	15
+RESP:GTERI	18
+RESP:GTGIN	20
+RESP:GTGOT	21
+RESP:GTVGL	26
+RESP:GTSLM	35
+RESP:GTFRI (Compressed)	100

✧ *Report Mask*

Please refer to <+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	13	57	90	24	68	11	22	0
HEX	0D	39	5A	18	44	0B	16	00

If Bit 6 of <+RSP Mask> is 1, the device name is used as the unique ID of the device. Please refer to <Device Name> in (AT+GTCFG) for the device name. Device name is an 8-byte string. If the length of <Device Name> is more than 8 bytes, 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	q	u	e	c	l	i	n	k
HEX	71	75	65	63	6C	69	6E	6B

✧ *External Power Voltage*

The value of external power supply, the unit is mV. The highest bit is used to indicate the length of this value field, 0 means 2 bytes and 1 means 4 bytes. If the highest bit is 1, please use the formula **<External Power Voltage> & 0x7FFFFFFF** to obtain a HEX value. For example, 0x0011 is 17 mV, and 0x80010011 is 65553 mV.

✧ *Motion Status*

The current motion status of the device.

✧ *Satellites in Use*

Number of satellites being used for tracking. The high nibble is reserved and the low nibble is valid. But if Bit 1 of <RSP Expansion Mask> is set to 1, this parameter would be expanded to two bytes, the high byte is reserved and the low byte is valid.

- *Report ID / Report Type*

  The high nibble is for <Report ID> and the low nibble is for <Report Type>.

- *Speed*

  3 bytes in total. The first 2 bytes are for the integer part of the speed and the last byte is for the fractional part. The fractional part has 1 digit.

- *Longitude*

  The longitude of the current position. 4 bytes in total. The device converts the longitude to an integer with 6 implicit decimals and reports this integer in HEX format. If the value of the longitude is negative, it is represented in Two'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 Two'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 Two's Complement format. Unit: meter.

- *GNSS UTC Time*

  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 represent the hour part, the fifth byte represents the minute part, and the sixth byte represents the second part.

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

- *GNSS Trigger Type*

The trigger type of GNSS point has the following meanings.

- **00** - Time point
- **01** - Corner point
- **02** - Distance point
- **03** - Mileage point
- **04** - Optimum point (time & mileage)

5.2.2 FRI(Fixed Report Information)

The location report message **+RESP:GTFRI** in HEX format is as follow.

Example:
2B5253500700FC0FBF00A380200703050311564B40050607610448211910030100000000 8F005306FB400B01E5D4E907E80B0706342704600001DF5C027A4F1F0001000000008F005306FB400B01E5D4E907E80B0706343104600001DF5C027A4F1F0001000000008F005306FB400B01E5D4E907E80B0706343B04600001DF5C027A4F1F000000010000000000100021E00000000021E07E80B070635003599699B0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+RSP
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	RSP Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Report ID | Report Type	1	
	Number	1	1 - 15
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)

Parts	Fields	Length	Range/Format
	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	4	00000000 - FFFFFFFF
	Reserved|GNSS Trigger Type(Optional)	1	00|00 - 04
	Current Mileage	3	0.0 - 65535.0(km)
	Total Mileage	5	0.0 - 4294967.0(km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	CSQ RSSI|RSRP	1	0 - 31 | 99 | 0 - 97 | 255
	CSQ BER	1	0 - 7 | 99
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.2.2.1 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 (AT+GTFRI) is set to 1 and the <Check Interval> for the location report is set to 1 second.

Example:
2B5253506400FC1FBF009B80200703050311564B400506076104642FB5210E000F60040006FB3C1E01E5DAC3672C9322A0007FDFBFA0000007B5A000000FDDA0007FD7E9A00000582DA0000010
08A000002FF6A000005002A000005005A000007807A000004006A00006A09AA000012882E004
600001DF5C05FE6667000000000000000000000000000000000000007E80B070A0F0D002825BD0
D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+RSP

Parts	Fields	Length	Range/Format
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	RSP Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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 Use	1|2	0 - 72
	Number	2	1 - 270
	Compressed Location Info		
	MCC	2	0000 - FFFF
	MNC	2	0000 - FFFF
	LAC	2	0000 - FFFF
	Cell ID	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	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
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
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
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:

  – **0b00** - It indicates the GNSS location is invalid and the device fails 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 - 409.0 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 from -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 from -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 from -0.002408 to 0.002047 degree. The range of distance that can be represented by the relative longitude on the Arctic Circle is from -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 from -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 allowed range, the GNSS information will be represented by its Absolute Value.

✧ *GNSS Trigger Type*
The trigger type of GNSS point has the following meanings.

- **00** - Time point

- **01** - Corner point
- **02** - Distance point
- **03** - Mileage point
- **04** - Optimum point (time & mileage)

5.2.3 LBC(Location By Call Alarm)

If the parameter <Location Request Mask> 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 SMS. The message **+RESP:GTLBC** in HEX format is as below.

Example:
2B5253500300FC1FBF0068802007030503 0D562E600600011609642F9C12180070130830671 81F010100000100160059 06FB3FB601E5D3F207E80A1E080D1F04600000550B085BE2AA000000000 00000C8030015340000001 2273A07E80A1E100D1F00CC21D00D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+RSP
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	RSP Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Report ID | Report Type	1	
	Number Length | Number Type	1	
	Phone Number	<=10	
	Number	1	1
	GNSS Accuracy	1	0 - 50

Parts	Fields	Length	Range/Format
	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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0(km)
	Total Mileage	5	0.0 - 4294967.0(km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	CSQ RSSI|RSRP	1	0 - 31 | 99 | 0 - 97 | 255
	CSQ BER	1	0 - 7 | 99
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	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 <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".

Message	Number Length	Number Type
HEX	7	0

✧ *Phone Number*

No more than 10 bytes. In each byte, use the high nibble and low nibble to represent one digit of the phone number respectively.

If there is no digit for the last low nibble to represent, fill it with 0xF.

Phone Number (02154450293)	02	15	44	50	29	3
HEX	02	15	44	50	29	3F

5.2.4 ERI(Expand Fixed Report Information)

If **+RESP:GTERI** is enabled, the device will send the message **+RESP:GTERI** to the backend server instead of **+RESP:GTFRI**.

The message **+RESP:GTERI** in HEX format is as below.

Example:
2B5253501200FC0FBF000001000080802007030503115 64B40050607610463211810000 1000F000000081F5749443332304700D455083831FA0108DF1A0A560101000003012C005506FB409D01E5D4BE07E80B0707221B04600001DF5C027A4F1F0000000100000000001002B39000000002B3907E80B0707221C365042700D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+RSP
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	RSP Expansion Mask	4	00000000 - FFFFFFFF
Body	ERI Mask	4	00000000 - FFFFFFFF
	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Report ID | Report Type	1	
	Reserved	1	00
	Bluetooth Accessory Data(Optional)		
	Number	1	1 - 15
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359

Parts	Fields	Length	Range/Format
	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	4	00000000 - FFFFFFFF
	Reserved|GNSS Trigger Type(Optional)	1	00|00 - 04
	Current Mileage	3	0.0 - 65535.0(km)
	Total Mileage	5	0.0 - 4294967.0(km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	CSQ RSSI|RSRP	1	0 - 31 | 99 | 0 - 97 | 255
	CSQ BER	1	0 - 7 | 99
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ **Bluetooth Accessory Data(Optional)**

Fields	Length	Range/Format
Bluetooth Accessory Number	1	0 - 10
Index	1	0 - 9 | 0xFF
Accessory Type	1	0 | 6 | 12 | 13 | 15
Accessory Model	1	0 | 2 | 4 | 5
Raw Data Length	2	0000 - FFFF
Raw Data(Optional)	<=4	
Accessory Append Mask	2|4	0 - FFFF | 0 - 7FFFFFFF
Accessory Name(Optional)	<=21	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
Accessory MAC(Optional)	6	000000000000 - FFFFFFFFFFFF
Accessory Status(Optional)	1	0 - 1
Accessory Battery Level(Optional)	2	0 - 5000(mV)
Accessory Temperature(Optional)	1	-40 - 80(℃)
Accessory Humidity(Optional)	1	0 - 100%(rh)

Fields	Length	Range/Format
Tire Pressure(Optional)	2	0 - 500(kPa)
Timestamp(Optional)	7	YYYYMMDDHHMMSS
Enhanced Temperature(Optional)	2	-40.00 - 80.00(℃)
Accessory Battery Percentage(Optional)	1	0 - 100(%)
Relay State(Optional)	1	0 - 1
Tri-axial Acceleration Data (Optional)	6	HEX
Angle Values (Optional)	3	HEX
Event Mask (Optional)	1	HEX
Tilt Event (Optional)	2	HEX
Motion Event (Optional)	2	HEX
Crash Event (Optional)	2	HEX
Falling Event (Optional)	2	HEX
Accessory RSSI (Optional)	1	-128 - 127

- *Bluetooth Accessory Number*

  It indicates the number of accessories connected with the device .

- *Index*

  There are two meanings 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

  – **6** - Beacon multi-functional sensor

  – **12** - BLE TPMS sensor

  – **13** - Relay sensor

  – **15** - Movement-angle BLE sensor

- *Accessory Model*

  The model of the Bluetooth accessory which is defined in (AT+GTBAS).

- *Raw Data Length*

  It indicates the length of <Raw Data>.

- *Raw Data*

  The (raw data) is read from Bluetooth accessory. It varies depending on <Accessory Type> and <Accessory Model>.

- *Accessory Name*

  The name of the Bluetooth accessory. It ends with 0x00.

