GV50CEU @Track Air Interface Protocol

GSM/GPRS/LTE CAT1/GNSS Tracker

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1 Revision History

Version	Date	Author	Description of Change
1.00	2024-04-26	Todd Zheng	1. Initial.

2 Overview

2.1 Scope of This Document

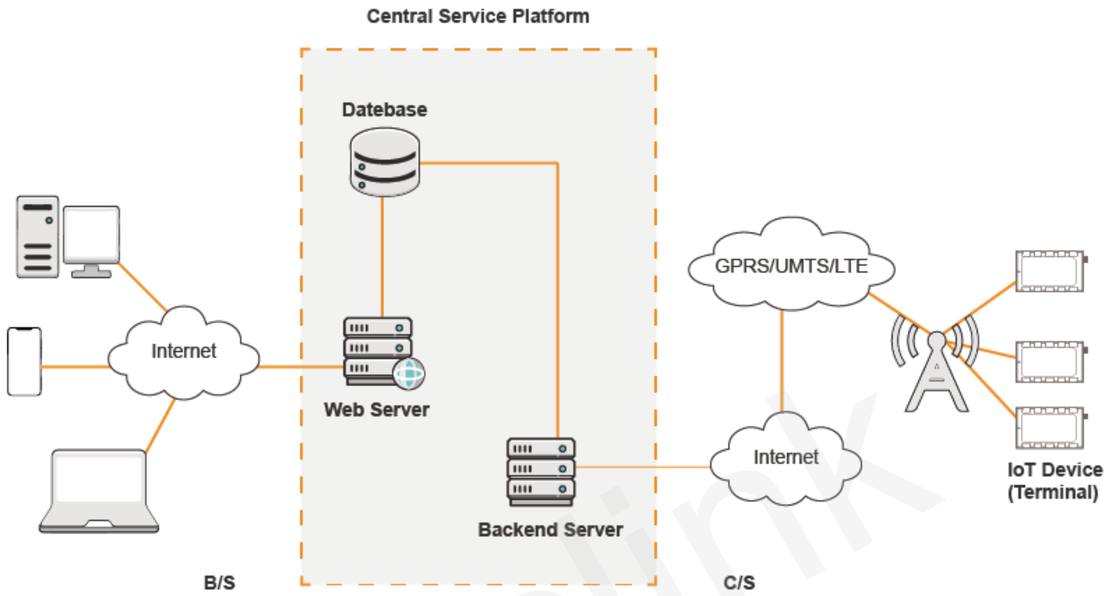
The @Track Air Interface Protocol is a digital communication interface between Queclink Trackers and the backend server. It is used for all communication between the backend server and the terminal via SMS or GPRS. The backend server sends a command to the terminal and then the terminal confirms the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

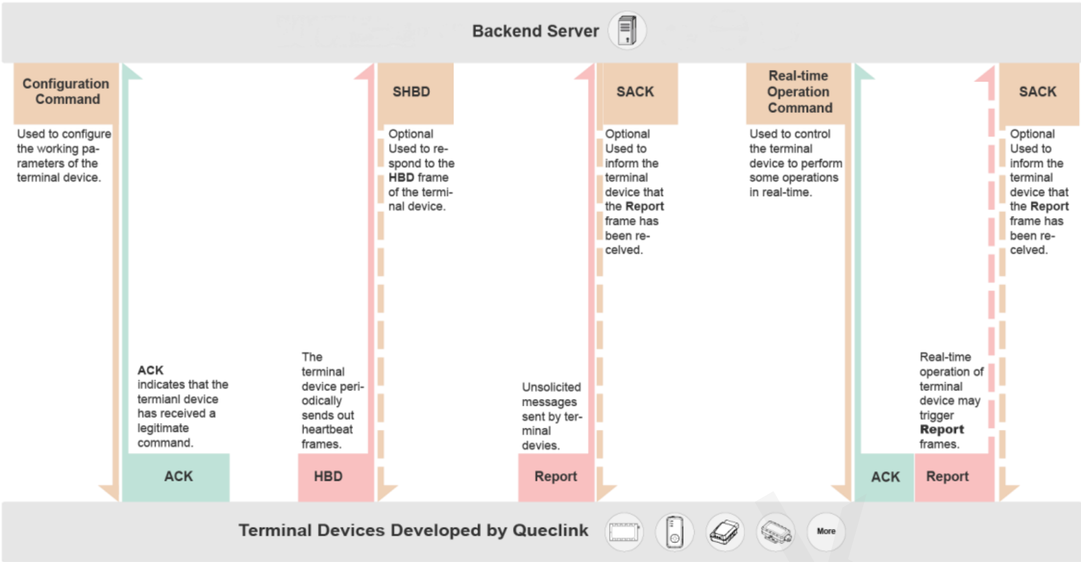


The backend server needs to be accessible by many terminals and should have the following abilities:

- 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=gv50ceu,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'	gv50ceu
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
	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 "gv50ceu".

✧ *APN*

Access point name (APN).

✧ *APN User Name*

The user name of APN. If the parameter field is empty, the current value for this parameter will be cleared.

✧ *APN Password*

The password of APN. If the parameter field is empty, the current value for this parameter will be cleared.

✧ *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. If the parameter field is empty, the current value for this parameter will be cleared.

✧ *Backup APN Password*

The password of backup APN. If the parameter field is empty, the current value for this parameter will be cleared.

✧ *Network Mode*

- **0** - Auto (LTE & GSM/EGPRS)
- **1** - GSM/EGPRS Only
- **2** - Reserved
- **3** - LTE Only

✧ *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=gv50ceu,3,,1,60.174.225.173,20581,60.174.225.173,20581,13812341234,15,1,0,0,,30,0.0.0.0,0.0.0.0,,0,0001$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	SRI	SRI
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Report Mode	1	0-9	0
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	Buffer Mode	1	0-2	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
	Reserved	0		
	Connection Life	<=3	0 | 10 - 600(s)	30
	Primary DNS Server	<=15		0.0.0.0
	Secondary DNS Server	<=15		0.0.0.0
	Reserved	0		
	Special SACK 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 "gv50ceu".

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

✧ *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*

This parameter defines whether the backend server should respond to the terminal with the SACK messages when receiving messages from the terminal.

- **0** - The backend server does not reply with the SACK message when receiving a message from the terminal.
- **1** - The backend server replies with the SACK message when receiving a message from the terminal.
- **2** - The backend server replies with the SACK message when receiving a message from the terminal, but the terminal does not check the serial number of the SACK message.

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.

✧ *Connection Life*

A numeral to indicate the time to maintain TCP connection for receiving commands from the server. If there is no data transmission within the time of <Connection Life>, the TCP connection will be closed. Unit: second.

- *Primary DNS Server*

  The address of primary DNS server.
- *Secondary DNS Server*

  The address of secondary DNS server.
- *Special SACK Mode*

  This parameter defines whether the backend server will respond to the terminal with specified SACK messages when receiving the specified messages (i.e. **+RESP:GTCID**) from the terminal. It is valid when the parameter <SACK Mode> is disabled.
  - **0** - The backend server will not reply with a specified SACK message when receiving a specified message from the terminal.
  - **1** - The backend server will reply with a specified SACK message when receiving a specified message from the terminal.

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=gv50ceu,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,,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'	gv50ceu
Body	APN	<=64		
	APN User Name	<=30		
	APN Password	<=30		
	Report Mode	1	0-9	0
	Reserved	0		
	Buffer Mode	1	0-2	1
	Main Domain	<=60	ASCII (not including '=' and ',')	

Parts	Fields	Length	Range/Format	Default
	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
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=gv50ceu,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'	gv50ceu
Body	Server ID	1	0	0
	Keep Alive	<=4	0 | 5 - 1080(min)	60
	Username	<=64	ASCII String	admin
	MQTT Password	<=64	ASCII String	password
	Reserved	0		
	Subscribe Topic	<=64	ASCII String	quec_ctrl
	Reserved	0		
	Publish Topic	<=64	ASCII String	quec_msg
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	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 "gv50ceu".

✧ *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.

✧ *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

In addition, a single character "#" is defined to indicate the use of the IMEI number that will be used internally as the Client ID.

3.1.5 TLS (TLS Data Encryption)

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

Example: AT+GTTLS=gv50ceu,0,1,1,,,FFFF$

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

Parts	Fields	Length	Range/Format	Default
	Command Word	3	TLS	TLS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Server ID	1	0	0
	Mode	1	0 | 1	0
	Verification Mode	1	0-2	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 "gv50ceu".

✧ *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=gv50ceu,,,,,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'	gv50ceu
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 "gv50ceu".

✧ *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=gv50ceu,gv50ceu,GV50CEU,0,0.0,,,003F,1,00,1BDEF,0,0,0,300,00,1,0,0,001F,0,4,,0,FFF F$

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'	gv50ceu
Body	New Password	4 - 20	'0'-'9' 'a'-'z' 'A'-'Z'	
	Device Name	<=20	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'	GV50CEU
	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 - 01	00
	Event Mask	<=8	00000000 - FFFFFFFF	1BDEF
	Pin Mask	<=2	0 - FF	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	001F
	GNSS Lost Time	<=2	0 - 30(min)	0
	GNSS Working Mode	<=2	14	14

Parts	Fields	Length	Range/Format	Default
	Reserved	0		
	Invert Output State	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 "gv50ceu".

✧ *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> and <Position Append Mask>.
- **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.

Note

When <Power Saving Mode> is set to 1 or 2, the GNSS will continue to work for 5 minutes after the engine is turned off. This mechanism is added to improve the GNSS positioning performance and improve the GNSS drift.

✧ *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.

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 4** - for **CID** (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 **IGN** (ASCII)/(HEX), **IGF** (ASCII)/(HEX), **VGN** (ASCII)/(HEX) and **VGF** (ASCII)/(HEX)
- **Bit 13** - for ignition on and off location report **IGL** (ASCII)/(HEX) and **VGL**(ASCII)/(HEX)
- **Bit 15** - for **PNR** (ASCII)/(HEX)
- **Bit 16** - for **PFR** (ASCII)/(HEX)
- **Bit 17** - for **DRM** (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.

✧ *Pin Mask*

It configures the working mode of PIN on the connector.

- **Bit 4** - for PIN1. Set it to 0 as digital input 1, set it to 1 as analog input 1.

Note

The configuration of these PINs must be consistent with actual usage. Otherwise, these PINs may be corrupted.

✧ *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** - for **SOS** (ASCII)/(HEX)
- **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 Working Mode*

The working mode of GNSS chip. If the current GNSS chip doesn't support combination mode, the device will get position by GPS only.

- **14** - GPS, GLONASS, Galileo and Beidou positioning systems. In this mode, the device fixes positions with GPS, GLONASS, Galileo and Beidou systems.

✧ *Invert Output State*

It controls whether to invert the output state of OUTPUT1.

- **0** - Disable this parameter.

- **1** - Enable this parameter.

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.

Besides these two automatic reboot methods, the device also supports triggering the reboot manually by digital input.

Example: AT+GTDOG=gv50ceu,1,60,30,0200,,1,0,,60,60,60,FFFF$

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'	gv50ceu
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
	Input ID	1	0 - 1 | 6	0
	Reserved	0		
	No Network Interval	<=4	0 | 5 - 1440(min)	60
	No Activation Interval	<=4	0 | 5 - 1440(min)	60
	Send Failure Timeout	<=4	0 | 5 - 1440(min)	60
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 "gv50ceu".

✧ *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.

- *Input ID*

  The ID of the digital input port which is used to trigger the manual reboot. 0 means "Do not use manual reboot".

- *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".

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=gv50ceu,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'	gv50ceu
Body	Mode	1	0 | 1	0
	Speed Mode	1	0 | 1	1

Parts	Fields	Length	Range/Format	Default
	Motion Speed Threshold	<=2	5 - 50(km/h)	45
	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 "gv50ceu".

✧ *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), **IGN** (ASCII)/(HEX) or **IGF** (ASCII)/(HEX) message, <Hour Meter Count> will be included in these reports.

Example:
AT+GTHMC=gv50ceu,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'	gv50ceu
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		
	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 "gv50ceu".

✧ *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:GTIGN** and **+RESP:GTIGF** 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:GTIGN** or **+RESP:GTIGF** 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> , <+CAN 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=gv50ceu,,,6F,FE7FBF,FE7FBF,FF7D,EF,,7D,7FF,,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'	gv50ceu
Body	Reserved	0		
	Reserved	0		
	+ACK Mask	<=2	0 - FF	6F
	+RSP Mask	<=16	0 - FFFFFFFFFFFFFFFF	FE7FBF
	+EVT Mask	<=16	0 - FFFFFFFFFFFFFFFF	FE7FBF
	+INF Mask	<=16	0 - FFFFFFFFFFFFFFFF	FF7D
	+HBD Mask	<=2	0 - FF	EF
	Reserved	0		
	+CRD Mask	<=4	0 - FFFF	7D
	+CAN Mask	<=8	0 - FFFFFFFF	7FF
	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 "gv50ceu".
- *+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
Bit 29	Reserved
Bit 28	Reserved
Bit 27	Reserved
Bit 26	Reserved
Bit 25	<CAN Data>
Bit 24	Reserved
Bit 23	<Total Hour Meter Count>
Bit 22	<Current Hour Meter Count>
Bit 21	<Total Mileage>
Bit 20	<Current Mileage>
Bit 19	<Satellite Information>
Bit 18	<Motion Status>
Bit 17	<Digital IO Status>
Bit 16	Reserved
Bit 15	Reserved
Bit 14	<Analog Input1 Voltage>
Bit 13	<Analog Input Mode>
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>

✧ *+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 31	Reserved
Bit 30	Reserved
Bit 29	Reserved
Bit 28	Reserved
Bit 27	Reserved
Bit 26	Reserved
Bit 25	Reserved
Bit 24	Reserved
Bit 23	Reserved
Bit 22	Reserved
Bit 21	Reserved
Bit 20	Reserved
Bit 19	Reserved
Bit 18	Reserved
Bit 17	Reserved
Bit 16	Reserved
Bit 15	Reserved
Bit 14	Reserved
Bit 13	Reserved
Bit 12	Reserved
Bit 11	Reserved
Bit 10	Reserved
Bit 9	Reserved
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	<CSQ RSSI / CSQ BER>

✧ *+EVT Mask*

Component mask of the event report message.

Mask Bit	Item
Bit 31	Reserved
Bit 30	Reserved
Bit 29	Reserved
Bit 28	Reserved
Bit 27	Reserved
Bit 26	Reserved
Bit 25	<CAN Data>
Bit 24	Reserved
Bit 23	<Total Hour Meter Count>
Bit 22	<Current Hour Meter Count>
Bit 21	<Total Mileage>
Bit 20	<Current Mileage>
Bit 19	<Satellite Information>
Bit 18	<Motion Status>
Bit 17	<Digital IO Status>
Bit 16	Reserved
Bit 15	Reserved
Bit 14	<Analog Input1 Voltage>
Bit 13	<Analog Input Mode>
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>

Mask Bit	Item
Bit 5	<Count Number>
Bit 4	<Send Time>
Bit 3	<MCC / MNC / LAC / Cell ID / Reserved>
Bit 2	<Altitude>
Bit 1	<Azimuth>
Bit 0	<Speed>

✧ *+INF Mask*

Component mask of the information report message. Bit 8 - Bit 15 indicate which groups of information items are included when the device reports the message **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	+RESP:GTIOS
Bit 8	+RESP:GTVER
Bit 7	<INF Expansion Mask>
Bit 6	<Count Number>
Bit 5	<Send Time>
Bit 4	<Firmware Version>
Bit 3	<Protocol Version>
Bit 2	<Device Type>
Bit 1	<Device Name>
Bit 0	<Length>

✧ *INF Expansion Mask*

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

Mask Bit	Item
Bit 9	Reserved
Bit 8	Reserved
Bit 7	Reserved
Bit 6	+RESP:GTCML
Bit 5	Reserved
Bit 4	Reserved
Bit 3	+RESP:GTCSN
Bit 2	+RESP:GTCVN
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	+RESP:GTASV
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>

✧ *+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>

- *+CAN Mask*

  Component mask of the CANBUS Information packet in HEX format.

Mask Bit	Item
Bit 11-31	Reserved
Bit 10	<Firmware Version>
Bit 9	<Protocol Version>
Bit 8	<Device Type>
Bit 7	<Length>
Bit 6	<Device Name>
Bit 5	<Count Number>
Bit 4	<Send Time>
Bit 3	<MCC / MNC / LAC / Cell ID / Reserved>
Bit 2	<Altitude>
Bit 1	<Azimuth>
Bit 0	<Speed>

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 **SOS** (ASCII)/(HEX), **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=gv50ceu,3,1F,0900,1200,1300,1800,,,0,0,0,0,0,,,,,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'	gv50ceu
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		
	Digital Input ID	1	0 - 1 | 6	0
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	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 "gv50ceu".

✧ *Mode*

A numeral to indicate the working mode of this function.

- **0** - Disable this function.
- **1** - Manual start mode.
  By connecting an external unit to a specified digital input of the device, the driver manually enables time check. If it is outside of working hours, the device will hide the location information in the report messages. Otherwise, the location information will be reported normally.
- **2** - Full manual mode.

By connecting an external unit to a specified digital input of the device, the driver has full control of the privacy protection. The device will not check the time against the working hours range automatically. It hides location information if the input is activated and reports location information normally if the input is deactivated.

- **3** - Automatic mode.
  In this mode, the device will ignore the status of the digital input. It 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.

✧ *Digital Input ID*

The input ID used to trigger this function when <Mode> is 1 or 2.

The working parameters of the specified input must be set by (AT+GTDIS) first. If interruptible digital input is used, please connect slide switch instead of tact button to the input for this function.

✧ *Output ID, Output Status, Duration and Toggle Times*

If this function is enabled and it is outside of working hours, the specified wave will be output on the specified output.

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=gv50ceu,1,11,,,,,,,FFFF$

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

Parts	Fields	Length	Range/Format	Default
	Command Word	3	PDS	PDS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
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 "gv50ceu".

✧ *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** - State of wave shape 1 and final state of gradual progressive wave shape.
- **Bit 6** - State of digital input
- **Bit 7** - State of SPD
- **Bit 8** - State of SSR
- **Bit 9** - State of main power
- **Bit 10** - State of PEO
- **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=gv50ceu,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'	gv50ceu
Body	Enable Auto-unlock PIN	1	0 | 1	0
	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 "gv50ceu".

✧ *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 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=gv50ceu,+,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'	gv50ceu
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 "gv50ceu".
- *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.

3.2.11 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 and SMS functions.

Example:
AT+GTWLT=gv50ceu,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'	gv50ceu
Body	Call Filter	1	0 - 1 | 4 - 5	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 "gv50ceu".

✧ *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 and SOS number will ignore the allowlist function.

Note

If both Bit 1 and Bit 0 are set to 1, the device will only answer incoming calls from the predefined phone numbers.

✧ *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.

3.2.12 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=gv50ceu,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'	gv50ceu
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 "gv50ceu".

✧ *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>.

3.2.13 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).

Note
Please make sure hard-wired ignition line is not connected.

Example:
AT+GTVVS=gv50ceu,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'	gv50ceu
Body	Ignition On Voltage	<=5	250 - 90000(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 "gv50ceu".

✧ *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.

Note

If necessary, the values of <Ignition On Voltage> and <Voltage Offset> are automatically adjusted based on the measured external supply voltage data for more accurate ignition judgment.

✧ *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.

3.2.14 VMS (Virtual Ignition Mode Selection)

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

Example: AT+GTVMS=gv50ceu,7,03,03,1,0,0,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'	gv50ceu
Body	Virtual Ignition Mode	1	0-2 | 4 | 7	1
	Virtual Ignition On Mask	2	00 - 03	03
	Virtual Ignition Off Mask	2	00 - 03	03
	Virtual Ignition On Logic	1	0 | 1	1

Parts	Fields	Length	Range/Format	Default
	Voltage Idle Vehicle Event	1	0 | 1	0
	Virtual Ignition Flag	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 "gv50ceu".

✧ *Virtual Ignition Mode*

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

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

Note

Records of hard-wired ignition are forcibly saved when PDS mode is enabled. When the hard wired is recorded, virtual ignition detection will be ignored.

✧ *Voltage Idle Vehicle Event*

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

Note

When this function is enabled, virtual ignition detection will be disabled and only **+RESP:GTVGN/+RESP:GTVGF** will be reported as an event.

✧ *Virtual Ignition Flag*

It controls whether hardware ignition and virtual ignition can work at the same time. This parameter works only after device reboot when the value changes.

- **0** - Hardware ignition and virtual ignition cannot work at the same time.
- **1** - Hardware ignition and virtual ignition can work simultaneously.

3.2.15 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=gv50ceu,1,0,AT+GTRTO=gv50ceu,0,,,,,,000B$,,,,,0005$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	CMD	CMD
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Mode	1	0 | 1	0
	Command ID	<=2	0 - 31	
	Command String	<=200	AT command	

Parts	Fields	Length	Range/Format	Default
	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 "gv50ceu".

✧ *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.

3.2.16 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=gv50ceu,0,0,FF,0,0,0,0,1,0,0,,,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'	gv50ceu
Body	Mode	1	0-2	0
	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

Parts	Fields	Length	Range/Format	Default
	Command Ack Mode	1	0 | 1	0
	Inpeo Mask	<=5	00000 - FFFFF	0
	Outpeo Mask	<=5	00000 - FFFFF	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 "gv50ceu".

✧ *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
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

ID	Bit	Item
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
21	Bit 20	Digital input 1 is activated
22	Bit 21	Digital input 1 is inactivated
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
41	Bit 40	Digital input6 is inactivated
42	Bit 41	Digital input6 is activated
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
11	Bit 10	Inside the GEO 10
12	Bit 11	Inside the GEO 11

ID	Bit	Item
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.

✧ *Inpeo Mask*

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

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

✧ *Outpeo Mask*

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

ID	Bit	Item
1	Bit 0	Outside the PEO 0
2	Bit 1	Outside the PEO 1
3	Bit 2	Outside the PEO 2
4	Bit 3	Outside the PEO 3
5	Bit 4	Outside the PEO 4
6	Bit 5	Outside the PEO 5
7	Bit 6	Outside the PEO 6
8	Bit 7	Outside the PEO 7
9	Bit 8	Outside the PEO 8
10	Bit 9	Outside the PEO 9

ID	Bit	Item
11	Bit 10	Outside the PEO 10
12	Bit 11	Outside the PEO 11
13	Bit 12	Outside the PEO 12
14	Bit 13	Outside the PEO 13
15	Bit 14	Outside the PEO 14
16	Bit 15	Outside the PEO 15
17	Bit 16	Outside the PEO 16
18	Bit 17	Outside the PEO 17
19	Bit 18	Outside the PEO 18
20	Bit 19	Outside the PEO 19

Note

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

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=gv50ceu,1,,GV50CEU%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'	gv50ceu
Body	Mode	1	0 | 1	1
	Reserved	0		
	Bluetooth Name	<=18	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_' '%'	GV50CEU%IMEI
	Reserved	0		
	Discoverable Mode	1	0-3	3

Parts	Fields	Length	Range/Format	Default
	Discoverable Time	<=4	0 - 1440(min)	0
	Bluetooth Report Mask	4	0000 - FFFF	0D03
	Bluetooth Event Mask	4	0000 - FFFF	0003
	PIN Code Mode	1	0 | 1	0
	PIN Code	4|6	'0'-'9'	123456
	Reserved	0		
	Reserved	0		
	Reserved	0		
	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 "gv50ceu".

✧ *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**, **+RESP:GTBAR** 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=gv50ceu,0,6,5,WTH301,7805412CF340,FFFF,30,2400,,0,0,10,2,300,0,20,30,2,300,,0,0,0,0,,,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'	gv50ceu
Body	Index	1	0 - 9	0
	Accessory Type	<=2	0-2 | 4 | 6 | 7 | 10-14	0
	Accessory Model	1	0-5	0
	Accessory Name	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_', ' '	
	Accessory MAC	12	000000000000 - FFFFFFFFFFFF	FFFFFFFFFFFF
	Accessory Append Mask	<=4	0 - FFFF	FFFF
	Read Interval	<=5	10 - 86400(s)	30
	Low Voltage Threshold	<=4	0 - 5000(mV)	2400
	Reserved	0		
	Accessory Parameters (Optional)			
	Reserved	0		
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	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 "gv50ceu".

✧ *Index*

The index of the Bluetooth accessory.

✧ *Accessory Type*

The type of the Bluetooth accessory which is defined in the <Index>. The following is supported now:

- **0** - No Bluetooth accessory.
- **1** - Escort Bluetooth accessory.
- **2** - Beacon temperature sensor.
- **4** - CAN accessory.
- **6** - Multi-functional beacon sensor.
- **7** - Technoton accessory.
- **10** - Mechatronics Bluetooth accessory.
- **11** - Magnet Bluetooth accessory.
- **12** - BLE TPMS sensor.
- **13** - Relay Bluetooth accessory.
- **14** - Smart Cap Bluetooth accessory.

✧ *Accessory Model*

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

The following is supported now:

- The model of Escort Bluetooth accessory (<Accessory Type> is 1):
  - **0** - TD_BLE fuel sensor
  - **3** - Angle sensor
- The model of beacon temperature sensor (<Accessory Type> is 2):
  - **1** - Temperature ELA
- The model of CAN accessory (<Accessory Type> is 4):
  - **0** - BLE CAN100
- The model of multi-functional beacon sensor (<Accessory Type> is 6):
  - **3** - RHT ELA (Temperature and humidity sensor)
  - **4** - WMS301 (Door sensor with embedded temperature and humidity sensor)
  - **5** - WTH301 (Temperature and humidity sensor)
- The model of Technoton accessory (<Accessory Type> is 7):
  - **0** - DUT-E S7 (Fuel level sensor)
  - **1** - DFM 100 S7 (Fuel flowmeter sensor)
  - **2** - DFM 250DS7 (Fuel flowmeter sensor)
  - **3** - GNOM DDE S7 (Axle load sensor)
  - **4** - GNOM DP S7 (Axle load sensor)
- The model of Mechatronics accessory (<Accessory Type> is 10):
  - **0** - Fuel sensor
  - **1** - Angle sensor
- The model of Magnet sensor (<Accessory Type> is 11):
  - **0** - MAG ELA (Used to check whether the door is open or closed)
- 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 Smart Cap sensor accessory (<Accessory Type> is 14):
  - **0** - TR21 (Fuel Cap sensor)

✧ *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 dafault 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	<Accessory Event Notification Data>	Including <Accessory Mode>, <Accessory Event>
Bit 9	<Tire pressure>	Tire pressure
Bit 10	<Timestamp>	Timestamp
Bit 11	<Enhanced Temperature>	Enhanced temperature
Bit 12	<Magnet Data>	Including <Magnet ID>, <MAG Event Counter>, <Magnet state>
Bit 13	<Accessory Battery Percentage>	Accessory battery percentage
Bit 14	<Relay Data>	Including <Relay Config Result>, <Relay state>

✧ *Read Interval*

The interval for reading data from the Bluetooth accessory. This parameter is only valid when the Bluetooth accessory is connectable, and data is obtained by sending commands.

✧ *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.

✧ *Accessory Parameters (Optional)*

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

If the Accessory Type is **1** (Escort Bluetooth Accessory), <Accessory Parameters (Optional)> will be unfolded as follows.

Fields	Length	Range/Format	Default
Event Notification	1	0 | 1	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

- *Event Notification*

  It configures whether to enable event notification function.

  – **0** - Disable.

  – **1** - Enable. If a new event occurs on the accessory, the device will report the message **BAA** (ASCII)/(HEX).

If the Accessory Type is **2** (Beacon temperature sensor), <Accessory Parameters (Optional)> will be unfolded as follows.

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

The device will report the message **BAA** (ASCII)/(HEX). to the backend server when the temperature outside or inside the range is detected.

- *Mode*

  The working mode of the temperature alarm.

  – **0** - Disable temperature alarm.

  – **1** - Report temperature alarm if the current temperature is within the temperature range defined by <Low Temperature> and <High Temperature>.

  – **2** - Report temperature alarm if the current temperature is outside the temperature range defined by <Low Temperature> and <High Temperature>.

  – **3** - Report temperature alarm only once if the current temperature enters or exits the temperature range defined by <Low Temperature> and <High Temperature>. In this mode, <Send Interval> will be ignored.

- *Low Temperature*

  It specifies the lower temperature limit in centigrade.

- *High Temperature*

  It specifies the upper temperature limit in centigrade.
- *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 <Validity> time, the temperature alarm will be triggered.

If the Accessory Type is **4** (CAN accessory), <Accessory Parameters (Optional)> will be unfolded as follows.

Fields	Length	Range/Format	Default
PIN Code	4|6	0000 - 9999 | 000000 - 999999	0000
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

- *PIN Code*

  The code needs to be input when it is paired with accessories.

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 (Centigrade)	0
High Temperature	<=3	-40 - 80 (Centigrade)	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 **7** (Technoton accessory), <Accessory Parameters (Optional)> will be unfolded as follows.

Fields	Length	Range/Format	Default
IGN Send Interval	<=5	0|10 - 86400(s)	30
IGF Send Interval	<=5	0|10 - 86400(s)	60
Reserved			
Reserved			
Reserved			

● *IGN Send Interval*
The interval for sending the report message **BAR** (ASCII)/(HEX) to the backend server when the ignition is on. 0 means "Do not report the message **+RESP:GTBAR**".

● *IGF Send Interval*
The interval for sending the report message **+RESP:GTBAR** to the backend server when the ignition is off. 0 means "Do not report the message **+RESP:GTBAR**".

For DUT-E fuel sensor:

Fields	Length	Range/Format	Default
IGN Send Interval	<=5	0 | 10 - 86400(s)	30
IGF Send Interval	<=5	0 | 10 - 86400(s)	60
Actual Sensor Length	<=5	0 - 6000(mm)	0
Empty Frequency	<=7	0 - 4294967(Hz)	0
Full Frequency	<=7	0 - 4294967(Hz)	0

– *Actual Sensor Length*
  The actual length of sensor after cutting.
– *Empty Frequency*
  The frequency of empty sensor (not immersed in fuel).
– *Full Frequency*
  The frequency of sensor fully immersed in fuel.

Note
If the parameters <Actual Sensor Length>, <Empty Frequency> and <Full Frequency> are set to non-default values, the value of fuel level will send the message **+RESP:GTERI** (ASCII)/(HEX) instead of **+RESP:GTBAR**.
If the Accessory Type is **10** (Mechatronics Bluetooth accessory), <Accessory Parameters (Optional)> will be unfolded as follows.

Fields	Length	Range/Format	Default
Fuel Level Format	1	0 | 1	0
Reserved			
Reserved			
Reserved			
Reserved			

- *Fuel Level Format*
  The format of fuel level in the message.
  – **0** - The original value of fuel level.
  – **1** - The percentage of fuel level.

If the Accessory Type is **11** (Magnet Bluetooth accessory), <Accessory Parameters (Optional)> will be unfolded as follows.

Fields	Length	Range/Format	Default
MAG Event Notification	1	0 | 1	0
Reserved			
Reserved			
Reserved			
Reserved			

- *MAG Event Notification*
  It configures whether to enable magnet event notification function.
  – **0** - Disable.

– **1** - Enable. If a new event occurs on the accessory, the device will report the message **BAA** (ASCII)/(HEX)..

If the Accessory Type is **12**, 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
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

Fields	Length	Range/Format	Default
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>.

If the Accessory Type is **14** (Smart Cap Bluetooth accessory), this parameter will work as follows.

For smart cap sensor:

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

The device will report the message **BAA** (ASCII)/(HEX) to the backend server when the temperature reaches 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> time, the temperature alarm will be triggered.

- *Output ID*

  The ID of the output port to output the specified wave shape when the **BAA** (ASCII)/(HEX) event is detected.

Note

If <Accessory Type> is 4 and <Accessory Model> is 0 or <Accessory Type> is 7, the parameters <Accessory Append Mask>, <Low Voltage Threshold>, <Output ID>, <Output Status>, <Duration> and <Toggle Times> are invalid. And the data would not be reported via the message **ERI** (ASCII)/(HEX).