- *Accessory MAC*
  The MAC address of the Bluetooth accessory.
- *Accessory Status*
  A numeral to indicate whether the accessory is available.
  – **0** - The accessory is not available.
  – **1** - The accessory is available.
- *Accessory Battery Level*
  It indicates the remaining level of the battery in Bluetooth accessory.
- *Accessory Temperature*
  Temperature data of Bluetooth accessory.
- *Accessory Humidity*
  Humidity data for the Bluetooth accessory.
- *Enhanced Temperature*
  It instructs Bluetooth accessories to measure temperature with high precision.

Temperature (16.66)	**1666**	
HEX	06	82

Note
The current temperature value. A total of 2 bytes. The temperature value is converted to an integer with 2 implicit decimals, and the integer is reported in HEX format. If the temperature value is negative, it is expressed in 2's complement format.

✧ *Accessory Battery Percentage*
Percentage of Bluetooth accessory's battery power.

✧ *Relay State*
The current state of the relay sensor.

Note

The word "Optional" means the item is controlled by the parameter <ERI Mask>.

✧ *GNSS Trigger Type*
The trigger type of GNSS point has the following meanings.
- **00** - Time point
- **01** - Corner point
- **02** - Distance point
- **03** - Mileage point
- **04** - Optimum point (time & mileage)

✧ *Accessory RSSI*
Signal strength RSSI value for the Bluetooth accessory.

5.2.5 GIN|GOT(Geo-Fence Information)

The messages **+RESP:GTGIN** and **+RESP:GTGOT** in HEX format are as below.

Example:
2B5253501400FC1FBF006A80200703050311564B4005061A4905642FC82207010100000000000

100000101002E01004E001D06FC6A6C01E61DD907E80A11062C0F04600001DF5C05FE66670000
00000000000000000000000000000000007E80A11062C10029A9AB20D0A

2B5253501500FC1FBF006A80200703050311564B4005061A4905642FC82206010100000000000
020000101002B060050001A06FC605601E61C4E07E80A11062B3704600001DF5C05FE66670000
00000000000000000000000000000000007E80A11062B38029858DF0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+RSP
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	RSP Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Area Type	1	0 - 1
	Mask Group	1	01
	Area Mask Group 1	8	0000000000000001 - 00000000000FFFFF
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359
	Altitude	2	
	Longitude	4	
	Latitude	4	
	GNSS UTC Time	7	YYYYMMDDHHMMSS
	MCC	2	0000 - FFFF

Parts	Fields	Length	Range/Format
	MNC	2	0000 - FFFF
	LAC	2	0000 - FFFF
	Cell ID	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	CSQ RSSI|RSRP	1	0 - 31 | 99 | 0 - 97 | 255
	CSQ BER	1	0 - 7 | 99
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Mask Group*

Bitwise mask to determine whether to report <Area Mask>. Bit 0 is for Area Mask Group 1 . 1 means "Report the information", and 0 means "Do not report the information".

✧ *Area Mask Group*

Bitwise mask for trigger condition composition of the corresponding GEO ID. Each bit, from the lowest bit to the highest bit, represents the logic status of the corresponding ID to trigger the entering or exiting event. 1 means that the event of the ID set is triggered, and 0 means the event of the ID set is not triggered. In a group, if no event of ID is triggered, the bitwise mask will be null.

- *Area Mask Group 1*

  From bit 0 to bit 63 represents ID 0 to 63.

5.2.6 SLM(Sleep Mode Configuration)

The report message **+RESP:GTSLM** in HEX format is as below.

Example:
2B5253502300FC1FBF006380200703050311564B4005061A4905002D26220F110000010100010
10040004F06FB421901E5D57D07E80B050B190404600001DF5C027A4F1F000000000000000000
0000000000000000007E80B050B190401C3B4EF0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+RSP
	Message Type	1	

Parts	Fields	Length	Range/Format
	Report Mask	4	00000000 - FFFFFFFF
	RSP Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Report ID | Report Type	1	
	Report Items Mask	2	0000 - FFFF
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0(km)
	Total Mileage	5	0.0 - 4294967.0(km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	CSQ RSSI|RSRP	1	0 - 31 | 99 | 0 - 97 | 255
	CSQ BER	1	0 - 7 | 99
Tail	Send Time	7	YYYYMMDDHHMMSS

Parts	Fields	Length	Range/Format
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Report Items Mask*

Please refer to <Report Items Mask> of the command (AT+GTSLM).

5.2.7 CRI(Compressed Report Information)

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.

Example:

2B43524964010C189700A0564B4005060A1A07642FC5211F0A003C11F00003001A005F06FB409D01E5D42867283C151110410101110041011130010241011120424201100001112001020111000101104041011100410100 3C00070021004F00070020004F00070021004F00070021004F00070021004F00070021004F00070020004E00070020004E00070020004F00070020004E07E80B04030E2695AA0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+CRI
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	CRI Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Number	1	0 - 60
	Compression GNSS Length	2	0 - 1200

Parts	Fields	Length	Range/Format
	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
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	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 positions 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.

Fields	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		

Fields	Length (Bit)	Range/Format	Default
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.

Fields	Length (Byte)	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 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 60 seconds, the acceleration data of the last 60 seconds will be reported.

5.3 Device Information Reports

This section describes the message related to device generic information. Please refer to the details below.

5.3.1 INF(Device Information)

Information report messages include the messages shown in the default value of the following table. However, only **+RESP:GTINF** includes all the items while other messages only include information of items related to themselves.

Example:
2B494E4601FD7F006647423130304347008020070305031101010000000021001740 07E80B070724360001007F00001E000258000000F02F730FA76489860118802906098 1072F00040000000104600001DF5C027A4F1F006307E80B07072436365B12E70D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+INF
	Message Type	1	
	Report Mask	2	0000 - FFFF
Body	INF Expansion Mask	2	0000 - FFFF
	INF Expansion2 Mask	2	0000 - FFFF
	Length	2	
	Unique ID	8	IMEI/Device Name
	Device Type	3	802007
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	(+RESP:GTVER)		
	(+RESP:GTGPS)		
	(+RESP:GTBAT)		
	(+RESP:GTCID)		
	(+RESP:GTCSQ)		
	(+RESP:GTTMZ)		
	(+RESP:GTGSM)		
	(+RESP:GTGSV) (+RESP:GTRSV) (+RESP:GTBSV)		
	(+RESP:GTSCS)		
	(+RESP:GTBTI)		
	Network Type	1	00 - 03
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Message Type*

The ID of a specific information report message.

Message	ID
+RESP:GTINF	1
+RESP:GTGPS	2

Message	ID
+RESP:GTCID	4
+RESP:GTCSQ	5
+RESP:GTVER	6
+RESP:GTBAT	7
+RESP:GTTMZ	9
+RESP:GTGSM	10
+RESP:GTGSV	11
Reserved	...
+RESP:GTRSV	21
+RESP:GTBSV	22
+RESP:GTBTI	24
+RESP:GTSCS	28
Reserved	...

✧ *Report Mask*

Please refer to <+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	13	57	90	24	68	11	22	0
HEX	0D	39	5A	18	44	0B	16	00

If Bit 1 of <+INF Mask> is 1, the device name is used as the unique ID of the device.

Device name is an 8-byte string, please refer to <Device Name> in (AT+GTCFG).

If the length of <Device Name> is more than 8 bytes, the device will only acquire the first 8 bytes.

In the HEX format message, each byte is encoded into one byte as an integer. If the device name is less than 8 bytes, the remaining bytes are set to 0.

Device Name	q	u	e	c	l	i	n	k
HEX	71	75	65	63	6C	69	6E	6B

✧ *Device Type, Protocol Version, Firmware Version*

If <Message Type> is 6 (**+RESP:GTVER**) in the message, Bit 2 (<Device Type>)/Bit 3 (<Protocol Version>)/Bit 4 (<Firmware Version>) in <+INF Mask> will be forced to 1, and these fields will be always present in the HEX report of **+RESP:GTVER**.

+RESP:GTVER

Message	Fields	Length	Range/Format
+RESP:GTVER	Hardware Version	2	0000 - FFFF
	Reserved	2	0000

Message	Fields	Length	Range/Format
	Reserved	2	0000

GPS

Message	Fields	Length	Range/Format
+RESP:GTGPS	Motion Status	1	0x11 | 0x12 | 0x21 | 0x22 | 0x41 | 0x42 | 0x16 | 0x1A
	Reserved	1	00
	Satellites in Use	1	0 - 72
	Enable Power Saving | OWH Mode | Outside Working Hours | AGPS	1	00 - FF
	Last Fix UTC Time	7	YYYYMMDDHHMMSS
	Reserved	1	00
	FRI Discard No Fix	1	0|1
	Report Item Mask	2	
	IGN Interval	3	
	IGF Interval	3	
	Reserved	2	0000
	Reserved	1	00

✧ *Enable Power Saving, OWH Mode, Outside Working Hours, AGPS*

The highest bit, or Bit 7, is reserved; Bit 5 and Bit 6 are for <Enable Power Saving>; Bit 4 and Bit 3 are for <OWH Mode>; Bit 2 is for <Outside Working Hours>, and Bit 0 and Bit 1 are for <AGPS>. <Outside Working Hours> is used to indicate whether the device is currently outside working hours. 1 means "Outside working hours".

- **Bit 0 - 1 :** AGPS
- **Bit 2 :** Outside Working Hours
- **Bit 3 - 4 :** OWH Mode
- **Bit 5 - 6 :** Enable Power Saving

BAT

Message	Fields	Length	Range/Format
+RESP:GTBAT	Power Supply | Backup Battery On | Charging | LED State | Power Mode	1	00 - FF
	External Power Voltage	2	0 - 32000(mV)
	Backup Battery Voltage	2	0 - 4500(mV)

Message	Fields	Length	Range/Format
	Backup Battery Percentage	1	0 - 100

✧ *Power Supply, Backup Battery On, Charging, LED State, Power Mode*

The highest bit, or Bit 7, is for <Power 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>, indicating at least one LED indicator is blinking or steady on when it is 1, and all LEDs are off when it is 0. Bit 0 is for <Power Mode>.