3.3.3 BID (Bluetooth Beacon ID)

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

Example: AT+GTBID=gv50ceu,2,1,3,000A,2400,0,1,3,C300000BE486,C300000BE491,C300000BE492,,2,60,30,120,,,,,,1,,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'	gv50ceu
Body	Index	1	0 - 2	0
	Mode	1	0 | 1	0
	Beacon ID Model	1	0 | 2-4	0
	Accessory Append Mask	<=4	0000 - FFFF	000A
	Low Voltage Threshold	<=4	0 - 5000(mV)	2400
	Expand OUI Numbers	1	0 - 4	0
	Start Index	<=3	1 - 300	
	End Index	<=3	1 - 300	
	MAC List	<=12*75		
	Accessory Parameters(Optional)	0		
	OUI	6	000000 - FFFFFF	
	OUI 1(Optional)	6	000000 - FFFFFF	
	OUI 2(Optional)	6	000000 - FFFFFF	

Parts	Fields	Length	Range/Format	Default
	OUI 3(Optional)	6	000000 - FFFFFF	
	OUI 4(Optional)	6	000000 - FFFFFF	
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	0
	Message Type	1	0 | 1	0
	Reserved	0		
	NAME	<=16	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_', ' '	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 "gv50ceu".

✧ *Index*

The index of the beacon Bluetooth accessory.

✧ *Mode*

The working mode of this function.

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

✧ *Beacon ID Model*

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

- **0** - WKF300
- **2** - ID ELA
- **3** - WID300
- **4** - WID310

✧ *Accessory Append Mask*

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

✧ *Expand OUI Numbers*

The expand number of <OUI>.

✧ *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), this parameter is used as follows:

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** - Enable Keyfob detection: Allow the device to scan only once.

  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** - Enable Keyfob detection: Allow the device to scan continuously.

  After entering ignition on and moving state, the device will keep scanning Keyfob continuously. 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), this parameter is used as follows:

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 **3** (WID300), this parameter is used as follows:

Fields	Length	Range/Format	Default
Reserved	0		
Detection Mode	1	0 | 2 | 3	0

Fields	Length	Range/Format	Default
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 WID300.
  - **0** - Disable detection.
  - **2** - Enable detection: Allow the device to scan continuously.

    After entering ignition on and moving state, the device will keep scanning WID300 continuously. If the device detects WID300 or change of available WID300, it will send the **+RESP:GTBID/+RESP:GTBIE** messages to report information of WID300. If more than 15/ 100 WID300 are detected, the message **+RESP:GTBID/+RESP:GTBIE** contains the information of the top 15/ 100 WID300.
  - **3** - Enable detection: Allow the device to scan continuously.

    The **+RESP:GTBID/+RESP:GTBIE** message is sent to the backend server periodically according to the parameter <IGN Scan & Report Interval>/<IGF Scan & Report Interval>. If more than 15/ 100 WID300 are detected, the message **+RESP:GTBID/+RESP:GTBIE** contains the information of the top 15/ 100 WID300.
- *Detection Interval*

  The device scans WID300 for the time specified by this parameter when <Detection Mode> is 2.
- *IGN Scan & Report Interval*

  The time interval for sending **+RESP:GTBID/+RESP:GTBIE** messages when the engine is on and <Detection Mode> is 3.
- *IGF Scan & Report Interval*

  The time interval for sending **+RESP:GTBID/+RESP:GTBIE** messages when the engine is off and <Detection Mode> is 3.

If Beacon ID Model is **4** (WID310), this parameter is used as follows:

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 / +RESP:GTBIE** messages to report information of WID310. If more than 15/100 WID310 are detected, the message **+RESP:GTBID / +RESP:GTBIE** contains the information of the top 15/100 WID310.

– **3** - Enable detection: Allow the device to scan continuously.
  The **+RESP:GTBID / +RESP:GTBIE** message is sent to the backend server periodically according to the parameter <IGN Scan & Report Interval>/< IGF Scan & Report Interval>. If more than 15/100 WID310 are detected, the message **+RESP:GTBID / +RESP:GTBIE** contains the information of the top 15/100 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 / +RESP:GTBIE** messages when the engine is on and <Detection Mode> is 3.
- *IGF Scan & Report Interval*
  The time interval for sending **+RESP:GTBID / +RESP:GTBIE** messages when the engine is off and <Detection Mode> is 3.

✧ *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 / +RESP:GTBIE** will be reported.
If the value is empty, it means "Disable this function".
The number of <OUI> must match the value of <Expand OUI Numbers>. If <OUI> is empty, the corresponding value will be deleted.

✧ *Message Type*

The type of message.

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

✧ *NAME*

When <Mode> is set to 3, the device detects Bluetooth accessory by name.

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=gv50ceu,0,1,,1,0000,0000,0,30,1000,1000,,0,600,00000000,0,,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'	gv50ceu
Body	Mode	1	0-5	0
	Discard No Fix	1	0 | 1	1
	Reserved	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 | 5 - 86400(s)	600
	ERI Mask	8	00000000 - FFFFFFFF	00000000
	Continue Time	<=2	0 - 10(min)	0
	Reserved	0		
	Wrap Corner Point	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 "gv50ceu".

✧ *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.

✧ *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 2** - For the <CAN Data> field in **+RESP:GTERI**. This mask just works in ASCII-formatted **+RESP:GTERI** message.
- **Bit 5** - Reserved.
- **Bit 8** - For the <Bluetooth Accessory Data> field in **+RESP:GTERI**.
- **Bit 9** - Reserved.
- **Bit 15** - For the <RAT and Band Data> field in **+RESP:GTERI**. RAT means Radio Access Technology.

✧ *Continue Time*

After the ignition is turned off, the message **+RESP:GTFRI/+RESP:GTERI** will continue to be reported according to <Send Interval> for an extra period of time specified by <Continue Time> and then at <IGF Report Interval>.

✧ *Wrap Corner Point*

A numeral to indicate whether to wrap corner point with other fixed GNSS points and wait to send **+RESP:GTFRI** or **+RESP:GTERI** 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** or **+RESP:GTERI** 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=gv50ceu,0,1,0,30,500,500,300,0,0,,,0000$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	FFC	FFC
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Priority	1	0 - 4	0
	Mode	1	0-3	0
	FRI Mode	1	0-5	0
	FRI IGN Report Interval	<=5	5 - 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

"gv50ceu".

✧ *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.

✧ *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) or **ECR** (ASCII)/(HEX) event message and data packets **CRD**(ASCII)/(HEX) to the backend server.

Example:
AT+GTCRA=gv50ceu,1,50,50,50,0,500,500,0,0,0,0,1,,,,,,,,,20,100,10,60,1,FFFF$

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'	gv50ceu
Body	Mode	1	0-3	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	1 - 1500	500
	Samples After Crash	<=4	1 - 1500	500
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	0
	Report ACC Mode	1	0 | 1	0
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	Reserved	0		
	Reserved	0		
	Speed Confirmation	<=2	0 | 10 - 80(km/h)	20
	ODO Confirmation	<=3	0 | 50 - 200(m)	100
	Confirmation Time	<=2	3 - 15(s)	10
	Fall Degrees	2	20 - 80	60
	Extended Status Report	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 "gv50ceu".

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

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.

✧ *Samples After Crash*

The number of recorded XYZ-axis acceleration 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).

✧ *Speed Confirmation*

The vehicle speed used to measure whether a crash event will be reported. If a crash is detected and the vehicle speed is less than the value of <Speed Confirmation> for the period specified by <Confirmation Time>, the crash event will be reported. If <Speed Confirmation> is set to 0, the vehicle speed will not be checked when a crash is detected.

✧ *ODO Confirmation*

The ODO mileage of the vehicle used to measure whether a crash event will be reported. If the ODO mileage accumulated during <Confirmation Time> is less than the value of <ODO Confirmation>, the crash event will be reported. If the <ODO Confirmation> is set to 0, the ODO mileage will not be checked when a crash is detected.

Note

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

✧ *Confirmation Time*

A time parameter used in conjunction with <Speed Confirmation> or <ODO Confirmation> to determine whether to report the crash event.

✧ *Fall Degrees*

This parameter is valid only when <Mode> is set to 3. In Mode 3, if the condition defined by either <Speed Confirmation> or <ODO Confirmation> is met, and the degree change on the Z-axis is greater than the value of <Fall Degrees> within 3 seconds before or after a crash is detected, then the crash event will be reported.

✧ *Extended Status Report*

It is used to indicate the reporting type of the crash message.

- **0** - Report the message **CRA** (ASCII)/(HEX).
- **1** - Report the message **ECR** (ASCII)/(HEX) to include more information.

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=gv50ceu,0,3,112.129273,32.839031,50,0,0,0,0,0,0,0,0000,0000,0,000A$

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'	gv50ceu
Body	ID	<=2	0 - 19	
	Mode	1	0-3	0
	Longitude	<=11	(-)xxx.xxxxxx	
	Latitude	<=10	(-)xx.xxxxxx	
	Radius	<=7	50 - 6000000(m)	50
	Check Interval	<=5	0 | 5 - 86400(s)	0
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	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 "gv50ceu".

✧ *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 PEO (Polygon Geo-Fence)

The command **AT+GTPEO** is used to configure the parameters of polygon Geo-Fence. Polygon 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.

Note
This command can be used to set less than ten sets of longitude and latitude coordinates each time.

Example:
AT+GTPEO=gv50ceu,0,0,1,3,121.412240,31.187801,121.412248,31.187891,121.412258,31.187991,0,0,0,0,0,1,,,,000B$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	PEO	PEO
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	ID	<=2	0 - 19	0
	Mode	1	0-3	0
	Start Point	<=2	1 - 10	1
	End Point	<=2	3 - 10	3
	Longitude	<=11	(-)xxx.xxxxxx	
	Latitude	<=10	(-)xx.xxxxxx	
	Check Interval	<=5	0 | 5 - 86400(s)	0
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	0
	State Mode	1	0 | 1	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

"gv50ceu".

✧ *ID*

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

✧ *Mode*

The working mode for the device to report the polygon Geo-Fence message to the backend server.

- **0** - Disable the zone's polygon Geo-Fence function.
- **1** - Enter the zone. The **GIN**(ASCII)/(HEX) message will be generated only when the terminal enters the Geo-Fence.
- **2** - Exit the zone. The **GOT** (ASCII)/(HEX) message will be generated only when the terminal exits the Geo-Fence.
- **3** - Report the **+RESP:GTGIN** and **+RESP:GTGOT** when entering and exiting the Geo-Fence zone respectively.

✧ *Start Point*

The start point of the polygon GEO-Fence formed by a set of points.

✧ *End Point*

The end point of the polygon GEO-Fence formed by a set of points.

✧ *Longitude*

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

✧ *Latitude*

The latitude of a point which is defined as the endpoint of the polygon Geo-Fence region. The unit is degree, and accuracy is 6 decimal places. South latitude is defined as negative starting with the minus sign "-" and north latitude is defined as positive without "+".

Note

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

✧ *Check Interval*

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

✧ *State Mode*

The mode for reporting the device's PEO state.

- **0** - Report when getting the PEO state for the first time.
- **1** - Do not report until the PEO state changes.

3.5.4 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=gv50ceu,1,3,1,100,5,5,,60,10,10,,,30,30,,0,0,0,0,25,50,20,50,,,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	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
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		
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	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		

Parts	Fields	Length	Range/Format	Default
	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 "gv50ceu".

✧ *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".
- *Output ID*
  It specifies the ID of the output port to output specified wave shape when the harsh behavior is detected. If it is set to 0, there will be no output wave.
- *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.

3.5.5 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=gv50ceu,0,2,1,0,,,,0,0,0,0,,,,,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'	gv50ceu
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
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	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 "gv50ceu".

✧ *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.

- *Output ID*

  It specifies the ID of the output port to output specified wave shape when the vehicle enters the idle state. If it is set to 0, there will be no output wave.

3.5.6 JBS (Jamming Behavior Setting)

The command **AT+GTJBS** is used for the Jamming Behavior Setting function. There are two modes of Jamming Behavior Setting, namely Jamming Behavior Setting Configure Mode and Jamming Behavior Setting Reset Mode. The output1 is used for "fuel cut-off" and the output2 is used for "siren".

- **Jamming Behavior Setting Configure Mode**

```
Example:
AT+GTJBS=gv50ceu,0,,10,10,1800,1,30,0,0,5,1,0,0,0,60,30,0,001A$
```

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	JBS	JBS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Mode	1	0 | 1	0
	Reserved	0		
	Siren On Timer (T1)	<=3	1 - 600 (x100ms)	10
	Siren Off Timer (T2)	<=3	1 - 600 (x100ms)	10
	Ready Fuel Release Timer (T3)	<=5	1 - 65535 (s)	1800
	Check Speed	1	0 | 1	1
	Speed Limit	<=3	0 - 999(km/h)	30
	Output 1 Init State	1	0 | 1	0
	Motion Sensor	1	0 | 1	0
	GNSS Fix Failure Timeout Timer (T4)	<=3	1 - 100 (min)	5
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	Release Fuel Cut-off Timer (T5)	<=4	0 - 1000 (min)	0
	Check Jamming in T3	1	0 | 1	0
	Waiting Release Fuel Timer (T6)	<=5	0 - 65535 (s)	0
	Siren Alarm Duration (T7)	<=5	1 - 65535 (s)	60
	Preparing Alarm Timer (T8)	<=5	1 - 65535 (s)	30
	Output 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 "gv50ceu".

✧ *Mode*

A numeral to indicate the working mode of the Jamming Behavior Setting function.

- **0** - Disable the JBS function.
- **1** - Jamming Behavior Setting Configure Mode.

✧ *Siren On Timer (T1)*

It specifies the length of time the siren is on.

✧ *Siren Off Timer (T2)*

It specifies the length of time the siren is off.

✧ *Ready Fuel Release Timer (T3)*

It indicates the length of time when the fuel is cut off and whether jamming state is checked every 2 seconds is determined according to the <Check Jamming in T3>.

✧ *Check Speed*

Whether to check speed when the device enters jamming state.

- **0** - Disable speed check.
- **1** - Enable speed check.

✧ *Speed Limit*

The speed limit to cut off fuel.

✧ *Output 1 Init State*

It is used to set the initial state of output 1.

✧ *Motion Sensor*

Whether the motion sensor needs to measure the motion state to cut off fuel when the GNSS fix failure timeout expires. If <Motion Sensor> is set to 0, the state machine will always measure the GNSS fix state.

- **0** - Disable motion sensor.
- **1** - Enable motion sensor.

✧ *GNSS Fix Failure Timeout Timer (T4)*

It indicates the time length of GNSS timeout.

✧ *Release Fuel Cut-off Timer (T5)*

If the device enters JBS and then cuts off fuel, it will check the current jamming state when the <Fuel Cut-off Timer (T3)> condition is met. If the device doesn't quit the jamming state and the value of <Release Fuel Cut-off Timer> is greater than 0, the device will release fuel cut-off and <Release Fuel Cut-off Timer> will start to work.

When the <Release Fuel Cut-off Timer> condition is met, the device will check the current jamming state. If the device doesn't quit the jamming state, it will check the condition and decides whether to cut off fuel again. If the device doesn't quit the jamming state and the value of <Release Fuel Cut-off Timer> is 0, the device will keep fuel cut-off status until it quits the jamming state.

✧ *Check Jamming in T3*

It indicates whether the JBS state machine starts T3 timer to check jamming state and starts T6 timer if the device quits jamming state.

- **0** - Do not check jamming state (compatible with old JBS state machines).
- **1** - Check jamming state and start T6 timer.

✧ *Waiting Release Fuel Timer (T6)*

It indicates the length of time to be waited before releasing fuel and quitting JBS state machine.

✧ *Siren Alarm Duration (T7)*

It indicates the length of time the siren alarm sounds.

✧ *Preparing Alarm Timer (T8)*

It indicates the length of time for alarm preparation.

✧ *Output Mode*

A numeral to indicate the output port's function.

- **0** - The output1 is used for "cut off fuel".
- **1** - The output1 is used for "siren" alarm.

✧ **Jamming Behavior Setting Reset Mode**

Example: AT+GTJBS=gv50ceu,2,,,,,001A$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	JBS	JBS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Mode	1	2	
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	

Parts	Fields	Length	Range/Format	Default
	Tail	1	$	$

✧ *Mode*

A numeral to indicate the working mode of the JBS function.

- **2** - Jamming Behavior Setting Reset Mode.

3.5.7 JDC (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=gv50ceu,2,15,70,,70,2,60,10,0,2,0,0,,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'	gv50ceu
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
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	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 "gv50ceu".

✧ *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.