- **Bit 0 :** Power Mode
- **Bit 1 - 3 :** Reserved
- **Bit 4 :** LED State
- **Bit 5:** Charging
- **Bit 6 :** Backup Battery On
- **Bit 7 :** Power Supply

CID

Message	Fields	Length	Range/Format
+RESP:GTCID	ICCID	10	ICCID

✧ *ICCID*

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

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

CSQ

Message	Fields	Length	Range/Format
+RESP:GTCSQ	CSQ RSSI|RSRP	1	0-31 | 99 | 0-97 | 255
	CSQ BER	1	0 - 7 | 99

TMZ

Message	Fields	Length	Range/Format
+RESP:GTTMZ	Time Zone Offset Sign | Enable Daylight Saving | Network Time Checking	1	00 - FF
	Time Zone Offset	2	HHMM

✧ *Time Zone Offset Sign, Enable Daylight Saving, Network Time Checking*

Bit 2 is for <Network Time Checking> which indicates whether to check GNSS UTC time with network time. Bit 1 is for <Enable Daylight Saving> 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 time. 1 means "negative offset".

GSM

Message	Fields	Length	Range/Format
+RESP:GTGSM	GIR Trigger Type	1	
	Cell Number	1	
	MCC	2	
	MNC	2	
	LAC	2	
	Cell ID	4	00000000 - FFFFFFFF
	Reserved	1	00
	RX Level	1	
	...	2	
	MCC	2	
	MNC	2	
	LAC	2	
	Cell ID	4	00000000 - FFFFFFFF
	Reserved	1	
	RX Level	1	

✧ *GIR Trigger Type*

The ID of fix type. It indicates 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 sub command **C** in the **AT+GTRTO** command.
- **ERI** - This cell information is for ERI request.

Fix Type	ID
INF	0
RTL	2
LBC	3
TOW	4
FRI	5
GIR	6
ERI	7

✧ *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.

GSV

RSV

BSV

Messages	Fields	Length	Range/Format
+RESP:GTGSV +RESP:GTRSV +RESP:GTBSV	SV Count	1	
	SV ID	1	
	SV Power	1	
	...		
	SV ID	1	
	SV Power	1	

SCS

Message	Fields	Length	Range/Format
+RESP:GTSCS	Self Calibration Status	1	0 | 1 | 2
	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

BTI

Message	Fields	Length	Range/Format
+RESP:GTBTI	Bluetooth Name	<=20	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Bluetooth MAC Address	6	000000000000 - FFFFFFFFFFFF
	Bluetooth State	1	0|1
	Connected Device Number	1	0 - 11
	Connected Device Name	<=20	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Connected Device MAC	6	000000000000 - FFFFFFFFFFFF
	Role	1	0 | 1
	Real-Time State	1	0 - 1

Message	Fields	Length	Range/Format
	Ghost Battery Percentage	1	0 - 100
	Ghost Status	2	0000 - FFFF

Note

<Connected Device Name> ends with 0x00.

5.3.2 ATI(Version Information)

After the device receives the command (AT+GTRTO) to get the basic device information, it will send the information to the backend server via the message **+RESP:GTATI**.

Example:
2B41544936802007030503115 64B40050607610400181031031101010300010367000000000000000007E80B07082205378659230D0A

Parts	Fields	Length	Range/Format
Head	Message Header	4	+ATI
Body	Length	1	
	Device Type	3	802007
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	ATI Mask	4	00000000 - FFFFFFFF
	Firmware Version	2	'0' - '9' 'A' - 'F'
	Hardware Version	2	'0' - '9' 'A' - 'F'
	BT Firmware Version	2	0000 - FFFF
	BT Boot Firmware Version	2	0000 - FFFF
	Sensor ID	1	00 - FF
	Modem IMEI	8	IMEI
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *ATI Mask*

This mask is set by the (AT+GTRTO) command and used to control parameter fields in **+ATI** message.

5.4 Event Reports

This section describes the message related to certain events. Please refer to the details below.

5.4.1 Generic Event Report

- **PNA** (Power-on Report)
- **PFA** (Power-off Report)
- **MPN** (Main Power Connection)
- **MPF** (Main Power Disconnection)
- **BTC** (Battery Starts Charging)
- **STC** (Stop Charging Notification)
- **STT** (Device Status Notification)
- **PDP** (GPRS Connection Establishment Report)
- **IDN** (Enter Idle State)
- **STR** (Enter Start State)
- **STP** (Enter Start State)
- **LSP** (Enter Start State)

Example:

2B4556540100FC1FBF00608020070305030E564B4005060A1A07640000410001000000000000
0000000000000000000000000000000000000000000000000000000000000000000020000000
0000000000007E80A1F09030E050EF43A0D0A

2B4556540200FC1FBF00608020070305031156 4B4005061A4905642FD82215010000020100970
06106FB403E01E5D35207E80B0505172A04600001DF5C05FE66670000000000000000000000000
00000000000007E80A11080E30031A1FA10D0A

2B4556540300FC1FBF006080200703050311564B4005061A4905642FD841000100000000000000
000000000000000000000000000000000004600001DF5C027A4F1F000000000000000000000000
00000000000007E80B05051805031DA4970D0A

2B4556540400FC1FBF00608020070305030D562E6006000116096400002218010100000200980
05906FB3FB901E5D3F207E80A1E080D0D04600000550B085BE2AA00000000000000C80300152
B00000012273107E80A1E100D0E00C53D960D0A

2B4556540700FC1FBF00608020070305030D562E600600011609642F9C121601010000020016 00
5906FB3FB701E5D3F207E80A1E080D1904600000550B085BE2AA00000000000000C8030015340
0000012273A07E80A1E100D1A00CBF1690D0A

2B4556540800FC1FBF00608020070305030D562E600600011609640000211901010000000004F00
5106FB401F01E5D45A07E80A1E07303704600000550B085BE2AA00000000000000C8070000030

0000012111207E80A1E0F3037004B202E0D0A

2B4556540900FC1FBF00608020070305030E564B4005060A1A07642FA44212010000030600090
07806FB400201E5D4B407E80A1F09022A04600001DF5C027A4F1F000000000000000000200000
00000000000007E80A1F090234050CEDC00D0A

2B4556540C00FC1FBF00608020070305030D562E600600011609642DE32206010100000014B0
0D406FB3E2701E5D3E507E80A1E0911360000000000000000000000000003000000C80400310C
00000013280D07E80A1E11113A02135BDC0D0A

2B4556541000FC1FBF00608020070305030F564B4005060A1A07642FB52111010100000000 1F0
02106FCFD4701E60DDF07E80A1106353804600001DF5C05FE666700000C060000000C08000000
00000000000007E80A110E3539015128B20D0A
2B4556541700FC1FBF006080200703050311564B4005061A4905642FC82207010000 3004004D0
01D06FC6A5401E61DCD07E80A11062C0E04600001DF5C05FE666700000000000000000000000000
00000000000007E80A11062C100299B2F90D0A
2B4556541800FC1FBF006080200703050311564B4005061A4905642FE82105010000 2307005B0
04E06FCE74401E608FD07E80A1106340604600001DF5C05FE666700000000000000000000000000
00000000000007E80A1106370602B18F370D0A
2B4556541D00FC1FBF00608020070305030F564B4005060A1A07642F94211401010000000043 0
01C06FD0FD601E6147F07E80A1106373804600001DF5C05FE666700000D010000000D03000000
00000000000007E80A110E37390157BD1D0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Number	1	1

Parts	Fields	Length	Range/Format
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Message Type*

The ID of a specific event report message.

Message	ID
+RESP:GTPNA	1
+RESP:GTPFA	2
+RESP:GTMPN	3
+RESP:GTMPF	4
+RESP:GTBPL	6
+RESP:GTBTC	7
+RESP:GTSTC	8
+RESP:GTSTT	9
+RESP:GTPDP	12
+RESP:GTUPD	15
+RESP:GTIDN	16
+RESP:GTIDF	17
+RESP:GTDAT	18

Message	ID
+RESP:GTJDR	20
+RESP:GTGSS	21
+RESP:GTSTR	23
+RESP:GTSTP	24
+RESP:GTCRA	25
+RESP:GTGES	28
+RESP:GTLSP	29
+RESP:GTJDS	32
+RESP:GTRMD	33
+RESP:GTUPC	40
+RESP:GTVGN	45
+RESP:GTVGF	46
+RESP:GTASC	47
+RESP:GTPNR	48
+RESP:GTPFR	49
+RESP:GTHBE	51
+RESP:GTBCS	52
+RESP:GTBDS	53
+RESP:GTBAA	65
+RESP:GTBID	67
+RESP:GTSVR	73
+RESP:GTEUC	84
+RESP:GTRTP	86
+RESP:GTBFS	110

✧ *Report Mask*

Please refer to <+EVT Mask> in (AT+GTHRM).

✧ *Unique ID*

If Bit 6 of <+EVT Mask> is 0, the IMEI of the device is used as the unique ID of the device. IMEI is a 15-digit string. In the HEX format message, each 2 digits are encoded into one byte as an integer.

IMEI	13	57	90	24	68	11	22	0
HEX	0D	39	5A	18	44	0B	16	00

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

Device Name	q	u	e	c	l	i	n	k
HEX	71	75	65	63	6C	69	6E	6B

✧ *Satellites in Use*

Number of satellites being used for tracking. The high nibble is reserved and the low nibble is valid. But if Bit 1 of <EVT Expansion Mask> is set to 1, this parameter would be expanded to two bytes, the high byte is reserved and the low byte is valid.

5.4.2 BPL(Backup Battery Low Alarm)

The event report message **+RESP:GTBPL** in HEX format is as below.

Example:
2B4556540600FC1FBF0062802007030503 0C562E60060001160918000011 0F0E72010000000000 2B005A06FB40EF01E5D38407E80A17021B2404600000550B085BE2AA0000000000000000000000 0000000000000007E80A170B092408083EFB0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Backup Battery Voltage	2	0 - 4500(mV)
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359

Parts	Fields	Length	Range/Format
	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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.3 JDR(Jamming Indication Notification)

Jamming indication. The event report message **+RESP:GTJDR** in HEX format is as below.

Example:
2B4556541400FC1FBF006180200703050310564B4005060A1A07642E592107020100000000011B003106FB411F01E5CFB407E80B04081A1C00000000000000000000000000050000000106000000000000000007E80B04081D2501AD87930D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name

Parts	Fields	Length	Range/Format
	Battery Level	1	0 - 100
	External Power Voltage	2	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Jamming Net	1	1-3
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.4 JDS(Jamming Indication Notification)

Jamming indication. The event report message **+RESP:GTJDS** in HEX format is as below.

Example:
2B4556542000FC1FBF006280200703050310564B4005060A1A07642E38210501020100000000

11B003106FB411F01E5CFB407E80B0408241B04600001DF5C05FE6667000000050000000106000000000000000000007E80B0408292501BA23DA0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Jamming Status	1	1 | 2
	Jamming Net	1	1-3
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS

Parts	Fields	Length	Range/Format
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Jamming Status*

The current jamming status of the device.

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

5.4.5 VGN | VGF

✧ VGN - Virtual Ignition-on Report

✧ VGF - Virtual Ignition-off Report

The HEX format of the event report messages **+RESP:GTVGN** and **+RESP:GTVGF** is as follows. For these two messages, the <Current Mileage> and <Total Mileage> fields will always be present regardless of the <+EVT Mask> setting.

Example:

2B4556542D00FC1FBF0066802007030503 0D562E600600011609642FBC211700020000002C010 1000000004F005106FB401F01E5D45B07E80A1E07312C04600000550B085BE2AA000000000000 00C807000000000000012111807E80A1E0F312D005205B20D0A

2B4556542E00FC1FBF0066802007030503 0D562E60060001160964000012170002000005 4E0101 0000020016005906FB3FB701E5D3F207E80A1E080D1604600000550B085BE2AA0000000000000 0C8030015340000012273A07E80A1E100D1700C706240D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	Battery Level	1	0 - 100

Parts	Fields	Length	Range/Format
	External Power Voltage	2	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Reserved	1	00
	Report Type	1	2 | 4 | 7
	Duration of Ignition On or Ignition Off	4	0 - 999999(s)
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.6 IDF(Exit Idle State)

The HEX format of the event report message **+RESP:GTIDF** is as follows.

Example:
2B4556541100FC1FBF00648020070305030F564B4005060A1A07642FA412150000003B0101002
3080052003606FCEB9F01E60A6807E80A1106341004600001DF5C0DD0833A0000000700000075
0300000000000000000007E80A110E341104E33C710D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Duration of Idling	4	
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)

Parts	Fields	Length	Range/Format
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.7 GSS(GNSS Signal Status)

The HEX format of the event report message **+RESP:GTGSS** is as follows.

Example:
2B4256541500FC1FBF00658020070305030D562E600600011609642DF32100000000000000010000000000014B00D406FB3E2701E5D3E507E80A1E0911360000000000000000000000000000003000000C80400320C00000013290D07E80A1E111239021BFF250D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	GNSS Signal Status	1	0|1
	Reserved	4	00000000
	Number	1	1
	GNSS Accuracy	1	0 - 50

Parts	Fields	Length	Range/Format
	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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Satellites in Use*

Number of satellites being used for tracking. The high nibble is reserved and the low nibble is valid. But If Bit 1 of <EVT Expansion Mask> is 1 this parameter would be expanded to two bytes, the high byte is reserved and the low byte 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".

5.4.8 GES(Parking-Fence Information)

The HEX format of the event report message **+RESP:GTGES** is as follows.

Example:
2B4556541C00FC1FBF006C8020070305030F564B4005060A1A07642FA4221400130000000001F
40000000A01010022070057003F06FCE59401E6093E07E80A1106340104600001DF5C0DD0833A
000000060000007502000000000000000000007E80A110E340204DD3D910D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT

Parts	Fields	Length	Range/Format
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Trigger GEO ID	2	0 - 19
	Enable Trigger GEO	1	0 | 1
	Trigger Mode	1	0 | 21 | 22
	Radius	4	50 - 6000000(m)
	Check Interval	4	0 |5 - 86400(s)
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS

Parts	Fields	Length	Range/Format
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Trigger GEO ID*

The ID of Geo-Fence.

✧ *Enable Trigger GEO*

The current Parking-Fence is active or inactive.

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

5.4.9 RMD(Roaming State Report)

The HEX format of the event report message **+RESP:GTRMD** is as follows.

Example:
2B4556542100FC1FBF006180200703050310564B4005060A1A07642EFF2117000101000000001
C008606FB409001E5D3C907E80B0108382404600001DF5C05FE6667000000000000000000001
0C000000000E1D07E80B0108382600948B920D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72

Parts	Fields	Length	Range/Format
	Roaming State	1	0 - 3
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.10 PNR(Power-on Reason)

Example:
2B4556543000FC1FBF00618020070305030D562E6006000116096400004100020100000000000
00000000000000000000000000000000000000000000000000000000000000000000C8060000
000000012103907E80A1E0F2C23002C37400D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	

Parts	Fields	Length	Range/Format
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Power On Reason	1	0-3 | 6
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.11 PFR(Power-off Reason)

Example:
2B4556543100FC1FBF00618020070305030D562E600600011609642FAC2119020101000000000005906FB40B601E5D43F07E80A1E072C0C04600000550B085BE2AA00000000000000C80600002700000012103907E80A1E0F2C0D002A56110D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Power Off Reason	1	0-3
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF

Parts	Fields	Length	Range/Format
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.12 ASC(Acceleration Calibration Alarm)

The HEX format of the event report message **+RESP:GTASC** is as follows.

Example:
2B4556542F00FC1FBF006980200703050 30F564B4005060A1A07642FA422156300F808ED61FF9E
ED0101001805005C003106FCDBC301E6095707E80A1106320F04600001DF5C05FE666700000B0
80000000C00000000000000000000007E80A110E32110146780D0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	X_Forward	1	-100 - 100

Parts	Fields	Length	Range/Format
	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 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	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.

5.4.13 HBE(Acceleration Information for HBM)

XYZ-axis acceleration data in one harsh behavior. The HEX format of the event report message **+RESP:GTHBE** is as follows.

Example:
2B4556543300FC1FBF00728020070305030E564B4005061A5F0854300E2221000200001B000500
63FFE7FFFE005F000004010100400701 0C003E06FA7AEF01E606E707E80B040525100460000055
0B05DCDC2A00000707000000A00700110C00000005200C07E80B04052511037C45060D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Reserved	1	00
	Self Calibration Status	1	0 - 2
	Harsh Behavior Type	1	0 - 4
	Max Acceleration Data	6	'0'-'9' 'a'-'f'
	Average Acceleration Data	6	'0'-'9' 'a'-'f'
	Harsh Behavior Duration	3	0 - 999999(x10ms)
	Number	1	1
	GNSS Accuracy	1	0 - 50

Parts	Fields	Length	Range/Format
	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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Max Acceleration Data*

There are 12 characters in a group of acceleration data. It is the maximal value of acceleration data which triggers this harsh behavior report. The XYZ-axis of the <Max Acceleration Data> in the **+RESP:GTHBE** report correspond to those of the device's coordinate system.

The first 4 characters of these 12 characters represent X axis acceleration data, the middle 4 characters represent Y axis acceleration data and the last 4 characters are for Z axis acceleration data.

The ASCII "0001" indicates HEX value 0x0001, so it means the acceleration is 1. The ASCII "fffd" indicates HEX value 0xFFFD which is the compliment of -3, so it means the acceleration is -3. This value is only valid in Mode 5 of the (AT+GTHBM) command.

✧ *Average Acceleration Data*

There are 12 characters in a group of acceleration data. It is the average value of acceleration data which triggers this harsh behavior report.

The first 4 characters of these 12 characters represent X axis acceleration data, the middle 4 characters represent Y axis acceleration data and the last 4 characters are for Z axis acceleration data.

The ASCII "0001" indicates HEX value 0x0001, so it means the acceleration is 1. The ASCII "fffd" means HEX value 0xFFFD which is the compliment of -3, so it means the acceleration is -3. This value is only valid in Mode 5 of the (AT+GTHBM) command.

✧ *Harsh Behavior Duration*

The duration of the harsh behavior event. This value is only valid in Mode 5 of the (AT+GTHBM) command.

✧ *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.

✧ *Harsh Behavior Type*

The type of the harsh behavior.

- **0** - Harsh braking behavior.
- **1** - Harsh acceleration behavior.
- **2** - Harsh cornering behavior.
- **3** - Harsh braking and cornering behavior.
- **4** - Harsh acceleration and cornering behavior.

5.4.14 CRA(Crash Alarm)

The HEX format of the event report message **+RESP:GTCRA** is as follows.

Example:
2B4556541900FC1FBF006180200703050311564B4005061A4905642FD8221C280101000003010
5006B06FB405401E5D4B707E80B0506223204600001DF5C027A4F1F000000000000000000000
0000000000000007E80A1107293B05BEB9160D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A

Parts	Fields	Length	Range/Format
	Satellites in Use	1|2	0 - 72
	Crash Counter	1	00 - FF
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Crash Counter*

A parameter to indicate the crash sequence. It combines the report **+RESP:GTCRA** and **+RESP:GTCRD** into one crash event. It rolls from 0x00 to 0xFF.

5.4.15 BCS(Bluetooth Connection Alarm)

The report for Bluetooth connection.