3.5.8 RMD (Roaming Detection)

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

Example: AT+GTRMD=gv50ceu,0,,,,,1,1,46003,,,2,2,46007,,,3,3,46001,,,3DEF,,,3DEF,,,,,0,0,0,0,,,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'	gv50ceu
Body	Mode	1	0 | 1	0
	Reserved	0		
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	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	
	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		
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	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

"gv50ceu".

✧ *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 4** - for **CID** (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 **IGN** (ASCII)/(HEX), **IGF** (ASCII)/(HEX), **VGN** (ASCII)/(HEX) and **VGF** (ASCII)/(HEX)
- **Bit 13** - for the ignition on/off location reports **IGL**(ASCII)/(HEX) and **VGL** (ASCII)/ (HEX)
- **Bit 15** - for **PNR** (ASCII)/(HEX)
- **Bit 16** - for **PFR** (ASCII)/(HEX)
- **Bit 17** - for **DRM** (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>.

✧ *Output ID, Output Status, Duration, Toggle Times*

If this function is enabled and roaming state is detected, the specified wave will be output on the specified output.

Note

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

3.5.9 SOS (SOS Setting)

This command is used to configure a specified input port for emergency.

When an emergency occurs, the end user can use the specified input port to trigger the SOS function and the device will report the position message **SOS** (ASCII)/(HEX) to the backend server. A specified wave shape can be configured to output on a specified output port.

Example:
AT+GTSOS=gv50ceu,0,0,,0,0,0,0,,,1,,000D$

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

Parts	Fields	Length	Range/Format	Default
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Mode	1	0 | 2 | 4	0
	Digital Input ID	1	0 - 1 | 6	0
	Reserved	0		
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	0
	Reserved	0		
	Reserved	0		
	GNSS Position Type	1	1-3	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 "gv50ceu".

✧ *Mode*

The working mode of the SOS function.

- **0** - Disable SOS function.
- **2** - Send the current position to the backend server only.
- **4** - Send the current position to the SMS gateway via SMS.

✧ *Digital Input ID*

The ID of the digital input port which triggers the SOS function. 0 means "Disable the SOS function".

The digital input port should first be configured by the command (AT+GTDIS) for the SOS function.The digital input port6 should be configured by the command (AT+GTIGM) first for the SOS function. If a digital input port is configured to trigger the SOS function, there is no **DIS** (ASCII)/(HEX) report message for the specified digital input port.

✧ *GNSS Position Type*

A numeral to indicate the type of the GNSS position (last GNSS position or current GNSS position) to be reported to the backend server.

- **1** - Try to report the current GNSS location when the SOS event is triggered.
- **2** - Only report the last GNSS location immediately when the SOS event is triggered.
- **3** - Report the last GNSS location immediately when the SOS event is triggered and then the device tries to get the current GNSS location to be reported.

Note

If <GNSS Position Type> is set to 2, the **GSM** (ASCII)/(HEX) report will not be triggered.

3.5.10 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=gv50ceu,1,0,0,60,300,0,0,0,0,,,,,,,,,,,,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'	gv50ceu
Body	Mode	1	0-3	0
	Min Speed	<=3	0 - 400(km/h)	0
	Max Speed	<=3	0 - 400(km/h)	0
	Validity	<=4	0 - 3600(s)	60
	Send Interval	<=4	30 - 3600(s)	300
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	0
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
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

"gv50ceu".

✧ *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.

✧ *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.

3.5.11 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=gv50ceu,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'	gv50ceu
Body	Mode	1	0 | 1	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

Parts	Fields	Length	Range/Format	Default
	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 "gv50ceu".

✧ *Mode*

The working mode of the Start/Stop report function.

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

✧ *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.

3.5.12 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=gv50ceu,1,10,1,300,0,0,0,0,2,3,2,600,,,,,,,,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'	gv50ceu
Body	Mode	1	0 | 1	0
	Engine Off to Tow	<=2	1 - 15(min)	10
	Fake Tow Delay	<=2	0 - 10(min)	1
	Tow Interval	<=5	30 - 86400(s)	300
	Tow Output ID	1	0 - 1	0
	Tow Output Status	1	0 - 3	0
	Tow Output Duration	<=3	0 - 255(x100ms)	0
	Tow Output Toggle Times	<=3	0 - 255	0
	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 "gv50ceu".

✧ *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.

✧ *Tow Output ID*

The ID of the output port to output the specified wave shape when the tow event is detected.

✧ *Tow Output Status*

Please refer to the parameter <Output Status> in (AT+GTDOS).

✧ *Tow Output Duration*

Please refer to the parameter <Duration> in (AT+GTDOS).

✧ *Tow Output Toggle Times*

Please refer to the parameter <Toggle Times> in (AT+GTDOS).

✧ *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.

3.5.13 ACJ (Anti-Carjacking)

The command AT+GTACJ is used for the anti-carjacking function. It has three working modes:

1) Configure the anti-carjacking function
2) Release the lock of carjacking status
3) Query the current setting of anti-carjacking function

3.5.13.1 Anti-Carjacking Configure Command

This command is used to configure the anti-carjacking function. This function includes a hijack button, ignition status and door status. Based on the operation on the hijack button and the status of the ignition or the door, the device can detect whether there is a carjacking event. If a carjacking event is detected, the device will automatically lock the ignition of the car. Thus prevent the loss of possessions.

There are two independent ways to trigger the carjacking checking.
1)Ignition Mode

In this mode, the driver has to press the hijack button once before ignition on. Otherwise the device will enter into carjacking triggering mode.

2)Door Mode

In this mode, the driver has to press the hijack button once before opening the door. Otherwise the device will enter into carjacking triggering mode.
When the device enters into carjacking triggering mode, it will start a timer for the carjacking checking. If the driver does not press the hijack button once before the timer runs out, the device will enter into the carjacking mode and lock the ignition of the car. If the driver presses the hijack button during the time, the device will return to the normal mode.

Note

These two trigger modes can be used separately or they can be combined.
3)Ignition mode Auto Release Carjacking

Based on the ignition mode, the device will reset anti-carjacking and lock the ignition of the car. When the ignition of the car is off, change the output state to unlock ignition of the car by ignition on.

3.5.13.1.1 Quit Carjacking Mode

When the device enters into the carjacking mode, there are three ways to quit this mode and back to the normal mode. It will also unlock the ignition.

1) Receive the release command from the backend server

2) Receive special SMS release command to release the lock
3) Press hijack button 5 times with ignition on

3.5.13.1.2 Valet Service

For the sake of the owner of the car, this function also supports valet service without triggering the carjacking event. Before the owner gives his car to the valet service, he could press and hold the hijack button for 5 seconds. Then the device will disable carjacking trigger for a certain period according to the setting. It will give the valet service enough time to park the vehicle.

When the owner wants his vehicle back, normally the valet service will trigger the carjacking checking. For the first time to check the carjacking after being cancelled for the valet service, the device will use a bit longer trigger timer to allow the owner to disable the carjacking checking when he gets the vehicle back by pressing the hijack button once before the timer runs out.

3.5.13.1.3 Special Notes

To use this function on GV50CEU, certain things need to be noted.

1) To use the ignition mode, it's necessary to make sure the device could get power supply before ignition on. It is recommended to switch on the internal battery or connect the device with external power supply which is not affected by the ignition on/off state.
2) To use the door mode, it is recommended to multiplex the ignition input into digital input 6.

Example: AT+GTACJ=gv50ceu,1,1,1,10,6,3,15,,,3,1,0,0,0,0,,,,,0001$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	ACJ	ACJ
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Working Mode	1	1	1
	Hijack Trigger Mode	<=2	0-3	0
	Trigger Input ID	1	1	1
	Trigger Input Timeout	<=2	1 - 60(s)	10
	Door Trigger ID	1	6	6
	Hijack Time Trigger	<=5	1 - 65535(x100ms)	1
	Valet Time Trigger	2	10 - 30(min)	15
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	Reserved	0		
	LED Slow Flash	1	3 - 5(x100ms)	3
	LED Fast Flash	<=3	1 - 2(x100ms)	1
	Output Mode Work	1	0-2	0
	Output Status	1	0-3	0
	Duration	<=5	0 - 65535(x100ms)	0
	Toggle Times	<=3	0 - 255	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 "gv50ceu".

✧ *Working Mode*

The working mode of the **AT+GTACJ** command, set it to 1 for configuration command mode.

✧ *Hijacking Trigger Mode*

The mode to trigger the anti-carjacking checking.

- **0** - Do not trigger the anti-carjacking checking.
- **1** - Ignition mode
- **2** - Combine ignition mode and door mode together.
- **3** - Ignition mode Auto Release Carjacking

Note

Since the hardware ignition is reused to digital input6 to support the door mode, to combine the ignition mode, it's necessary to configure virtual ignition first.

✧ *Trigger Input ID*

The ID of the digital input to connect the hijack button. Always use digital input 1 on GV50CEU.

✧ *Trigger Input Timeout*

Timer for the hijack button pressing. If the driver does not want to trigger the carjacking checking, he should turn on the ignition or open the door before the timeout of this timer after pressing the hijack button. Otherwise, he needs to press the hijack button again before turning on the ignition or opening the door according to the <Trigger Mode>.

✧ *Door Trigger ID*

The ID of the digital input for detecting the status of the door. Always use digital input 6 on GV50CEU. To use this digital input, it's necessary to multiplex the ignition input into digital input 6.

✧ *Hijack Time Trigger*

The timer for carjacking checking. If the timer runs out before the driver presses the hijack button, the device will enter into carjacking mode.

- The trigger timer will be evenly divided into three stage:
  - *The first stage* - Nothing happen, turn off the carjacking LED.
  - *The second stage* - The carjacking LED flashes slowly.
  - *The third stage* - The carjacking LED flashes rapidly.
  - *Beyond the third stage* - Carjacking LED stays solid. The device enters into carjacking mode. The ignition of the car is locked.

Note

When the <Output Mode Work> field is set to 1 (Use output to Control the block), this parameter will be the delay time to change the output status.

✧ *Valet Timer Trigger*

The trigger timer for the valet service. This timer is used both for canceling the carjacking checking before the owner gives his car to the valet service and triggering the carjacking mode when the owner wants his car back from the valet service.

- Before the owner gives his car to the valet service, he could press and hold the hijack button for 5 seconds. Then device will disable the carjacking checking before this timer runs out. This gives the valet service enough time to park the vehicle without triggering the carjacking mode.
- After this timer runs out. The device starts to check the carjacking again. The first time to trigger the carjacking mode, it will use this timer for checking. This gives the owner enough time to cancel the carjacking triggering when he wants his car back from the valet service.

✧ *LED Slow Flash*

The time interval of the carjacking LED's slow flashing.

✧ *LED Fast Flash*

The time interval of the carjacking LED's fast flashing.

✧ *Output Mode Work*

The working mode to control the digital output 1 in the carjacking.

- **0** - Do not use digital output 1
- **1** - Use output to control the block
- **2** - Use output to control LED/Siren

✧ *Output Status*

It configures the final status of the output port when triggered carjacking.

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

✧ *Reserved*

Not used at present. Please keep it empty.

✧ *Serial Number*

The serial number of a command. It will be included in the ACK message of the command.

✧ *Tail Character*

A character to indicate the end of the command. It must be "$".

3.5.13.2 Anti-Carjacking Release Command

This command is used to disable the carjacking mode by the backend server. When the device enters into carjacking mode, the administrator could use this command to release the lock of ignition and bring the device back to its normal status after the carjacking event is resolved.

Example:
AT+GTACJ=gv50ceu,0,,,,,,,,,0002$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	ACJ	ACJ
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Working Mode	1	0	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 "gv50ceu".

✧ *Working Mode*

The working mode of the AT+GTACJ command, set it to 0 for release command mode.

3.5.13.3 Anti-Carjacking Query Command

This command is used to query the current setting of the anti-carjacking function. The backend server could send this command to the device. Upon receiving this command, the device will report its current setting of anti-carjacking function with report message +RESP:GTACS.

Example:
AT+GTACJ=gv50ceu,2,,,,,,,,,0002$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	ACJ	ACJ
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Working Mode	1	2	2
	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 "gv50ceu".

✧ *Working Mode*

The working mode of the **AT+GTACJ** command, set it to 2 for query command mode.

3.6 IO Applications

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

3.6.1 AIS (Analog Input Setting)

The command **AT+GTAIS** is used to configure the parameters of analog input ports.

Make sure there is an analog signal connected to the corresponding analog input port before enabling this function.

Example: AT+GTAIS=gv50ceu,1,0,10000,12000,1,,0,0,0,0,0,,,,,,0,,FFFF$

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

Parts	Fields	Length	Range/Format	Default
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	ID	1	1	
	Mode	1	0-2	0
	Min Threshold	<=5	0 - 16000 (mV)	0
	Max Threshold	<=5	0 - 16000 (mV)	0
	Sample Rate	<=2	0 | 1 - 12(x2s)	0
	Reserved	0		
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	0
	Sync with FRI	1	0 | 1	0
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Voltage Margin Error	<=3	0 - 100(x10mV)	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 "gv50ceu".

✧ *ID*

The port ID of analog input.

✧ *Mode*

The working mode of the analog input alarm **AIS** (ASCII)/(HEX).

- **0** - Disable analog input alarm.
- **1** - Enable analog input alarm. If the input voltage is within the range of (<Min Threshold>, <Max Threshold>), the alarm will be triggered.
- **2** - Enable analog input alarm. If the input voltage is outside the range of (<Min Threshold>, <Max Threshold>), the alarm will be triggered.

✧ *Min Threshold*

If <Mode> is set to 1 or 2, this parameter indicates the lower voltage limit of the analog input port to trigger the alarm.

✧ *Max Threshold*

If <Mode> is set to 1 or 2, this parameter indicates the upper voltage limit of the analog input port to trigger the alarm.

Note

When <Mode> is set to 1 or 2, the value of <Min Threshold> should be set less than the value of <Max Threshold>.

✧ *Sample Rate*

The sampling period for the analog input port.

✧ *Output ID*

It specifies the ID of the output port to output specified wave shape when the analog input alarm is triggered. If it is set to 0, there will be no output wave.

✧ *Output Status*

It is used to set the final status of the output port.

- **0** - Inactive status.
- **1** - Active status.
- **2** - Gradual-progressive-wave-shape active status. For detailed information, please refer to (AT+GTGDO).
- **3** - Gradual-progressive-low-wave-shape Enable status. For detailed information, please refer to (AT+GTGDO).

✧ *Toggle Times*

The rise and fall times of the square wave.

✧ *Sync with FRI*

The device can send the analog input voltage periodically along with FRI report. Set this field to 1 to enable the function and 0 to disable it.

✧ *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>, this voltage value will not be processed.

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 which meets the condition (5900mV < current voltage < 6100mV) or (11900mV < current voltage < 12100mV) will not be processed. This parameter improves the performance of the **+RESP:GTAIS** report.

3.6.2 DIS (Digital Input Setting)

The command **AT+GTDIS** is used to configure the parameters of the digital input ports. The input <Ignition Detection> is dedicated to ignition detection, others can be customized. If the logic status is changed on one of the customized digital input ports, the device will report the message **DIS** (ASCII)/(HEX) to the backend server.

Example:
AT+GTDIS=gv50ceu,0,,5,0,1,0,2,0,,,,,,,,,,0,,,0005$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	DIS	DIS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Ignition Detection	1	0	0
	Reserved	0		
	Debounce Time	<=2	0 - 20(x10ms)	5
	Validity Time	<=2	0 | 1 - 12(x2s)	0
	Input ID 1	1	1	1
	Mode1	1	0 | 1	0
	Debounce Time1	<=2	0 - 20(x10ms)	2
	Validity Time1	<=2	0 | 1 - 12(x2s)	0
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Last Position	1	0 | 1	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 "gv50ceu".

✧ *Ignition Detection*

The ID of the ignition detection port.

✧ *Input ID*

The digital input port ID.

✧ *Mode*

Enable/disable the interrupt input.

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

✧ *Debounce Time*

The time for interruptible input port debouncing.

✧ *Validity Time*

The validity time of the input port. 0 means "Do not check the validity time".

✧ *Last Position*

A numeral to indicate whether to include real time position or last known position in the report **+RESP:GTDIS**.

- **0** - Include real time position in the report **+RESP:GTDIS**. It takes time to get GNSS position before the report.
- **1** - Include the last known position in the report **+RESP:GTDIS**. The report can be sent to the backend server immediately after digital input state changes.

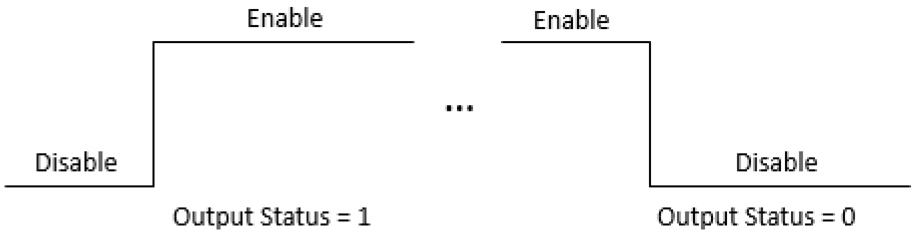
3.6.3 DOS (Digital Output Setting)

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

The digital output 1 is a latched output. The final status of the output will be latched during power off.
If a specified output port is set to wave shape 4, then the port will output square wave. When the main power is off, the port will stop outputting the wave; if the main power is turned on again, the port will start to output the wave again. If the device is rebooted, the port will still output the wave.

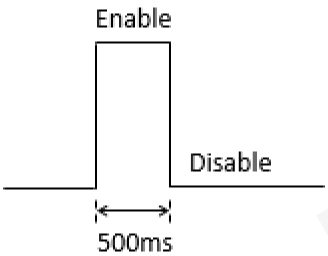
Wave Shape 1:

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



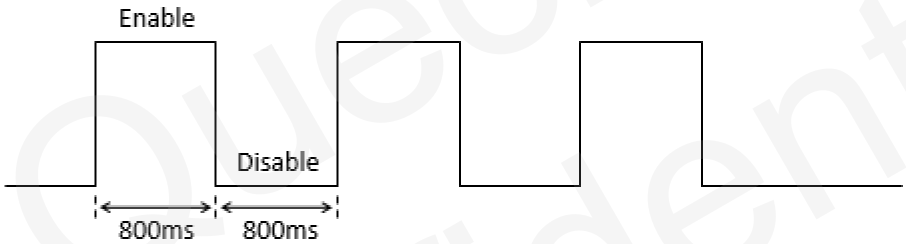
Wave Shape 2:

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



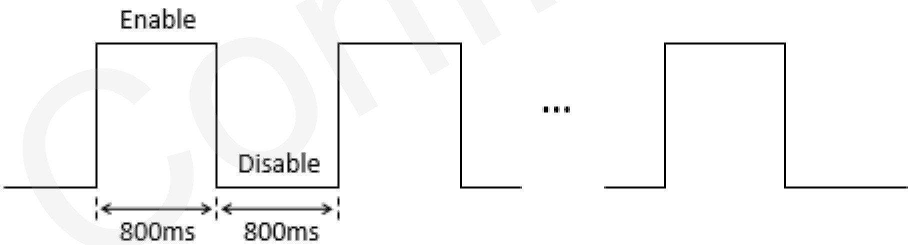
Wave Shape 3:

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



Wave Shape 4:

✓ *<Duration>* = 800ms, *<Toggle Times>* = 0



Example:
AT+GTDOS=gv50ceu,0,1,1,0,0,0,,,0,0,5,,,,FFFF$

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

Parts	Fields	Length	Range/Format	Default
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Command Frame Version	1	0	0
	Number of Output Ports	1	1	1
	Output ID	1	0 - 1	
	Output Status	1	0-3	
	Duration	<=3	0 - 255(x100ms)	
	Toggle Times	<=3	0 - 255	
	Reserved	0		
	Reserved	0		
	DOS Report	1	0 - 1	0
	Overspeed Restrict Output	2	0 | 1 - 60(km/h)	0
	Debounce Time	<=3	5 - 120(s)	5
	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 "gv50ceu".

✧ *Command Frame Version*

It indicates the version of this command. Its value will be changed if this command needs to be extended.

✧ *Number of Output Ports*

The number of output ports to be set. The six parameters <Output ID>, <Output Status>, <Duration>, <Toggle Times>, <Long Operation> and <Reserved> following this parameter will repeat <Number of Output Ports> times.

✧ *Output ID*

It indicates the ID of output ports.

✧ *Output Status*

It is used to set the final status of the output port and valid only for wave shape 1.

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

✧ *Duration*

Please refer to the wave shapes shown above. Unit: 100ms.

✧ *Toggle Times*

Please refer to the wave shapes shown above. When <Duration> is set to 0, <Toggle Times> must be set to 0; otherwise, the command is invalid.

✧ *DOS Report*

Whether to report **DOS** (ASCII)/(HEX) when the status of wave shape 1 output changes.
For each bit, set it to 1 to enable the report, and set it to 0 to disable the report.

Note

This parameter is also valid for the Gradual-progressive-wave-shape function.

✧ *Overspeed Restrict Output*

Digital output will not be triggered when GNSS speed exceeds the set speed. 0 means "Disable this parameter".

Note

- This function works only in the power saving mode 0 or the ignition state.
- Positioning failure blocks the output by default.
- The Debounce time will be re-timed from the time the command is sent when <Overspeed Restrict Output> is set.
- If **AT+GTDOS** is sent continuously, it will overwrite the previous **AT+GTDOS** command.
- Only support the wave shape 1 and gradual-progressive-wave-shape. The command **AT+GTDOS** will not be executed if the wave shape is set to 2, 3 or 4.

✧ *Debounce Time*

If the speed is lower than <Overspeed Restrict Output> for the time specified by <Debounce Time>, **AT+GTDOS** will be executed.

3.6.4 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=gv50ceu,0,250,12000,0,0,0,0,0,0,0,0,0,0,0007$

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

Parts	Fields	Length	Range/Format	Default
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Mode	1	0-2	0
	Min Threshold	<=5	0 - 90000 (mV)	0
	Max Threshold	<=5	0 - 90000 (mV)	0
	Sample Period	<=2	0 | 1 - 12(x2s)	0
	Debounce Time	1	0 - 5 (x1s)	0
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	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 - 20(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 "gv50ceu".

✧ *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.

✧ *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.

✧ *Output ID*

It specifies the ID of the output port to output specified wave shape when the **+RESP:GTEPS** alarm is triggered. If it is set to 0, there will be no output wave.

✧ *Sync with FRI*

Besides the **+RESP:GTEPS** alarm report, the device can also send the voltage of external power supply periodically along with the fixed report message.

- **0** - Do not report external power supply voltage with fixed report message.
- **1** - Report external power supply voltage with fixed report message.

✧ *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.

3.6.5 GDO (Gradual Digital Output)

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

For progressive output, an increment step is added to the ON Time until the ON Time (including the time increment) is equal to or greater than the Cycle time. This phase is defined as progressive state.

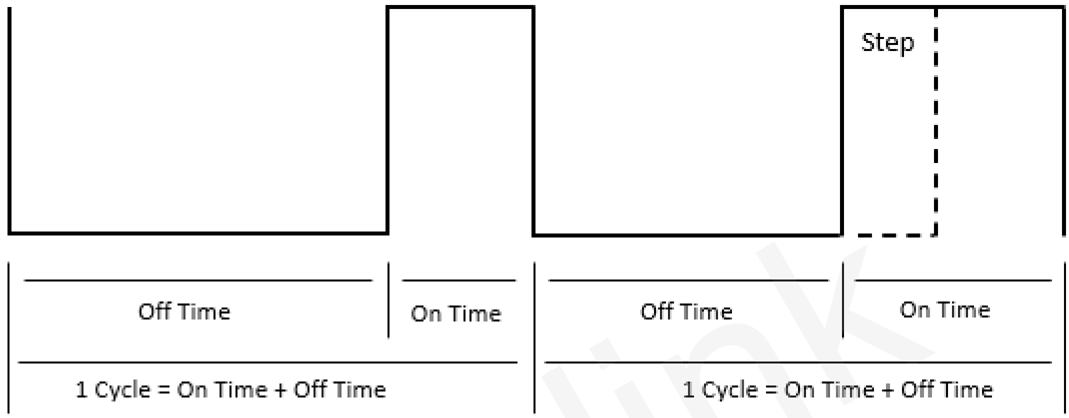
After the condition **On Time + Incremental Step >= Cycle Time** is reached, the output becomes steady until it is deactivated by the command (AT+GTDOS). This phase in which the output is steady is defined as constant state. If the device reboots during constant state and the (AT+GTPDS) settings are configured and enabled, the device will restore the previous output state.

The next time the progressive output is activated, the cycle described above starts over regardless of the previous progressive state.

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

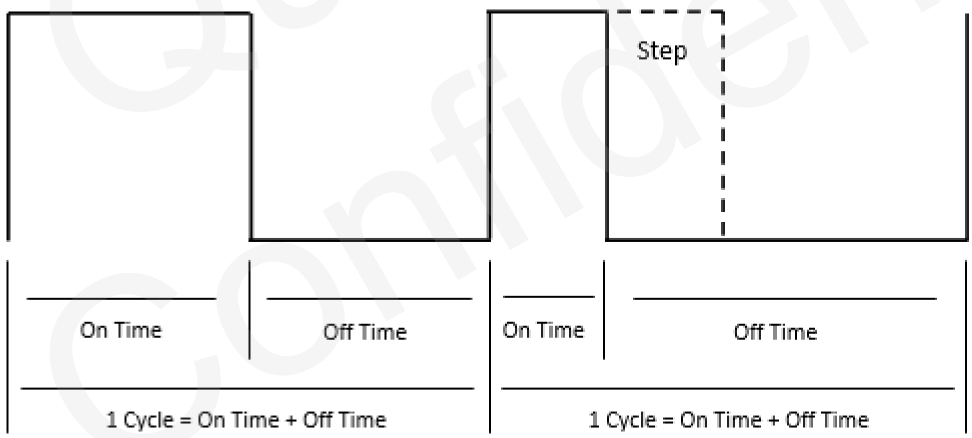
- The time for one complete cycle is equal to OFF time plus ON time.
- For constant output, the ON time and the Cycle time should be the same.
- For progressive output, when the <Output Status> is set to 2, an incremental step will be added to the ON time at the end of a cycle before the start of the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

Gradual Progressive Wave Shape



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

Gradual Progressive Wave Shape



Example:
AT+GTGDO=gv50ceu,0,30,1,,,,,,0004$

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

Parts	Fields	Length	Range/Format	Default
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	First ON/OFF Time	<=3	0 - 100	0
	Cycle Time	<=3	0 - 100	30
	Incremental Step	<=3	0 - 100	1
	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 "gv50ceu".

✧ *First ON Time*

The time that the output is in active state during the first cycle. Unit: 100ms.

✧ *First OFF Time*

The time that the output is in inactive state during the first cycle when <Output Status> is set to 3. Unit: 100ms.

✧ *Cycle Time*

The time that forms a complete cycle. Unit: 100ms.

✧ *Incremental Step*

The time that shall be added to the ON/OFF time before starting the next cycle. If this parameter value is 0, the cycles are equal. Unit: 100ms.

Note

The value of <First ON Time> or <First OFF Time> cannot be greater than <Cycle Time>.

3.6.6 IOB (Input/Output Binding)

This command is used to configure the user defined output port actions triggered by input ports. If the I/O binding is configured and the corresponding condition is met, the device will output specified wave shape on the specified output port. Otherwise, the device will restore the initial state of the specified output port. The device will report the message **IOB** (ASCII)/(HEX) to the backend server when the logic state of the bound input ports changes.

Example: AT+GTIOB=gv50ceu,0,3,3,0,0,0,0,0,,,,,0006$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	IOB	IOB
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	ID	1	0 - 3	
	Input Mask	<=4	0 - 42	0
	Trigger Mask	<=4	0 - 42	0
	Input Sample Period	<=2	0 | 1 - 12 (x2s)	0
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	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 "gv50ceu".

✧ *ID*

The ID of the user defined IO binding.

✧ *Input Mask*

Bitwise mask for input ports composition. Each bit represents one digital input port. Set it to 1 to enable corresponding input port and set it to 0 to disable.

- **Bit 0** - Ignition detection
- **Bit 1** - Digital input 1
- **Bit 6** - Digital input 6

✧ *Trigger Mask*

Bitwise mask for trigger condition composition of the corresponding input ports. Each bit represents the logic state of the corresponding input port to trigger the IOB event. Set it to 1 to use "Active state" as the trigger condition and 0 to use "Inactive state" as the trigger condition. Only when the logic state of all the input ports in one IO binding meets the trigger condition will the IOB event be triggered.

- **Bit 0** - Ignition detection
- **Bit 1** - Digital input 1
- **Bit 6** - Digital input 6

✧ *Input Sample Period*

The interval for checking the state of all the digital input ports in one IO binding. **AT+GTIOB** and (AT+GTDIS) use separate sample periods to check the input port state even for the same input port.

- *Output ID*

  The ID of the output port to output specified wave when the trigger condition is met. 0 means "No wave will be output".

Note

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

3.6.7 IGM (Ignition Multiplexing Setting)

The command **AT+GTIGM** is used to make the ignition input available as a digital input. If the logic state of the digital input port changes, the device will report the message **+RESP:GTDIS** to the backend server.

Example:
AT+GTIGM=gv50ceu,6,1,1,20,9,,,,,,0006$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	IGM	IGM
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	ID	1	6	6
	Mode	1	0 | 1	0
	Report Mode	1	0-3	0
	Debounce Time	<=2	0 - 20(x10ms)	0
	Validity Time	<=2	0 | 1 - 12(x2s)	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 "gv50ceu".

- *ID*

The ID of the digital input that the ignition input is configured as.

✧ *Mode*

Enable/disable the interrupt input.

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

✧ *Report Mode*

It defines the event to trigger the message **+RESP:GTDIS** to be reported to the backend server.

- **0** - Disable the **+RESP:GTDIS** report.
- **1** - Activate the digital input.
- **2** - Deactivate the digital input.
- **3** - Upon activating and deactivating the digital input.

✧ *Debounce Time*

The debounce time for interruptible input port.

✧ *Validity Time*

The validity time of the input port. 0 means "Do not check the validity time".

Note

The device needs to be rebooted for the change of the <Mode> setting in **AT+GTIGM** to take effect.

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 CAN (CANBUS Setting)

The command **AT+GTCAN** is used to set the CANBUS device configuration for reporting CANBUS device information in **CAN** (ASCII)/(HEX), which includes VIN, vehicle speed, engine speed, engine coolant temperature and other information.

Example: AT+GTCAN=gv50ceu,1,30,60,C00FFFFF,0,,001FFFFF,0,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	CAN	CAN
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Mode	1	0 | 1	0
	CAN Report Interval	<=5	0 | 5 - 86400(s)	0

Parts	Fields	Length	Range/Format	Default
	CAN Report Interval IGF	<=5	0 | 5 - 86400(s)	0
	CAN Report Mask	<=8	0 - FFFFFFFF	C00FFFFF
	Additional Event Mask	<=2	0 - 1	0
	Reserved	0		
	CAN Report Expansion Mask	<=8	0 - FFFFFFFF	1FFFFF
	GNSS Assisted 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 "gv50ceu".

✧ *Mode*

The working mode of this function.

- **0** - Disable this function.
- **1** - Enable the CAN chip. In this mode, only CANBUS device information will be reported.

✧ *CAN Report Interval*

The interval for sending the message **+RESP:GTCAN** to the backend server when the ignition is on. 0 means "Do not report the message **+RESP:GTCAN**".

✧ *CAN Report Interval IGF*

The interval for sending the message **+RESP:GTCAN** to the backend server when the ignition is off. 0 means "Do not report the message **+RESP:GTCAN**".

✧ *Additional Event Mask*

A bitwise numeral to control whether to send the message **+RESP:GTCAN** by additional event mask. 0 means "Ignore all additional events".

- **Bit 0** - By ignition on/off event.

✧ *CAN Report Mask*

Bitwise mask to configure the composition of CAN report message.

Note

Bit 31 (for <GSM Information>) and Bit 30 (for <GNSS Information>) of the <CAN Report Mask> only control the composition of **+RESP:GTCAN** in (ASCII) format.

<+CAN Mask> in (AT+GTHRM) controls the GSM and GNSS information in HEX format **+RESP:GTCAN**.

Bit 22 of this parameter only controls <Total Distance Impulses> in HEX format **+RESP:GTCAN**.