Example:
2B4556543400FC1FFF007D8020070305030C474231303043470064 2F9C210F0D0347423130304 34725494D45490078054135A60200015606C1A590D8010100000000AE004E06FB3E5B01E5D435 07E80A1906082C04600000550B085BE2AA0000000000000000030002060000000020607E80A1 90E082C181244C50D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Bluetooth Report Mask	2	0000 - FFFF
	Bluetooth Name	<=21	ASCII
	Bluetooth MAC Address	6	000000000000 - FFFFFFFFFFFF
	Peer Role	1	0 | 1
	Peer Address Type	1	0 | 1
	Peer MAC Address	6	000000000000 - FFFFFFFFFFFF
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)

Parts	Fields	Length	Range/Format
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Bluetooth Name*

The name of the device for Bluetooth identification. It ends with 0x00.

5.4.16 BDS(Bluetooth Disconnection Alarm)

The report for Bluetooth disconnection.

Example:
2B4556543500FC1FFF007E8020070305030C474231303043470064 2F9C210F0D03474231303043 4725494D45490078054135A60200015606C1A590D800010100000000AE004E06FB3E5B01E5D43 507E80A190608290460000055 0B085BE2AA00000000000000000300020300000000020307E80A 190E082A181153A80D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72

Parts	Fields	Length	Range/Format
	Bluetooth Report Mask	2	00000 - FFFF
	Bluetooth Name	<=21	ASCII
	Bluetooth MAC Address	6	000000000000 - FFFFFFFFFFFF
	Peer Role	1	0 | 1
	Peer Address Type	1	0 | 1
	Peer MAC Address	6	000000000000 - FFFFFFFFFFFF
	Reason	1	0
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Bluetooth Name*

The name of the device for Bluetooth identification. It ends with 0x00.

5.4.17 BAA(Bluetooth Accessory Alarm)

The HEX format of the event report message **+RESP:GTBAA** is as follows.

Example:
2B4556544100FC1FFF006E8020070305030D474231303043470064 2F9C211CFE030212000A0000

```
00000000000001010000000B6002B06FB3F4101E5D42807E80A1C09192004600000550B085BE
2AA0000000200000000005002A31000000030A1107E80A1C09192001B0511A0D0A
```

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Index	1	0-4 | 7-9 | FF | FE
	Accessory Type	1	0 | 3 | 6 | 12 | 13 | 15
	Accessory Model / Beacon ID Model	1	0 | 2 | 4 | 5
	Alarm Type	1	0-4 | 7-9 | E-15 | 19-1E
	Append Mask	2|4	0 - FFFF | 0 - 7FFFFFFF
	Accessory Name(Optional)	<=21	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Accessory MAC(Optional)	6	'0' - '9' 'A' - 'F'
	Accessory Status(Optional)	1	0 - 1
	Accessory Battery Level(Optional)	2	0 - 5000(mV)
	Accessory Temperature(Optional)	1	-40 - 80(℃)
	Accessory Humidity(Optional)	1	0 - 100%(rh)
	Tire Pressure(Optional)	2	0 - 500(kPa)
	Timestamp(Optional)	7	YYYYMMDDHHMMSS
	Enhanced Temperature(Optional)	2	-40.00 - 80.00(℃)

Parts	Fields	Length	Range/Format
	Accessory Battery Percentage(Optional)	1	0 - 100(%)
	Relay Config Result(Optional)	1	0 - 4
	Relay State(Optional)	1	0 - 1
	Tri-axial Acceleration Data (Optional)	6	(HEX)
	Angle Values (Optional)	3	(HEX)
	Event Mask (Optional)	1	(HEX)
	Tilt Event (Optional)	2	(HEX)
	Motion Event (Optional)	2	(HEX)
	Crash Event (Optional)	2	(HEX)
	Falling Event (Optional)	2	(HEX)
	Accessory RSSI (Optional)	1	-128 - 127
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Index*

The index of the Bluetooth accessory.

- The index of Bluetooth accessory defined in (AT+GTBAS) which triggers the message **+RESP:GTBAA**.
- **0xFF :** For WKF300.
- **0xFE :** For other Beacon.

✧ *Accessory Type*

The type of the Bluetooth accessory which is defined in the <Index>.

- **0** - No Bluetooth accessory.
- **3** - Bluetooth beacon accessory.
- **6** - Beacon Multi-functional sensor.
- **12** - BLE TPMS sensor.
- **13** - Relay sensor.
- **15** - Movement-angle BLE sensor.

✧ *Accessory Model / Beacon ID Model*

The model of the Bluetooth accessory which is defined in (AT+GTBAS) or the model of the Bluetooth beacon accessory which is defined in (AT+GTBID).

✧ *Alarm Type*

The type of the alarm which is generated by the Bluetooth accessory specified by <Accessory Type> and <Accessory Model> in the command (AT+GTBAS).

- **0** - The voltage of the Bluetooth accessory is low.
- **1** - Temperature alarm: The current temperature value is below <Low Temperature> set in the command (AT+GTBAS).
- **2** - Temperature alarm: The current temperature value is above <High Temperature> set in the command (AT+GTBAS).
- **3** - Temperature alarm: The current temperature value is within the range defined by <Low Temperature> and <High Temperature> set in the command (AT+GTBAS).
- **4** - Push button event for WKF300 is detected.
- **7** - Humidity alarm: The current humidity value is below <Low Humidity> set in the command (AT+GTBAS).
- **8** - Humidity alarm: The current humidity value is above <High Humidity> set in the command (AT+GTBAS).
- **9** - Humidity alarm: The current temperature value is within the range defined by <Low Humidity> and <High Humidity>, which are set in the command (AT+GTBAS).
- **0E** - Tire pressure alarm: The current Tire pressure value is lower than <Low Tire pressure> set in the (AT+GTBAS) command.
- **0F** - Tire pressure alarm: The current Tire pressure value is higher than <High Tire pressure> set in the (AT+GTBAS) command.
- **10** - Tire pressure alarm: The current Tire pressure value is within the range defined by <Low Tire pressure> and <High Tire pressure> set in the command (AT+GTBAS).
- **11** - No available Bluetooth accessory is detected.
- **12** - An available Bluetooth accessory is detected.
- **13** - Door open.
- **14** - Door closed.
- **15** - Relay event notification.
- **19** - Tilt event.

- **1A** - Motion event(Both MOV BLE and WID320G will report event).
- **1B** - Crash event.
- **1C** - Fall event.
- **1D** - Tilt normal event.
- **1E** - Still event.

✧ *Append Mask*

Bitwise mask defined in the command (AT+GTBAS) or (AT+GTBID) to indicate the reported Bluetooth accessory data fields.

- **Bit 0** - <Accessory Name>
- **Bit 1** - <Accessory MAC>
- **Bit 2** - <Accessory Status>
- **Bit 3** - <Accessory Battery Level>
- **Bit 4** - <Accessory Temperature>
- **Bit 5** - <Accessory Humidity>
- **Bit 9** - <Tire Pressure>
- **Bit 10** - <Time Stamp>
- **Bit 13** - <Accessory Battery Percentage>
- **Bit 14** - <Relay Data>, including <Relay Config Result>, <Relay State>
- **Bit 15** - <Expansion Mask>, if Bit 15 is set to 1, Bit 16 - Bit 31 will be valid.
- **Bit 16** - <Tri-axial Acceleration Data>
- **Bit 17** - <Angle Values>
- **Bit 18** - <Sensor Event Mask>, including <Event Mask>, <Tilt Event>, <Motion Event>, <Crash Event>, <Falling Event>

Note

In the message bit 0 - bit 15 precedes bit 16 - bit 31. Here is an example: <Accessory Append Mask> = 0x081F0007, 0x081F indicates bit 15 - bit 0, 0x0007 indicates bit 31 - bit 16.

✧ *Accessory Name*

The name of the Bluetooth accessory which ends with '0'(0x00). If the accessory name is not found, this filed will be filled with 0x00.

✧ *Accessory MAC*

The MAC address of the Bluetooth accessory.

✧ *Accessory Status*

A numeral to indicate whether the accessory is available.

- **0** - The accessory is not available.
- **1** - The accessory is available.

✧ *Accessory Battery Level*

The battery voltage of the Bluetooth accessory.

✧ *Accessory Temperature*

Temperature data of the Bluetooth accessory.

✧ *Enhanced Temperature*

It instructs Bluetooth accessories to measure high-precision temperature.

Note

The current temperature value. A total of 2 bytes. The temperature value is converted to an integer with 2 implicit decimals, and the integer is reported in HEX format. If the temperature

value is negative, it is expressed in 2's complement format.

Temperature (16.66)	1666	
HEX	06	82

✧ *Accessory Humidity*

Humidity data of the Bluetooth accessory.

✧ *Timestamp*

Timestamp of the tire pressure value collection.

✧ *Accessory Battery Percentage*

Percentage of Bluetooth accessory's battery power.

✧ *Relay State*

The current state of the relay sensor.

✧ *Relay Config Result*

The number representing the response result of the relay, which is controlled and reported by Bit14 of the parameter <Accessory Append Mask> in (AT+GTBAS).

- **0** - Configuration updated successfully.
- **1** - Error in connecting.
- **2** - The current password is incorrect.
- **3** - Password update error.
- **4** - Relay open or close error.

✧ *Tri-axial Acceleration Data*

The values are coded on 16 bits (signed) in mg (+8g/-8g).

For example, **0xFFFE0005FF04**:

	X-axis		Y-axis		Z-axis	
HEX	D[0]	D[1]	D[2]	D[3]	D[4]	D[5]
Binary	0xFF	0xFE	0x00	0x05	0xFF	0x04

- **X-axis** - 0xFFFE => -2mg acceleration on X-axis
- **Y-axis** - 0x0005 => 5mg acceleration on Y-axis
- **Z-axis** - 0xFF04 => -252mg acceleration on Z-axis

✧ *Angle Values*

Angle values are coded on 8 bits(unsigned). The values are expressed in degree (0-180 degree) based on the direction of gravity.