Bit	Item	Description
Bit 31	<GSM Information>	Including <MCC>, <MNC>, <LAC>, <Cell ID> and <Reserved>.

Bit	Item	Description
Bit 30	<GNSS Information>	Including <GNSS Accuracy>, <Speed>, <Azimuth>, <Altitude>, <Longitude>, <Latitude>, <GNSS UTC Time>.
Bit 29	<CAN Report Expansion Mask>	If this bit is set to 1, the parameter <CAN Report Expansion Mask> in **AT+GTCAN** is valid. If this bit is set to 0, the parameter <CAN Report Expansion Mask> in **AT+GTCAN** is invalid.
Bit 28	Reserved	
Bit 27	Reserved	
Bit 26	Reserved	
Bit 25	Reserved	
Bit 24	Reserved	
Bit 23	Reserved	
Bit 22	<Total Distance Impulses>	Vehicle total distance measured in Impulses if distance from dashboard is not available.
Bit 21	<Total Vehicle Engine Overspeed Time>	The total time when the vehicle engine speed is greater than the limit defined in CAN100 configuration.
Bit 20	<Total Vehicle Overspeed Time>	The total time when the vehicle speed is greater than the limit defined in CAN100 configuration.
Bit 19	<Doors>	An 8-bit hexadecimal number. Each bit contains information of one door.
Bit 18	<Lights>	An 8-bit hexadecimal number. Each bit contains information of one light.
Bit 17	<Detailed Information/Indicators>	A hexadecimal number. Each bit indicates information of one indicator.
Bit 16	<Tachograph Information>	Two bytes. The higher byte describes driver 2 (the one whose card is inserted in tachograph slot 2), and the lower byte describes driver 1.
Bit 15	<Axle Weight 2nd>	Weight of vehicle's second axle.
Bit 14	<Total Idle Fuel Used>	Number of liters of fuel used since vehicle manufacture or device installation. Total idle fuel or energy used - with vehicle speed 0 km/h.
Bit 13	<Total Engine Idle Time>	Time of engine running during idle state since vehicle manufacture or device installation.

Bit	Item	Description
Bit 12	<Total Driving Time>	Time of engine running during driving (non-zero speed) since vehicle manufacture or device installation.
Bit 11	<Total Engine Hours>	Time of engine running since vehicle manufacture or device installation.
Bit 10	<Accelerator Pedal Pressure>	The pressure applied on acceleration pedal.
Bit 9	<Range>	The number of kilometers to drive on remaining fuel.
Bit 8	<Fuel Level>	The level of fuel in vehicle's tank (in liter or percentage).
Bit 7	<Fuel Consumption>	The fuel consumption of the engine.
Bit 6	<Engine Coolant Temperature>	The temperature of the engine coolant.
Bit 5	<Engine RPM>	Revolutions per minute of the engine.
Bit 4	<Vehicle Speed>	The speed of vehicle.
Bit 3	<Total Fuel Used>	The number of liters of fuel used since vehicle manufacture or device installation. Total fuel or energy used - read from vehicle.
Bit 2	<Total Distance>	Vehicle total distance.
Bit 1	<Ignition Key>	Ignition status.
Bit 0	<VIN>	Vehicle identification number.

- *CAN Report Expansion Mask*

  Bitwise mask to configure the composition of expanded CANBUS information of the **+RESP:GTCAN** message.

Bit	Item	Description
Bit 31	Reserved	
Bit 30	Reserved	
Bit 29	Reserved	
Bit 28	Reserved	
Bit 27	Reserved	
Bit 26	Reserved	
Bit 25	Reserved	
Bit 24	Reserved	
Bit 23	<Engine Torque>	The engine torque. Unit: Percentage.

Bit	Item	Description
Bit 22	<Rapid Accelerations>	The number of total rapid accelerations since installation and it is calculated based on CAN100 settings of speed increase time and value.
Bit 21	<Rapid Brakings>	The number of total rapid brakings since installation and it is calculated based on CAN100 settings of speed decrease time and value.
Bit 20	<Expansion Information>	A hexadecimal number. Each bit represents the information of one indicator.
Bit 19	<Registration Number>	The vehicle registration number
Bit 18	<Tachograph Driver 2 Name>	The name of tachograph driver 2
Bit 17	<Tachograph Driver 1 Name>	The name of tachograph driver 1
Bit 16	<Tachograph Driver 2 Card Number>	The card number of tachograph driver 2
Bit 15	<Tachograph Driver 1 Card Number>	The card number of tachograph driver 1
Bit 14	<Total Brake Applications>	Count of applying brake pedal (braking process initiated by brake pedal)
Bit 13	<Total Accelerator Kick-down Time>	Total time when accelerator pedal is pressed over 90%
Bit 12	<Total Cruise Control Time>	Total time when the vehicle speed is controlled by cruise-control module
Bit 11	<Total Effective Engine Speed Time>	Total time when the vehicle engine speed is effective
Bit 10	<Total Accelerator Kick-downs>	Count of accelerator pedal kick-downs (with the pedal pressed over 90%)
Bit 9	<Pedal Braking Factor>	It measures how often the driver brakes with brake pedal or engine and stores both counts, which are always increasing. Decreasing speed with brake pedal pressed causes increase of pedal braking factor.
Bit 8	<Engine Braking Factor>	It measures how often the driver brakes with brake pedal or engine and stores both counts, which are always increasing. Decreasing speed with no pedal pressed causes increase of engine braking factor.
Bit 7	<Analog Input Value>	Analog input value

Bit	Item	Description
Bit 6	<Tachograph Driving Direction>	Vehicle driving direction from tachograph
Bit 5	<Tachograph Vehicle Motion Signal>	Vehicle motion signal from tachograph
Bit 4	<Tachograph Overspeed Signal>	Tachograph overspeed signal for the vehicle
Bit 3	<Axle Weight 4th>	Weight of vehicle's fourth axle
Bit 2	<Axle Weight 3rd>	Weight of vehicle's third axle
Bit 1	<Axle Weight 1st>	Weight of vehicle's first axle
Bit 0	<Ad-Blue Level>	The level of Ad-Blue

✧ *GNSS Assisted Mode*

It specifies whether to use GNSS to calculate total distance when the communication between the device and CAN100 is abnormal.

- **0** - Disable.
- **1** - Enable. When the communication between the device and CAN100 is abnormal, the device will use GNSS to calculate total distance and report <Total Distance> in **+RESP:GTCAN**. This parameter works only when the unit of total distance is hectometer.

3.7.2 CLT (Canbus Alarm Setting)

The command **AT+GTCLT** is used to set alarm threshold of CANBUS data. It supports a maximum of 20 CANBUS alarm groups. Each CAN alarm trigger condition consists of <Alarm Mask 1>, <Alarm Mask 2> and <Alarm Mask 3>.

For the CAN alarm trigger event information, please refer to <Detailed Information / Indicators>, <Lights>, <Doors> and <Engine RPM> of the message CAN(ASCII)/(HEX). If <Alarm Mask 1>, <Alarm Mask 2> and <Alarm Mask 3> meet each trigger condition at the same time, and the trigger event duration time is longer than <Debounce Time>, the alarm message CLT(ASCII)/(HEX) will be sent.

Note

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

```
Example:
AT+GTCLT=gv50ceu,0,0,0,000FFFFF,0,0,0,30,8,001FFFFF,,60,15,0,0,0,0,,0006$
```

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

Parts	Fields	Length	Range/Format	Default
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Group ID	<=2	0 - 19	0
	Mode	1	0 | 1	0
	Debounce Time	<=3	0 - 255(x1s)	0
	CAN Data Mask	8	0 - FFFFFFFF	000FFFFF
	Alarm Mask 1	<=8	0 - FFFFFFFF	0
	Alarm Mask 2	<=8	0 - FFFFFFFF	0
	Alarm Mask 3	<=8	0 - FFFFFFFF	0
	High RPM Threshold	<=3	1 - 100(x100 rpm)	30
	Low RPM Threshold	<=3	0 - 99(x100 rpm)	8
	CAN Report Expansion Mask	<=8	0 - FFFFFFFF	001FFFFF
	Reserved	0		
	Vehicle Speed High Threshold	<=4	1 - 455(km/h)	60
	Vehicle Speed Low Threshold	<=4	0 - 454(km/h)	15
	Output ID	1	0 - 1	0
	Output Status	1	0 - 3	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	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 "gv50ceu".
- *Group ID*

  The ID of the CANBUS alarm group. A total of 20 groups are supported.
- *Mode*

  The CANBUS alarm working mode for each group.
  - **0** - Disable the CAN alarm function.
  - **1** - Enable the CAN alarm function.
- *Debounce Time*

  The time for CANBUS alarm trigger event debouncing.
- *CAN Data Mask*

  Bitwise mask to configure the CAN data composition of the **+RESP:GTCLT** message. <CAN Data Mask> only works in **CLT** (ASCII) message.

Bit	Item	Description
Bit 31	Reserved	
Bit 30	Reserved	
Bit 29	<CAN Report Expansion Mask>	If this bit is set to 1, the parameter <CAN Report Expansion Mask> in **AT+GTCLT** is valid. If this bit is set to 0, the parameter <CAN Report Expansion Mask> in **AT+GTCLT** is invalid.
Bit 28	Reserved	
Bit 22	<Total Distance Impulses>	Vehicle total distance measured in impulses if distance from dashboard is not available.
Bit 21	<Total Vehicle Engine Overspeed Time>	The total time when the vehicle engine speed is greater than the limit defined in CAN100 configuration.
Bit 20	<Total Vehicle Overspeed Time>	The total time when the vehicle speed is greater than the limit defined in CAN100 configuration.
Bit 19	<Doors>	An 8-bit hexadecimal number. Each bit contains information of one door.
Bit 18	<Lights>	An 8-bit hexadecimal number. Each bit contains information of a light.
Bit 17	<Detailed Information/Indicators>	A hexadecimal number. Each bit contains information of one indicator.
Bit 16	<Tachograph Information>	Two bytes. The higher byte describes driver 2 (the one whose card is inserted in tachograph slot 2), and the lower byte describes driver 1.
Bit 15	<Axle Weight 2nd>	Weight of vehicle's second axle
Bit 14	<Total Idle Fuel Used>	Number of liters of fuel used since vehicle manufacture or device installation
Bit 13	<Total Engine Idle Time>	Time of engine running during idling status (vehicle at a standstill) since vehicle manufacture or device installation

Bit	Item	Description
Bit 12	<Total Driving Time>	Time of engine running during driving (non-zero speed) since vehicle manufacture or device installation
Bit 11	<Total Engine Hours>	Time of engine running since vehicle manufacture or device installation
Bit 10	<Accelerator Pedal Pressure>	The pressure applied on acceleration pedal
Bit 9	<Range>	The number of kilometers to drive on remaining fuel
Bit 8	<Fuel Level>	The level of fuel in vehicle's tank in liters or percentage.
Bit 7	<Fuel Consumption>	The fuel consumption of the engine
Bit 6	<Engine Coolant Temperature>	The temperature of the engine coolant
Bit 5	<Engine RPM>	Revolutions per minute of the engine
Bit 4	<Vehicle Speed>	Vehicle road speed
Bit 3	<Total Fuel Used>	The number of liters of fuel used since vehicle manufacture or device installation
Bit 2	<Total Distance>	Vehicle total distance
Bit 1	<Ignition Key>	Ignition state
Bit 0	<VIN>	Vehicle identification number

✧ *Alarm Mask 1*

Bitwise setting of the alarm mask. The alarm mask information is based on <Detailed Information / Indicators> and <Expansion Information> of the **+RESP:GTCAN** message.

Bit	Alarm Mask 1
Bit 31	Reserved
Bit 30	Reserved
Bit 28	OLL - oil level low indicator (1 - on, 0 - off or not available)
Bit 27	SC - service call indicator (1 - on, 0 - off or not available)
Bit 26	AIR - airbags indicator (1 - on, 0 - off or not available)
Bit 25	CHK - "check engine" indicator (1 - on, 0 - off or not available)
Bit 23	ABS - ABS failure indicator (1 - on, 0 - off or not available)

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

- *Alarm Mask 2*

  Bitwise setting of the alarm mask. The alarm mask information is based on <Lights> and <Doors> of the **+RESP:GTCAN** message.

Bit	Alarm Mask 2
Bit 31	Reserved
Bit 30	Reserved
Bit 29	Reserved
Bit 28	Reserved
Bit 27	Reserved

Bit	Alarm Mask 2
Bit 26	Reserved
Bit 25	Reserved
Bit 24	Reserved
Bit 23	Reserved
Bit 22	Reserved
Bit 21	Hood (1 - open, 0 - closed)
Bit 20	Trunk (1 - open, 0 - closed)
Bit 19	Rear Right Door (1 - open, 0 - closed)
Bit 18	Rear Left Door (1 - open, 0 - closed)
Bit 17	Passenger Door (1 - open, 0 - closed)
Bit 16	Driver Door (1 - open, 0 - closed)
Bit 15	Reserved
Bit 14	Reserved
Bit 13	Reserved
Bit 12	Reserved
Bit 11	Reserved
Bit 10	Reserved
Bit 9	Reserved
Bit 8	Reserved
Bit 7	Reserved
Bit 6	Reserved
Bit 5	Hazard Lights (1 - on, 0 - off)
Bit 4	Rear Fog Light (1 - on, 0 - off)
Bit 3	Front Fog Light (1 - on, 0 - off)
Bit 2	High Beam (1 - on, 0 - off)
Bit 1	Low Beam (1 - on, 0 - off)
Bit 0	Running Lights (1 - on, 0 - off)

✧ *Alarm Mask 3*

Bitwise setting of the alarm mask. The alarm mask information is based on <Engine RPM> of the **+RESP:GTCAN** message.

Bit	Alarm Mask 3
Bit 31	Reserved
...	...
Bit 7	Over Vehicle Speed High Threshold Event (1 - Triggered, 0 - not triggered).
Bit 6	Under Vehicle Speed High Threshold Event (1 - Triggered, 0 - not triggered).

Bit	Alarm Mask 3
Bit 5	Over Vehicle Speed Low Threshold Event (1 - Triggered, 0 - not triggered).
Bit 4	Under Vehicle Speed Low Threshold Event (1 - Triggered, 0 - not triggered).
Bit 3	Over High RPM Event (1 - Triggered, 0 - not triggered).
Bit 2	Under High RPM Event (1 - Triggered, 0 - not triggered).
Bit 1	Over Low RPM Event (1 - Triggered, 0 - not triggered).
Bit 0	Under Low RPM Event (1 - Triggered, 0 - not triggered).

✧ *High RPM Threshold*

This is the threshold of the high engine RPM. If the current engine RPM is greater than <High RPM Threshold>, it will trigger over high RPM event.

✧ *Low RPM Threshold*

This is the threshold of the low engine RPM. If the current engine RPM is less than <Low RPM Threshold>, it will trigger under low RPM event.

✧ *CAN Report Expansion Mask*

Bitwise mask to configure the composition of CANBUS expansion information of the **+RESP:GTCLT** message.

Bit	Item	Description
Bit 31	Reserved	
Bit 30	Reserved	
Bit 29	Reserved	
Bit 27	Reserved	
Bit 26	Reserved	
Bit 23	<Engine Torque>	The engine torque. Unit: Percentage.
Bit 22	<Rapid Accelerations>	The number of total rapid accelerations since installation and it is calculated based on CAN100 settings of speed increase time and value.
Bit 21	<Rapid Brakings>	The number of total rapid brakings since installation and it is calculated based on CAN100 settings of speed decrease time and value.
Bit 20	<Expansion Information>	A hexadecimal number. Each bit represents information of one indicator.
Bit 19	<Registration Number>	The vehicle registration number

Bit	Item	Description
Bit 18	<Tachograph Driver 2 Name>	The name of tachograph driver 2
Bit 17	<Tachograph Driver 1 Name>	The name of tachograph driver 1
Bit 16	<Tachograph Driver 2 Card Number>	The card number of tachograph driver 2
Bit 15	<Tachograph Driver 1 Card Number>	The card number of tachograph driver 1
Bit 14	<Total Brake Applications>	Count of applying brake pedal (braking process initiated by brake pedal)
Bit 13	<Total Accelerator Kick-down Time>	Total time when accelerator pedal is pressed over 90%
Bit 12	<Total Cruise Control Time>	Total time when the vehicle speed is controlled by cruise-control module
Bit 11	<Total Effective Engine Speed Time>	Total time when the vehicle engine speed is effective
Bit 10	<Total Accelerator Kick-downs>	Count of accelerator pedal kick-downs (with the pedal pressed over 90%)
Bit 9	<Pedal Braking Factor>	It measures how often the driver brakes with brake pedal or with engine and stores both counts (which are always increasing). Decreasing speed with brake pedal pressed causes increase of pedal braking factor.
Bit 8	<Engine Braking Factor>	It measures how often the driver brakes with brake pedal or with engine and stores both counts (which are always increasing). Decreasing speed with no pedal pressed causes increase of engine braking factor.
Bit 7	<Analog Input Value>	Analog input value
Bit 6	<Tachograph Driving Direction>	Vehicle driving direction from tachograph

Bit	Item	Description
Bit 5	<Tachograph Vehicle Motion Signal>	Vehicle motion signal from tachograph
Bit 4	<Tachograph Overspeed Signal>	Tachograph overspeed signal for the vehicle
Bit 3	<Axle Weight 4th>	Weight of vehicle's fourth axle
Bit 2	<Axle Weight 3rd>	Weight of vehicle's third axle
Bit 1	<Axle Weight 1st>	Weight of vehicle's first axle
Bit 0	<Ad-Blue Level>	The level of Ad-Blue

✧ *Vehicle Speed High Threshold*

This parameter is for high threshold of CANBUS speed alarm. If the current CANBUS speed is higher than or equal to the value of <Vehicle Speed High Threshold> and last for <Debounce Time>, it will trigger Over Vehicle Speed High Threshold Event. On the contrary, if the current CANBUS speed is lower than <Vehicle Speed High Threshold> and last for <Debounce Time>, it will trigger Under Vehicle Speed High Threshold Event.

✧ *Vehicle Speed Low Threshold*

This parameter is for low threshold of CANBUS speed alarm. If the current CANBUS speed is higher than or equal to the value of <Vehicle Speed Low Threshold> and last for <Debounce Time>, it will trigger Over Vehicle Speed Low Threshold Event. On the contrary, if the current CANBUS speed is lower than <Vehicle Speed Low Threshold> and last for <Debounce Time>, it will trigger Under Vehicle Speed Low Threshold Event.

3.7.3 CFU (CAN100 FOTA Upgrade)

The command **AT+GTCFU** is used to upgrade the firmware of CAN100 over the air.

Example: AT+GTCFU=gv50ceu,0,10,0,name,pw,http://220.178.67.210:8208/GV50CEU/deltabin/csb_des_07_build1116.bin,0,0,,,0001$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	CFU	CFU
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
Body	Retry Times	1	0 - 3	0
	Timeout	2	10 - 30(min)	10
	Protocol Type	1	0	0
	Server User Name	<=6	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'	

Parts	Fields	Length	Range/Format	Default
	Server Password	<=6	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'	
	Server URL	100	Legal URL	
	Update Type	1	0 | 1	0
	Mode	<=1	0 | 1	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 "gv50ceu".

✧ *Retry Times*

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

✧ *Timeout*

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

✧ *Protocol Type*

The protocol used to download the package.

- **0** - HTTP. Only HTTP is supported now.

✧ *Server User Name*

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

✧ *Server Password*

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

✧ *Server URL*

It specifies the URL to download the package.

✧ *Mode*

It indicates whether to cancel the CAN100 upgrade process.

- **0 or empty** - Start the CAN100 upgrade process.
- **1** - Cancel CAN100 upgrade process.

✧ *Update Type*

It specifies the type of CAN100 update over the air.

- **0** - CAN100 firmware update.
- **1** - CAN100 configuration update.

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=gv50ceu,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'	gv50ceu
Body	Configuration Name	<=40	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'	
	Configuration Version	4	0000 - 9999	
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Digital Signature	32	'0'-'9' 'a'-'z' 'A'-'Z'	
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Generation Time	14	YYYYMMDDHHMMSS	
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 "gv50ceu".

✧ *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=gv50ceu,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
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv50ceu
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	00000000
	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 "gv50ceu".

✧ *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=gv50ceu,0,0,20,0,,,http://60.174.225.173:10050/GV50CEU/deltabin/GV50CEU_00307_00307.bin,,0,0,,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'	gv50ceu
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 "gv50ceu".

✧ *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=gv50ceu,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'	gv50ceu
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

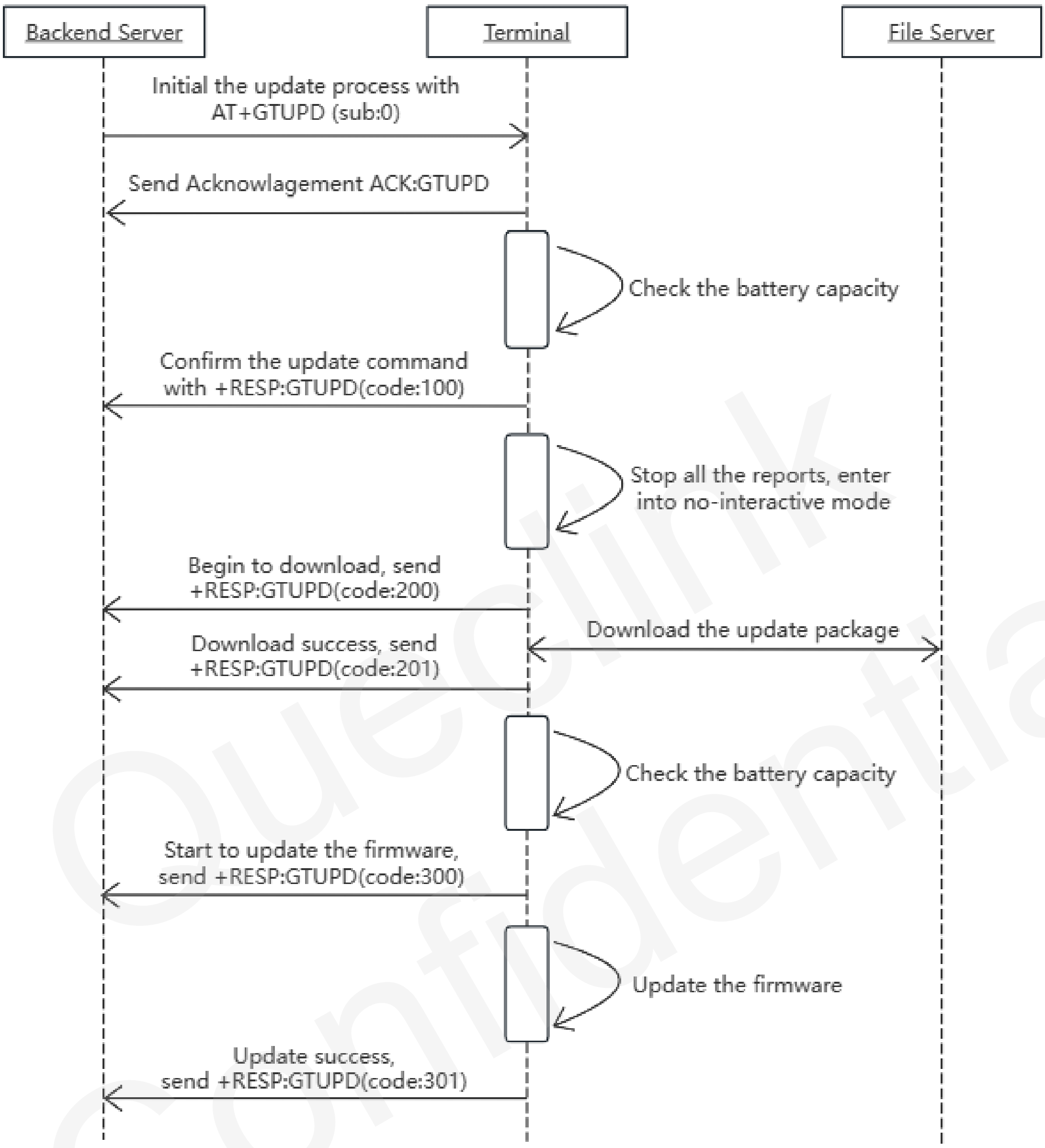
If the update command is confirmed, the device will use the information sent by the backend server to download the update package. If the download fails, the device will retry the specified times. If all attempts fail, the update process is aborted and the device will automatically reboot to go back 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=gv50ceu,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'	gv50ceu
Body	Sub Command	<=2	0-E | 10 | 12 | 13 | 1C | 22 | 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 "gv50ceu".

✧ *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 | 1 | 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		

Parameter	Length	Range/Format	Default
Output Direction	1	0 | 1 | 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	3 - 79	SRI	
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		

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

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

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

✧ **A** - IOS. Get status of all the IO ports via the message **IOS**(ASCII)/(HEX).

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

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

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

- **10** - CAN. Get CAN information via the message **CAN**(ASCII)/(HEX).

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

✧ **12** - CVN. Get the version number information of CAN100 via the message **CVN**(ASCII)/(HEX).

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

✧ **13** - CSN. Get the serial number information of CAN100 via the message **CSN**(ASCII)/(HEX). It works only when CAN is connected and the configuration is correct.

If CAN is connected by BLE, set the <Accessory Type> of (AT+GTBAS) to 4 and the <Accessory Model> to 0. The <Mode> of (AT+GTCAN) also needs to be set to 1.

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

✧ **22** - CAN100. Set car model for CAN100 or read car model from CAN100.

Parameter	Length	Range/Format	Default
CAN100 Operation Mode	1	0-2	
Output Direction|CAN100 Car Model ID	1 | 1-5	0 | 1 | 3 |1 - 65535	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 | 1 | 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=gv50ceu,2,FRI,,,,,0015$**, and get it via **ALM** (ASCII). To get more than one AT command configuration, the neighbouring commands are separated by the ASCII character ":".
  For example, to get configuration of the commands (AT+GTFRI), (AT+GTOWH), (AT+GTSRI), set **AT+GTRTO=gv50ceu,2,FRI:OWH:SRI,,,,,0015$**, 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=gv50ceu,4,FRI,,,,,000F$**. To reset more than one AT command configuration, the neighbouring commands are separated by the ASCII character ":".
For example, to reset configuration of the commands **AT+GTFRI**, **AT+GTOWH**, **AT+GTSRI**, send the command **AT+GTRTO=gv50ceu,4,FRI:OWH:SRI,,,,,0015$**. The buffered messages saved can be deleted with the command **AT+GTRTO=gv50ceu,4,BUF,,,,,000F$**.
The mileage value saved during <GNSS assisted mode> enabling can be reset with the command **AT+GTRTO=gv50ceu,4,DST,,,,,000F$**.
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.

✧ *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) / **ASV** (ASCII)/ (HEX).

Bit	Message Name	Description
Bit 3	+RESP:GTASV	Report Galileo satellite information
Bit 2	+RESP:GTBSV	Report Beidou satellite information
Bit 1	+RESP:GTRSV	Report GLONASS satellite information
Bit 0	+RESP:GTGSV	Report GPS satellite information

✧ *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

Mask Bit	Item
Bit 19	Sensor ID
Bit 20	Modem IMEI
Bit 21 - Bit 31	Reserved

✧ *CAN100 Operation Mode*

If the sub command is **22**, this parameter will work as follows.

- **0** - Read the current car model and report it via the message **CML** (ASCII)/(HEX).
- **1** - Set car model. Please use the <CAN100 Car Model ID> parameter to set car model.
- **2** - Start CAN100 automatic synchronization. The synchronization result is reported via the **+RESP:GTCML** message.

Note

The entire synchronization takes about 10-40s, and CAN100 will restart immediately after the end of the synchronization regardless of the result. If automatic sync is enabled, please wait for the synchronization to finish before reading the current car model. If automatic synchronization has not ended, the subsequent synchronization command will be ignored.

✧ *CAN100 Car Model ID*

It works only when the sub command is **22** and the <CAN100 Operation Mode> is set to **1**. This parameter value should be car model ID described in supported car model list.

✧ *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.
- **1** - The message will be output to the main serial port.
- **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 RTP (Remote File Transfer)

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

Example:
AT+GTRTP=gv50ceu,0,0,0,http://60.174.225.173:20581/GV50CEU/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'	gv50ceu
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 "gv50ceu".

✧ *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.

3.9.3 LTP (Local File Transfer)

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

Example: AT+GTLTP=gv50ceu,,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'	gv50ceu
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 "gv50ceu".

✧ *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,80200F0100,864292043426376,,0000,20200613114927,FFFF$

+ACK:GTXXX,80200F0100,864292043426376,,0000,20200613114927,FFFF$

The Option field is included.

+ACK:GTGEO,80200F0100,135790246811220,GV50CEU,0,000A,20090214093254,11F0$

+ACK:GTPEO,80200F0100,135790246811220,GV50CEU,0,000B,20090214093254,11F0$

+ACK:GTIOB,80200F0100,135790246811220,GV50CEU,0,0006,20090214093254,11F0$

+ACK:GTCLT,80200F0100,135790246811220,GV50CEU,0,000D,20090214093254,FFFF$

+ACK:GTCMD,80200F0100,135790246811220,GV50CEU,0,0005,20100310172830,11F0$

+ACK:GTUDF,80200F0100,135790246811220,GV50CEU,0,0005,20100310172830,11F0$

+ACK:GTBAS,80200F0100,135790246811220,GV50CEU,0,0005,20090214093254,11F0$

+ACK:GTRTO,80200F0100,135790246811220,GV50CEU,GPS,0015,20090214093254,11F1$

+ACK:GTACJ,80200F0100,867488060673356,,1,0001,20240306034500,0021$

+ACK:GTACJ,80200F0100,867488060673356,,0,0001,20240306034500,0021$

+ACK:GTACJ,80200F0100,867488060673356,,2,0001,20240306034500,0021$

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
	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, 80200F means GV50CEU. 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+GTPEO** - This field represents the PEO command ID.

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

- **AT+GTIOB** - This field represents the IOB command ID.

Parts	Fields	Length	Range/Format
Body	IOB ID	1	0 - 3

- **AT+GTCLT** - This field represents the CLT group ID.

Parts	Fields	Length	Range/Format
Body	Group 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+GTRTO** - This field represents the RTO sub-command ID.