For example, **0x5A5A00**:

	X-axis	Y-axis	Z-axis
HEX	D[0]	D[1]	D[2]
Binary	0x5A	0x5A	0x00

- **X-axis** - 0x5A => 90deg, X-axis state is horizontal
- **Y-axis** - 0x5A => 90deg, Y-axis state is horizontal
- **Z-axis** - 0x00 => 0deg, Z-axis state is vertical up

✧ *Event Mask*

This is event alarm mask.

- **Bit 0** - Tilt mask, it controls Angle Tilt zone.
- **Bit 1** - Motion mask, it controls motion state zone.

- **Bit 2** - Crash mask, it controls Crash value zone.
- **Bit 3** - Falling mask, it controls Falling value zone.

If tilt function is enabled, the tilt mask will be set to 1, otherwise it will be set to 0.

If motion function is enabled, the motion mask will be set to 1, otherwise it will be set to 0.

If crash function is enabled, the crash mask will be set to 1, otherwise it will be set to 0.

If falling function is enabled, the falling mask will be set to 1, otherwise it will be set to 0.

✧ *Tilt Event*

Tilt Event (state change) counter on the 15 (unsigned) MSB, Instantaneous state (1: tilt/0: normal) on LSB.

	Tilt[0]		**Tilt[1]**	
HEX	0	0	0	A
Binary	0000	0000	0000	1010

For example: **0x000A**

- **0** - Tilt state (normal)
- **0000 0000 0000 101** - Event counter value on 15 bits, count 5

✧ *Motion Event*

Motion Event (state change) counter on the 15 (unsigned) MSB, Instantaneous state (1: move/0: still) on LSB.

	Motion[0]		**Motion[1]**	
HEX	0	0	0	B
Binary	0000	0000	0000	1011

For example: **0x000B**

- **1** - Motion state (move)
- **0000 0000 0000 101** - Event counter value on 15 bits, count 5

✧ *Crash Event*

Crash Event (state change) counter on the 16 (unsigned) bits.

	Crash[0]		**Crash[1]**	
HEX	0	0	0	A
Binary	0000	0000	0000	1010

For example: **0x000A**

- **0000 0000 0000 1010** - Event counter value on 16 bits, count 10.

✧ *Fall Event*

Fall Event (state change) counter on the 16 (unsigned) bits.

	Falling[0]		**Falling[1]**	
HEX	0	0	0	A
Binary	0000	0000	0000	1010

For example: **0x000A**

- **0000 0000 0000 1010** - Event counter value on 16 bits, count 10

✧ *Accessory RSSI*

Signal strength RSSI value for the Bluetooth accessory.

5.4.18 BID(Bluetooth Beacon ID Report)

The HEX format of the event report message **+RESP:GTBID** is as follows.

Example:
2B4256544300FC1FBF00A98020070305030D562E600600011609642DF321060604004A780541295AF70B9ABA04004A780541295B0A0BD6B404004A7805412ED9C40000A904004A7805412ED9230AF0A804004A780541295B050BCCB304004A7805412ED9140A82A40100000000014B00D406FB3E2701E5D3E507E80A1E0911360000000000000000000000000000003000000C804003206000000013290707E80A1E111231021A57800D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Number	1	0 - 3 | 0 - 15
	Beacon ID Model	1	0 | 2 | 4
	Accessory Append Mask	2	0000 - FFFF
	Accessory MAC (Optional)	6	'0' - '9' 'A' - 'F'
	Accessory Battery Level (Optional)	2	0 - 5000(mV)
	Accessory Signal Strength (Optional)	1	-120 - 0
	Beacon type (Optional)	1	0 - 2
	Beacon Data (Optional)	<=100	

Parts	Fields	Length	Range/Format
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Number*

The number of Bluetooth beacon accessories.

- **WKF300**. The maximum value is 3.
- **ID ELA**. The maximum value is 15.
- **WID310**. The maximum value is 15.

✧ *Beacon ID Model*

The model of the Bluetooth beacon accessory which is defined in (AT+GTBID).

✧ *Accessory Append Mask*

Bitwise mask defined in the (AT+GTBID) command to indicate the reported Bluetooth beacon accessory data fields.

- **Bit 0** - Reserved
- **Bit 1** - <Accessory Mac>
- **Bit 2** - Reserved
- **Bit 3** - <Accessory Battery Level>
- **Bit 4** - Reserved
- **Bit 5** - Reserved
- **Bit 6** - <Accessory Signal Strength>
- **Bit 7** - <Beacon Type> and <Beacon Data>

- *Accessory MAC*
  Bluetooth accessory MAC address.
- *Accessory Battery Level*
  The voltage of Bluetooth accessory.
- *Accessory Signal Strength*
  The signal strength of Bluetooth accessory.
- *Beacon type*
  Types of beacons.
  - **0** - "ID" Format
  - **1** - "iBeacon" Format
  - **2** - "Eddy stone" Format
- *Beacon Data*
  Select the data format according to <Beacon Type>:
  - If <Beacon Type> is 0, the data format is as follows:

Fields	Length	Range/Format
ID_Mfr_Data	6	(HEX)

  - If <Beacon Type> is 1, the data format is as follows:

Fields	Length	Range/Format
UUID	16	(HEX)
Major	2	(HEX)
Minor	2	(HEX)

  - If <Beacon Type> is 2, the data format is as follows:

Fields	Length	Range/Format
NID	10	(HEX)
BID	6	(HEX)

5.4.19 RTP(Remote File Transfer)

The HEX format of the event report message **+RESP:GTRTP** is as follows.

Example:
2B4556545600FC1FBF008C8020070305030D562E600600011609642F9C2117000001012D68747
4703A2F2F36302E3137342E3232352E3137333A31303034382F636C69656E742E6372740001010
00000009A00A706FB406B01E5D3A607E80A1E0526000460000055OB085BE2AA0000000000000
0000001260F00000010350907E80A1E0D260116A4C8DB0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF

Parts	Fields	Length	Range/Format
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Mode	1	0
	Protocol Type	1	0
	File Type	1	0 - 2
	Code	2	100 | 101 | 200 | 201 | 202 | 301 | 302
	Download URL	<=101	Complete URL
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS

Parts	Fields	Length	Range/Format
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Mode*

The working mode of file transfer.

- **0** - Download file

✧ *Protocol Type*

The type of communication protocol used to obtain data from the background server.

- **0** - HTTP

✧ *File Type*

It defines the type of file to download from the server.

- **0** - CA certificate
- **1** - Client certificate
- **2** - Client key

✧ *Code*

It indicates the download information.

- **100** - The update command is starting.
- **101** - The update command is refused by the device.
- **200** - The device starts to download the file.
- **201** - The device finishes downloading the file successfully.
- **202** - The device fails to download the file.
- **301** - The device finishes updating the file successfully.
- **302** - The device fails to update the file.

✧ *Download URL*

The complete URL to download the configuration. It includes the file name and ends by 0x00.

5.4.20 SVR(Stolen Vehicle Recovery)

Stolen vehicle recovery message reported by the Primary device.

Example:
2B4556544909FEDFFF00798020070402031347563331304C41556430030000000000100211C0212
12121212120B3000000000000000000000000010100000100000004506FB400701E5D46907E7070
D052B2404600000550B0E9E30A5000000000000006400000043B0000006407050007E7070D0F0D
26374C17560D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	

Parts	Fields	Length	Range/Format
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	SVR Working State	1	0-2
	Ghost/Primary Device MAC Broadcast	6	000000000000 - FFFFFFFFFFFF
	SVR Appending Length	1	
	SVR Appending Information	<=15	
	Reserved	1	00
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359
	Altitude	2	
	Longitude	4	
	Latitude	4	
	GNSS UTC Time	7	YYYYMMDDHHMMSS
	MCC	2	0000 - FFFF
	MNC	2	0000 - FFFF
	LAC	2	0000 - FFFF
	Cell ID	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS

Parts	Fields	Length	Range/Format
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.21 BFS(Bluetooth Fields Setting Report)

The HEX format of the event report message **+RESP:GTBFS** is as follows.

Example:
2B4556544300FC1FBF006C8020090302030A562E600600616109642F9A221F0100000A7805410
1F5600A7F010000000100FA005E06FB40A201E5D45307E80B0C070E2804600000550B085BE2AA
00000000000000000401001E240001E244102807E80B0C0F0E2904A211DE0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	BFS
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
	EVT Expansion Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Reserevd	1	00
	Accessory Number	1	0 - 10
	MAC	6	HEX
	UUID	16	HEX
	Major	2	HEX

Parts	Fields	Length	Range/Format
	Minor	2	HEX
	Beacon Battery Level	2	HEX
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.5 Data Flow Reports

This section describes the message related to certain data needs to be sent. Please refer to the details below.

5.5.1 CRG|BTD

CRG(Crash GNSS Data Packet)

BTD(Bluetooth Accessory Data Report)

Example:

2B444154040000007F020980200703050311474231303043470001140101000001005D006F06F

B41C601E5D56907E80B07081D1E0201000002005D006E06FB41C601E5D55E07E80B07081D1F03
01000003005D006E06FB41C901E5D55707E80B07081D200401000000005D006E06FB41CD01E5
D55207E80B07081D210501000001005D006E06FB41CD01E5D54D07E80B07081D220601000003
005D006E06FB41CE01E5D54607E80B07081D230701000001005D006E06FB41CD01E5D54007E8
0B07081D240801000002005D006E06FB41CB01E5D53B07E80B07081D250901000003005D006E
06FB41C601E5D53407E80B07081D260A01000003005D006E06FB41C301E5D52D07E80B07081D
270B01000003005D006E06FB41C101E5D52807E80B07081D280C01000003005D006D06FB41C1
01E5D52307E80B07081D290D01000002005D006D06FB41BE01E5D51E07E80B07081D2A0E0100
0003005D006D06FB41B701E5D51607E80B07081D2B0F01000004005D006D06FB41B401E5D511
07E80B07081D2C1001000000005D006D06FB41AB01E5D50C07E80B07081D2D1101000001005D
006D06FB41A501E5D50707E80B07081D2E1201000002005D006D06FB419E01E5D50407E80B07
081D2F1301000003005D006D06FB419901E5D50007E80B07081D301401000001005D006D06FB
419101E5D4FD07E80B07081D3107E80B07081E02376FB0710D0A

2B4441540A0000007F0056802007030503114742313030434700000F0004000003FF5749443332
304700D455083831FA0108CD190A070017000D03BD5959010F000D00DE00530005C607E80B07
081F0D3779287C0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+DAT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	(+RESP:GTCRG)		
	(+RESP:GTBTD)		
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Message Type*

The ID of a specific data report message.

Message	ID
+RESP:GTCRG	4
+RESP:GTBTD	10

+RESP:GTCRG

Fields		Length	Range/Format
+RESP:GTCRG	Data Type	1	0|1
	GNSS Validity Number	1	0 - 20
	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	(-)xxx.xxxxxx
	Latitude	4	(-)xx.xxxxxx
	GNSS UTC Time	7	YYYYMMDDHHMMSS
	...		
	GNSS Point Index	1	120
	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	(-)xxx.xxxxxx
	Latitude	4	(-)xx.xxxxxx
	GNSS UTC Time	7	YYYYMMDDHHMMSS

+RESP:GTBTD

Fields		Length	Range/Format
+RESP:GTBTD	Index	1	00 - 09
	Accessory Type	1	0 | 15
	Accessory Model	1	0 - 5
	Data Mask Length	1	0 - 255
	Data Mask	<=4	0 - 7FFFFFFF
	Accessory Name(Optional)	<=20	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Accessory MAC(Optional)	6	'0'-'9' 'a'-'f' 'A'-'F'
	Accessory Status(Optional)	1	0 | 1
	Accessory Battery Level(Optional)	2	0 - 5000
	Accessory Temperature(Optional)	1	-40 - 80
	Enhanced Temperature(Optional)	2	-40.00 - 80.00
	Tri-axial Acceleration Data (Optional)	6	HEX

Fields		Length	Range/Format
	Angle Values (Optional)	3	HEX
	Event Mask (Optional)	1	HEX
	Tilt Event (Optional)	2	HEX
	Motion Event (Optional)	2	HEX
	Crash Event (Optional)	2	HEX
	Fall Event (Optional)	2	HEX
	Accessory RSSI (Optional)	1	-128 - 127

✧ *Report Mask*

Please refer to <+DAT Mask> in (AT+GTHRM).

✧ *Data Type*

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.

5.5.2 CRD(Crash Data Packet)

The HEX format of the report message **+RESP:GTCRD** is as follows.

Example:

2B435244007D0282802007030503115 64B40050607610412210504025800000000FFB10000000
0FFB100000000FFB100000000FFB100000000FFB100000000FFB100000000FFB000000000FFB00
0000000FFB000000000FFB000000000FFB100000000FFB100000000FFB100000000FFB10000000
0FFB100000000FFB100000000FFB100000000FFB100000000FFB100000000FFB100000000FFB10
0000000FFB100000000FFB100000000FFB100000000FFB100000000FFB100000000FFB10000000
0FFB100000000FFB100000000FFB100000000FFB100000000FFB200000000FFB200000000FFB10
0000000FFB100000000FFB100000000FFB100000000FFB100000000FFB100000000FFB10000000
0FFB100000000FFB100000000FFB100000000FFB100000001FFB100000001FFB100000001FFB10
0000001FFB100000000FFB100000000FFB100000001FFB100000001FFB100000001FFB10000000
0FFB100000000FFB100000000FFB000000000FFB000000000FFB000000000FFB100000000FFB10
0000000FFB100000000FFB000000000FFB000000000FFB100000000FFB100000000FFB10000000
0FFB100000000FFB100000000FFB100000000FFB100000000FFB100000000FFB100000000FFB10
0000000FFB100000000FFB100000000FFB100000000FFB100000000FFB100000000FFB10000000
0FFB100000000FFB100000000FFB100000000FFB200000000FFB100000000FFB100000000FFB10
0000000FFB100000000FFB100000000FFB100000000FFB200000000FFB200000001FFB20000000
1FFB200000001FFB100000001FFB100000000FFB100000000FFB100000000FFB100000000FFB10
0000000FFB107E80B07081A29374792860D0A

Parts	Fields	Length	Range/Format
Head	Message Header	4	+CRD
	Report Mask	2	0000 - FFFF
Body	Length	2	
	Device Type	3	802007
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	Crash Counter	1	00 - FF
	Data Type	1	00 - 7F
	Total Frame	1	01 - 80
	Frame Number	1	01 - 80
	Data Length	2	0 - 1200
	Data	<=1200	'0'-'9' 'a'-'f'
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Report Mask*

Please refer to <+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	13	57	90	24	68	11	22	0
HEX	0D	39	5A	18	44	0B	16	00

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

Device Name	q	u	e	c	l	i	n	k
HEX	71	75	65	63	6C	69	6E	6B

✧ *Crash Counter*

It indicates the sequence number of the crash event. The reports of **+RESP:GTCRA** and **+RESP:GTCRD** are combined into one crash event. It rolls from 0x00 to 0xFF.

✧ *Data Type*

A hexadecimal parameter to indicate the time of the data (before crash or after crash) and crash direction (+X, -X, +Y, -Y, +Z, -Z or several of them). Please refer to the following table for the detailed syntax.

Bits	Description	Range
Bit 0	0: Before crash 1: After crash	0 - 1
Bit 1	0: X-axis crash not detected 1: X-axis crash detected	0 - 1
Bit 2	0: X-axis positive direction 1: X-axis negative direction	0 - 1
Bit 3	0: Y-axis crash not detected 1: Y-axis crash detected	0 - 1
Bit 4	0: Y-axis positive direction 1: Y-axis negative direction	0 - 1
Bit 5	0: Z-axis crash not detected 1: Z-axis crash detected	0 - 1
Bit 6	0: Z-axis positive direction 1: Z-axis negative direction	0 - 1
Bit 7	0: Acceleration data 1: Acceleration data and gyroscope data	0 - 1

- *Total Frame*

  Total number of the messages that are sent to the backend server for the crash event.

- *Frame Number*

  A numeral to indicate the sequence of the current message.

- *Data*

  There is a maximum of 1200 bytes in one frame which contains acceleration samples in 2 seconds at most. 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. And they are two's complement. Regarding how to convert the two's complement to the original value, please refer to the Appendix.

5.5.3 ACC(Acceleration Data Packet)

The HEX format of the report message **+RESP:GTACC** is as follows.

Example:

2B41434380200703055 64B4005061A490500010000005300 01FFFF00530001FFFF00530001FFFF00530001FFFF00530001000000530001000000530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530002FFFF00530002FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530002FFFF00530001FFFF00530001FFFF00540001FFFF00530002FFFF00530002000000540001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00540001FFFF00530001FFFF00530002FFFF00540001FFFF00530001FFFF00540001FFFF00530001FFFF00540002FFFF00540001FFFF00540001FFFF00530001FFFF00530001FFFF00540001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001FFFF00530001000000530001FFFF00540001FFFF00530001FFFF00530001FFFF00530001FFFF00530001000000540001FFFF00540001FFFF00530001FFFF00530001FFFF005400010000005400010000005300 01FFFF00530001FFFF005307E80A11072730059631E40D0A

Parts	Fields	Length	Range/Format
Head	Message Header	4	+ACC
Body	Device Type	3	802007
	Protocol Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	Data	6*75	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Unique ID*

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

✧ *Data*

There are 6*75 bytes in one message 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.

5.6 Data Transmission

This section describes the message related to certain data needs to be sent. Please refer to the details below.

5.6.1 DAT(Transparent Data Transmission)

The HEX format of the event report message **+RESP:GTDAT** is as follows.

Example:
2B4556541200FC1FBF006A8020070305031156 4B400506076104642F9441110008646666672677367660100000002003B004D06FB3FDA01E5D49907E80B07072E1504600001DF5C05FE66670000000000000000100000000000000370507E80B07072E29368CF8400D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	

Parts	Fields	Length	Range/Format
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Data Length	2	
	Data		
	Number	1	1
	GNSS Accuracy	1	0 - 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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Data Length*

It indicates the length of the parameter <Data>.

5.7 Update Configuration

This section describes the message related to firmware and configuration upgrade. Please refer to the details below.

5.7.1 UPC(Configuration Update Notification)

The HEX format of the event report message **+RESP:GTUPC** is as follows.

Example:
2B4556542800FC1FBF008A8020070305030E564B4005060A1A07642EEE411B00012C687474703A2F2F36302E3137342E3232352E3137333A31303034382F7570635F61742E696E6900010000000400F2007806FB40E501E5D5C807E80A1F09020004600001DF5C027A4F1F000000000000000000200000000000000000007E80A1F09020204FF8C760D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Command ID	1	
	Result	2	100-103 | 200-202 | 300-302 | 305 | 306
	Download URL	<=101	Complete URL
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)

Parts	Fields	Length	Range/Format
	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	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Command ID*

The command ID in the update configuration file. It is always 0 before the device starts to update the configuration (<Result><=300). It indicates the total number of the commands when <Result> is 301. It indicates the ID of the command which has wrong format when <Result> is 302.It is empty when <Result> is greater than 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** - Reserved.
- **305** - The update process is interrupted by abnormal reboot.
- **306** - The update process is interrupted by MD5 verification error.

✧ *Download URL*

The complete URL to download the configuration. It includes the file name and ends by 0x00.

5.7.2 UPD(Firmware Upgrade Report)

The HEX format of the event report message **+RESP:GTUPD** is as follows. For this message, <Protocol Version> and <Firmware Version> will always be present regardless of the <+EVT Mask> setting.

Example:
2B4556540F00FC1FBF006380200703050311564B400506076104642FB5211A00C901010100000
00093004E06FB40A101E5D4AB07E80B07072D0A04600001DF5C027A4F1F000000010000000001
00362700000000362707E80B07072D0A368014D20D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Code	2	
	Retry	1	
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359
	Altitude	2	
	Longitude	4	
	Latitude	4	

Parts	Fields	Length	Range/Format
	GNSS UTC Time	7	YYYYMMDDHHMMSS
	MCC	2	0000 - FFFF
	MNC	2	0000 - FFFF
	LAC	2	0000 - FFFF
	Cell ID	4	00000000 - FFFFFFFF
	Reserved	1	00
	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
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.7.3 EUC(Extended Configuration Update Report)

The HEX format of the event report message **+RESP:GTEUC** is as follows, which is similar to **+RESP:GTUPC**.

Example:
2B4556545400FC1FBF00908020070305030E564B4005060A1A07642FA442120002012D6874747
03A2F2F36302E3137342E3232352E3137333A31303034382F7570635F61742E696E69000123456
70001000003060009007806FB400201E5D4B407E80A1F09022A04600001DF5C027A4F1F000000
00000000002000000000000000007E80A1F090239050DC2A80D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802007
	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	0 - 32000(mV)

Parts	Fields	Length	Range/Format
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1|2	0 - 72
	Command ID	2	
	Result	2	100-103 | 200-202 | 300-302 | 305 | 306
	Download URL	<=101	Complete URL
	Identifier Number	4	
	Reserved	1	00
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359
	Altitude	2	
	Longitude	4	
	Latitude	4	
	GNSS UTC Time	7	YYYYMMDDHHMMSS
	MCC	2	0000 - FFFF
	MNC	2	0000 - FFFF
	LAC	2	0000 - FFFF
	Cell ID	4	00000000 - FFFFFFFF
	Reserved	1	00
	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
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.8 HBD (Heartbeat Data)

5.8.1 Heartbeat Report

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

Example:
2B484244EF228020070305030D562E60060001160907E80A1E0D0C06164C39540D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+HBD
	Report Mask	1	00 - FF
Body	Length	1	
	Device Type	3	802007
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

- *Report Mask*

  Please refer to <+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	13	57	90	24	68	11	22	0
HEX	0D	39	5A	18	44	0B	16	00

  If Bit 4 of <+HBD Mask> is 1, the device name is used as the unique ID of the device.

  Device name is an 8-byte string, please refer to <Device Name> in (AT+GTCFG). If the length of <Device Name> is more than 8 bytes, the device will only acquire the first 8 bytes.

  In the Hex format message, each byte is encoded into one byte as an integer. If the device name is less than 8 bytes, the remaining bytes are set to 0.

Device Name	q	u	e	c	l	i	n	k
HEX	71	75	65	63	6C	69	6E	6B

  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>.

5.9 Buffer Report in Hex Format

When HEX format messages go into the local buffer, the device will replace the second byte of the report messages with "B". Thus, **+BSP** is 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.

6 Appendices

Here are the appendices of the @Track protocol, including the modification history of this protocol, copyright notice, etc., Please refer to the details below.

6.1 Two's Complement

For a positive value, the two's complement is itself. Take 17 as an example. Its hex format is 0x11 and the two's complement for it is 0x11. For a negative value, the following gives detailed calculations.

-X is a negative value.
Firstly, get to know the number of bits for the negative value N, then the two's complement for it is:

2^N - X

For example, to use 16 bits to represent -100, the two's complements for it should be:

2^16 - 100 = 65436 = 0xFF9C

Above is two's complement for -100 in hex format.

On the contrary, the two's complement can also be converted to the hex value that it represents in a similar way.

1. Get to know the number of bits for the two's complement.
2. Get the sign of the value, positive or negative. If the highest bit is 1, it is a negative value. If the highest bit is 0, it is a positive value.
3. If it is a positive value, there is no need for conversion. It is the value.
4. If it is a negative value, get the real value through the following calculation:

-(2^N - X)

Where:

N is the number of bits for the two's complement.
X is the value that is converted from the two's complement directly.

For example, if the number of bits for the two's complement is 16 and the two's complement is 0xFF9C, then it is a negative value as the highest bit is 1, and the detailed calculation for it is:

-(2^16 - 0XFF9C) = -100

6.2 Accessory Index

Accessory Model Name	Accessory Type	Accessory Model	Alarm Type	Append Mask
Temperature ELA	2	1	0 - 3	081F
WTH300	6	2	0-3 | 7-9	083F
DTH100(WMS301)		4	0-3 | 7-9 | 13-14	283F
WTH301		5	0-3 | 7-9	283F
ATP100/ATP102	12	0	0 | E-10	0617
WRL300	13	0	15	4007
WID320G	15	0	0 | 19-1E	7881F

6.3 CRC-16 Calculation

The 16-bit CRC checksum in the report should be calculated according to the properties in the table below:

Example:
CRC (00 7F 24 1E 01 00 01 11 47 56 37 36 4D 47 2D 34 00 FF FF 07 E4 06 1C 09 1B 24 01 58) = 60D9H (0x60D9)

Property	Value
Name	CRC-16
Width	16 bits
Polynomial	0x1021 ($X^{16} + X^{155} + X^2 + 1$)
Initialization	FFFFH (0xFFFF)
Reflect input	False
Reflect output	False
Final XOR	0000H (0x0000)

Here is a corresponding CRC-16 algorithm routine written in C language:

```
static const kal_uint16 crc16_table[256] =
{
    0x0000,0x1021,0x2042,0x3063,0x4084,0x50A5,0x60C6,0x70E7,
    0x8108,0x9129,0xA14A,0xB16B,0xC18C,0xD1AD,0xE1CE,0xF1EF,
    0x1231,0x0210,0x3273,0x2252,0x52B5,0x4294,0x72F7,0x62D6,
    0x9339,0x8318,0xB37B,0xA35A,0xD3BD,0xC39C,0xF3FF,0xE3DE,
    0x2462,0x3443,0x0420,0x1401,0x64E6,0x74C7,0x44A4,0x5485,
    0xA56A,0xB54B,0x8528,0x9509,0xE5EE,0xF5CF,0xC5AC,0xD58D,
```

```
    0x3653,0x2672,0x1611,0x0630,0x76D7,0x66F6,0x5695,0x46B4,
    0xB75B,0xA77A,0x9719,0x8738,0xF7DF,0xE7FE,0xD79D,0xC7BC,
    0x48C4,0x58E5,0x6886,0x78A7,0x0840,0x1861,0x2802,0x3823,
    0xC9CC,0xD9ED,0xE98E,0xF9AF,0x8948,0x9969,0xA90A,0xB92B,
    0x5AF5,0x4AD4,0x7AB7,0x6A96,0x1A71,0x0A50,0x3A33,0x2A12,
    0xDBFD,0xCBDC,0xFBBF,0xEB9E,0x9B79,0x8B58,0xBB3B,0xAB1A,
    0x6CA6,0x7C87,0x4CE4,0x5CC5,0x2C22,0x3C03,0x0C60,0x1C41,
    0xEDAE,0xFD8F,0xCDEC,0xDDCD,0xAD2A,0xBD0B,0x8D68,0x9D49,
    0x7E97,0x6EB6,0x5ED5,0x4EF4,0x3E13,0x2E32,0x1E51,0x0E70,
    0xFF9F,0xEFBE,0xDFDD,0xCFFC,0xBF1B,0xAF3A,0x9F59,0x8F78,
    0x9188,0x81A9,0xB1CA,0xA1EB,0xD10C,0xC12D,0xF14E,0xE16F,
    0x1080,0x00A1,0x30C2,0x20E3,0x5004,0x4025,0x7046,0x6067,
    0x83B9,0x9398,0xA3FB,0xB3DA,0xC33D,0xD31C,0xE37F,0xF35E,
    0x02B1,0x1290,0x22F3,0x32D2,0x4235,0x5214,0x6277,0x7256,
    0xB5EA,0xA5CB,0x95A8,0x8589,0xF56E,0xE54F,0xD52C,0xC50D,
    0x34E2,0x24C3,0x14A0,0x0481,0x7466,0x6447,0x5424,0x4405,
    0xA7DB,0xB7FA,0x8799,0x97B8,0xE75F,0xF77E,0xC71D,0xD73C,
    0x26D3,0x36F2,0x0691,0x16B0,0x6657,0x7676,0x4615,0x5634,
    0xD94C,0xC96D,0xF90E,0xE92F,0x99C8,0x89E9,0xB98A,0xA9AB,
    0x5844,0x4865,0x7806,0x6827,0x18C0,0x08E1,0x3882,0x28A3,
    0xCB7D,0xDB5C,0xEB3F,0xFB1E,0x8BF9,0x9BD8,0xABBB,0xBB9A,
    0x4A75,0x5A54,0x6A37,0x7A16,0x0AF1,0x1AD0,0x2AB3,0x3A92,
    0xFD2E,0xED0F,0xDD6C,0xCD4D,0xBDAA,0xAD8B,0x9DE8,0x8DC9,
    0x7C26,0x6C07,0x5C64,0x4C45,0x3CA2,0x2C83,0x1CE0,0x0CC1,
    0xEF1F,0xFF3E,0xCF5D,0xDF7C,0xAF9B,0xBFBA,0x8FD9,0x9FF8,
    0x6E17,0x7E36,0x4E55,0x5E74,0x2E93,0x3EB2,0x0ED1,0x1EF0,
};

kal_uint16 quec_prot_get_crc16(kal_uint8* pdata, kal_uint16 len)
{
    kal_uint16 crc16 = 0xffff;

    while(len > 0) {
        crc16 = crc16_table[*pdata ^ (kal_uint8)(crc16 >> 8)] ^ (crc16 << 8);
        pdata++;
        len--;
    }

    return crc16;
}
```