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

- **Anti-Carjacking Configure Command**

Parts	Fields	Length	Range/Format
Body	Working Mode	1	0 | 1 | 2

- **Anti-Carjacking Release Command**

Parts	Fields	Length	Range/Format
Body	Working Mode	1	0

- **Anti-Carjacking Query Command**

Parts	Fields	Length	Range/Format
Body	Working Mode	1	2

- 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.
- **DIS** (Digital Input Alarm)
  If the status change of digital inputs is detected, the device will send the message **+RESP:GTDIS** to the backend server.
- **IOB** (IO Ports Bind Alarm)
  If the IO combination is set and the corresponding condition is met, the device will report the message **+RESP:GTIOB** to the backend server.
- **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 .
- **SOS** (Digital Input Port Triggers SOS)
  If the SOS function is enabled, the device will send the message **+RESP:GTSOS** to the backend server when the corresponding digital input port triggers SOS.
- **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**.
- **IGL** (Ignition Location Information)
  The location message **+RESP:GTIGL** for ignition on/off.
- **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,80200F0100,867488060596284,GV50CEU,,00,1,3,0.0,0,180.6,117.129144,31.8388
61,20230524034505,0460,0001,DF5C,027A4F1F,01,7,0.2,20230524034505,01B8$

+RESP:GTDIS,80200F0100,867488060596284,GV50CEU,,60,1,1,0.0,0,138.5,117.129051,31.83978
6,20230519083404,0460,0001,DF5C,05FE6667,01,7,0.0,20230519083405,04BD$

+RESP:GTIOB,80200F0100,867488060596284,GV50CEU,,10,1,1,0.0,182,85.3,117.129200,31.8391
63,20230523025618,0460,0001,DF5C,05FE6667,01,2,0.4,20230522192619,0218$
```

+RESP:GTSPD,80200F0100,867488060596284,GV50CEU,,00,1,1,0.4,0,220.2,117.129759,31.839433,20230523062932,0460,0001,DF5C,027A4F1F,01,4,0.0,20230523160033,0B6A$

+RESP:GTSOS,80200F0100,867488060596284,GV50CEU,,60,1,0,0.0,351,67.3,117.129029,31.840100,20230524034859,0460,0001,DF5C,05FE6667,01,2,0.0,20230524035256,01D2$

+RESP:GTRTL,80200F0100,135790246811220,GV50CEU,,00,1,1,4.3,92,70.0,121.354335,31.222073,20230214013254,0460,0000,18d8,6141,01,4,2000.0,20230214093254,11F0$

+RESP:GTDOG,80200F0100,867488060596284,GV50CEU,,63,1,2,0.0,171,104.6,117.129097,31.839252,20230524035637,0460,0001,DF5C,05FE6667,01,10,0.3,20230524035638,01E5$

+RESP:GTIGL,80200F0100,867488060596284,GV50CEU,,01,1,1,0.0,0,48.6,117.129292,31.839412,20230524035846,0460,0001,DF5C,05FE6667,01,10,0.4,20230524035847,0201$

+RESP:GTVGL,80200F0100,867488060596284,GV50CEU,,50,1,1,0.0,0,81.6,117.129297,31.839118,20230519072153,0460,0001,DF5C,05FE6667,01,3,0.7,20230519072154,03B9$

+RESP:GTHBM,80200F0100,867488060596045,GV50CEU,,21,1,1,68.1,106,52.6,117.210049,31.821433,20230519080002,0460,0001,DF4E,05A27415,01,4,148.8,20230519160003,0B97$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	TOW | DIS | IOB | SPD | SOS | RTL | DOG | IGL | 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 - 4 | 6 - 8)Y(0 - 6)
	Number	1	1
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)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
	GNSS Satellite Number (Optional)	<=2	0 - 24
	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 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 ID of digital input port which triggers the report message **+RESP:GTDIS** and **+RESP:GTSOS**.
- The ID of the bound IO which triggers the report message **+RESP:GTIOB**.
- The ID of the digital input port which triggers the reboot message **+RESP:GTDOG**.
- 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**.
- For other messages, it will always be 0.

Report type has different meanings in different messages as follows:

- In the **+RESP:GTDIS** report message generated by the digital input
  – 0 - The current logic status of the input port is "Inactive status".
  – 1 - The current logic status of the input is "Active status".
- In the **+RESP:GTIOB** report message generated by bound IO
  – 0 - The current logic status of the bound IO does not meet the alarm condition.
  – 1 - The current logic status of the bound IO meets the alarm condition.
- In the speed alarm message **+RESP:GTSPD**
  – 0 - Outside the predefined speed range
  – 1 - 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 - Reboot device message for input triggered reboot
  – 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
- In the (virtual) ignition on/off message **+RESP:GTIGL/+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>.

✧ *GNSS Satellite Number*

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

✧ *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,80200F0100,864696060004173,GV50CEU,11985,10,1,1,0.0,0,118.5,117.129306,31.839197,20230808033438,0460,0001,DF5C,05FE6667,03,15,0,123.5,00123:04:44,11703,,,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 - 99999 (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
	GNSS Satellite Number (Optional)	<=2	0 - 24
	GNSS Trigger Type(Optional)	1	0-4

Parts	Fields	Length	Range/Format
	Mileage	<=9	0.0 - 4294967.0 (km)
	Hour Meter Count	11-13	00000:00:00-1193000:00:00
	Analog Input 1	<=5	0 - 16000(mV)
	Reserved	0	
	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.

✧ *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)

✧ *Position Append Mask*

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

✧ *GNSS Satellite Number*

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

✧ *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 middle two bytes indicate the input status, and the last two bytes indicate the output 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.

The input status: A bitwise hex integer to represent the logic status of digital input. The low

bit represents the ignition detection input and the high bit represents the digital input.
The output status: A bitwise hex integer to represent the logic status of digital output. The low bit represents digital output.

Mask Bit	Item
Bit 16-23	Motion status of the device
...	Reserved
Bit 14	Digital input 6
Bit 9	Digital input 1
Bit 8	Ignition detection
...	Reserved
Bit 0	Digital output 1

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,80200F0100,864696060004173,GV50CEU,00000100,,10,1,1,0.0,0,115.8,117.129356,31.839248,20230808061540,0460,0001,DF5C,05FE6667,03,15,1,4.0,0000102:34:33,9996,,,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 - 99999(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)

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
	GNSS Satellite Number (Optional)	<=2	0 - 24
	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
	Analog Input 1	<=5	0 - 16000(mV)
	Reserved	0	
	Reserved	0	
	Backup Battery Percentage	<=3	0 - 100
	Device Status	6	000000 - FFFFFF
	Reserved	0	
	CAN Data (Optional)	<=1000	
	Bluetooth Accessory Data (Optional)		
	RAT and Band data (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>.

✧ *GNSS Satellite Number*

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

✧ *CAN Data*

If Bit 2 of <ERI Mask> in (AT+GTFRI) is set to 1, the data got from CAN device will be displayed.

✧ *Bluetooth Accessory Data(Optional)*

Fields	Length	Range/Format
Bluetooth Accessory Number	<=2	0 - 10

Fields	Length	Range/Format
Index	2	00 - 09
Accessory Type	<=2	0-2 | 4 | 6 | 7 | 10-14
Accessory Model	1	0-5
Raw Data(Optional)	<=18	
Accessory Append Mask	<=4	0 - FFFF
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(Centigrade)
Accessory Humidity(Optional)	<=3	0 - 100%(rh)
Accessory Mode(Optional)	<=2	0 - 10
Accessory Event(Optional)	1	0 - 2
Tire pressure(Optional)	<=3	0 - 500(kPa)
Timestamp(Optional)	14	YYYYMMDDHHMMSS
Enhanced Temperature(Optional)	<=5	-40.00 - 80.00 (Centigrade)
Magnet ID(Optional)	2	00 - FF
MAG Event Counter(Optional)	<=5	0 - 32767
Magnet State(Optional)	1	0 - 1
Accessory Battery Percentage(Optional)	<=3	0 - 100(%)
Relay state(Optional)	1	0 - 1

✧ *Bluetooth Accessory Number*

It indicates the number of Bluetooth accessories connected with the device.

✧ *Index*

The Index of the Bluetooth accessory.

✧ *Accessory Type*

The type of the Bluetooth accessory.

✧ *Accessory Model*

The model of the Bluetooth accessory.

✧ *Raw Data*

The 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.

- **Fuel sensor**

It is a decimal value which indicates the fuel level.
For Mechatronics fuel sensor, if <Fuel Level Format> is set to 0, it indicates the original value of fuel level.
If <Fuel Level Format> is set to 1, it indicates the percentage of fuel level and the value starts with character "F" ("FXX").

- **TEMP ELA**

It is a two-byte hexadecimal Temperature value.

- **Escort Angle Sensor**

It is a four-byte hexadecimal value.
The first byte of the higher 2 bytes in the hexadecimal value is reserved, which is 00.
The second byte of the higher 2 bytes indicates Event Notification of Angle sensor.
And the lower 2 bytes of the hexadecimal value indicate Tilt Angle of sensor.

Fields	Length	Range/Format
Reserved	1	00
Event Notification	1	00 - FF
Tilt Angle	2	0000 - FFFF

- **Mechatronics Angle Sensor**

It is an eight-byte hexadecimal value.

Fields	Length	Range/Format
Reserved	1	00
X-plane angle	1	-90 - 90
Y-plane angle	1	-90 - 90
Z-plane angle	1	-90 - 90
Sensor status	1	0 - FF
Single events	2	0 - FFFF
Complex events	2	0 - FFFF

- **RHT ELA**

It is a four-byte hexadecimal value. The lower 2 bytes of the hexadecimal value indicate temperature, the higher 2 bytes indicate humidity.

- **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.

- **MAG ELA**

  It is a four-byte hexadecimal value. The lower 2 bytes of the hexadecimal value indicate MAG data, the higher 2 bytes indicate MAG ID.
- **TR21**

  It is a four-byte hexadecimal value.
  From left to right, the first byte includes battery percentage.
  The second byte includes temperature value.
  The third byte includes unlocked state. For example, 0x75 means cap is unlocked, and 0x6c means cap is locked.
  The last byte includes the rotation state. For example, 0x72 means cap has been rotated recently, and 0x73 means cap is steady.

✧ *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 14	<Relay Data>	Including <Relay Config Result>, <Relay state>
Bit 13	<Accessory Battery Percentage>	Accessory Battery Percentage
Bit 12	<Magnet Data>	Including <Magnet ID>, <MAG Event Counter>, <Magnet State>
Bit 11	<Enhanced Temperature>	Enhanced temperature
Bit 10	<Timestamp>	Timestamp
Bit 9	<Tire pressure>	Tire pressure
Bit 8	<Accessory Event Notification Data>	Including <Accessory Mode>, <Accessory Event>
Bit 7	<Accessory Input Output Data>	Including <Accessory Output status>, <Accessory Digital Input status>, <Accessory Analog Input voltage>
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

Mask Bit	Item	Description
Bit 0	<Accessory Name>	Accessory Name

✧ *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.

✧ *Accessory Mode*

The working mode of Angle sensor.

✧ *Accessory Event*

The event is generated by the Angle sensor.

✧ *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.

✧ *Magnet ID*

ID corresponding to different magnet sensors.

✧ *MAG Event Counter*

The total number of times detected by the magnet sensor.

✧ *Magnet State*

The state of the two parts of the magnet sensor.

- **0** - Separate
- **1** - Closed

✧ *Accessory Battery Percentage*

Percentage of Bluetooth accessory's battery power.

✧ *Relay state*

The current state of the relay sensor.

✧ *RAT and Band data (Optional)*

Fields	Length	Range/Format
RAT	<=2	0-4

Fields	Length	Range/Format
Band	<=4	0-5 | 7 | 8 | 20 | 28 | 850 | 900 | 1800 | 1900

- *RAT*

  Radio Access Technology.
  - **0** - NO SERVICE mode
  - **1** - EGPRS mode
  - **2** - Reserved
  - **3** - Reserved
  - **4** - LTE Cat1 mode
- *Band*

  0 means invalid band, 1-5/7-8/20/28 means band number and others means GSM number.

Note

The word "Optional" means the item is controlled by the parameter <ERI Mask> of the (AT+GTFRI) command.

4.2.4 EPS | AIS

✧ +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.

✧ +RESP:GTAIS

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

```
Example:
+RESP:GTEPS,80200F0100,135790246811220,GV50CEU,13500,00,1,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,01,15,2000.0,20090214093254,11F0$

+RESP:GTAIS,80200F0100,135790246811220,GV50CEU,1980,11,1,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,01,15,2000.0,20090214093254,11F0$
```

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	EPS | AIS
	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	External Power Voltage/Analog Input VCC	<=5	0 - 99999(mV)|0 - 16000(mV)
	Report ID / Report Type	2	X(0 | 1)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 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
	Mileage	<=9	0.0 - 4294967.0 (km)
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *External Power Voltage / Analog Input VCC*

The value of the external power supply voltage or the analog input voltage.

When the voltage meets the alarm condition as set by the command (AT+GTEPS) or (AT+GTAIS), the device will send the current voltage with the **+RESP:GTEPS** or **+RESP:GTAIS** 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.
  - The ID of the analog input port which triggers the report message **+RESP:GTAIS**.
- 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,80200F0100,135790246811220,GV50CEU,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 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
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,80200F0100,864696060004173,GV50CEU,,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
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
	Mileage	<=9	0.0 - 4294967.0 (km)
Tail	Send Time	14	YYYYMMDDHHMMSS

Parts	Fields	Length	Range/Format
	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,80200F0100,866775051509693,GV50CEU,,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,80200F0100,866775051509693,GV50CEU,,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
	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		

Parts	Fields	Length	Range/Format
	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 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
	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	
Reserved	0	
Reserved	0	

✧ *Area Type*

This message is for polygon or circular area. 0 means "Polygon", and 1 means "Circular".

✧ *Area Mask*

For polygon area, it indicates the report message is for a single polygon or multiple polygons overlapping.

- **Bit 0** - For Polygon ID 0
- **Bit 1** - For Polygon ID 1
- ...
- **Bit 19** - For Polygon ID 19

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/PEO-ID0 and GEO-ID1/PEO-ID1 occur at the same time.

4.2.8 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:  GV50CEU
 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[0 - 50]
	GNSS UTC Time	20	DYYYY/MM/DDTHH:MM:SS
	Battery Percentage	<=4	B[0 - 100]
	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.

4.2.9 GSM(Cells Information)

The report for the information of the serving cell and the neighboring cells.

Example:
+RESP:GTGSM,80200F0100,867488060596284,FRI,0460,0001,DF5C,02A90902,38,,0460,0001,DF5C,0DD0833A,55,,0460,0011,691D,0690271C,52,,0460,0011,691D,0DE98A34,38,,0460,0011,691D,0DE98A34,27,,0460,0011,691D,0DE98A34,29,,0460,0001,DF5C,05FE6667,24,00,20230524054409,031B$

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	SOS | RTL | LBC | TOW | FRI | GIR | ERI |
	MCC1	4	0XXX
	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

Parts	Fields	Length	Range/Format
	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
	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.

- **SOS** - This cell information is for SOS 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.

✧ *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
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,80200F0100,867488060672457,GV50CEU,21,898602c9991730100452,13,0,1,1221 6,1,4.19,0,1,,,20231101101651,10,0,,,01,00,+0830,1,20231101194652,744A$

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
	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 - 99999(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
	Pin Mask	<=2	0 - FF
	Analog Input Voltage1	<=5	0 - 16000(mV)
	Reserved	0	
	Reserved	0	

Parts	Fields	Length	Range/Format
	Digital Input	<=4	00 - 42
	Digital Output	<=4	00 - 01
	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.
- *Pin Mask*

  The current working mode of pin.
- *Digital Input*

  A bitwise hex integer to represent the logic status of the digital input.
- *Digital Output*

  A bitwise hex integer to represent the logic status of the digital output.
- *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,80200F0100,135790246811220,GV50CEU,,,,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
	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,80200F0100,866775051629715,GV50CEU,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 - 25
	Current Packet	<=2	1 - 25
	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	\^
	...		
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,80200F0100,864696060004173,GV50CEU,89860118801541301090,202308101127
51,04EA$

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,80200F0100,135790246811220,GV50CEU,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,80200F0303,867488060672457,,80200F,030A,0201,20231101195345,7467$

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	80200F
	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,80200F0202,867488060596284,GV50CEU,1,9571,,3.86,1,1,20230524052049,028D $

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BAT
	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 - 99999(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 IOS(IO Status Information)

After the device receives the command (AT+GTRTO) to get the status of all the IO ports, it will send the status to the backend server via the message **+RESP:GTIOS**.

Example:
+RESP:GTIOS,80200F0100,135790246811220,GV50CEU,,15658,,,01,00,20090214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	IOS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Pin Mask	<=2	0 - FF
	Analog Input VCC1	<=5	0 - 16000(mV)
	Reserved	0	
	Reserved	0	
	Digital Input	<=4	00 - 42
	Digital Output	<=4	00 - 01
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.4.8 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,80200F0100,866775051508042,GV50CEU,+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

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

4.4.9 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,80200F0100,866775051629715,GV50CEU,cmnet,cmnet_name,cmnet_password,3gnet,3gnet_name,3gnet_password,898600e0123955608398,24,0,B7B1,10.57.5.91,211.138.180.4,211.138.180.5,1,,,,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
	Auto APN State	1	0-2
	Reserved	0	
	Reserved	0	

Parts	Fields	Length	Range/Format
	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.

✧ *Auto APN State*

The current state of getting APN automatically.

- **0** - The device cannot obtain the APN or the APN obtained cannot activate PDP context.
- **1** - The device has obtained the APN and the APN obtained has already activated PDP context.
- **2** - The device is using the APN set by the command (AT+GTBSI).

4.4.10 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,80200F0100,359464036001111,GV50CEU,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	,
	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.

4.4.11 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,80200F0100,867995030082104,GV50CEU,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
	...		
	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.

4.4.12 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,80200F0100,359464036001111,GV50CEU,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

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	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.

4.4.13 CVN(CAN Version Information)

After the device receives the command (AT+GTRTO) to get the version number of the CAN100, it will send the information to the backend server via the message **+RESP:GTCVN**.

Example: +RESP:GTCVN,80200F0100,869158008709145,GV50CEU,2.2.1d,,,,,20150323013841,2166$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	CVN
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	CAN100 SW Version	<=7	'0' - '9', 'a' - 'z', '.'
	Reserved	0	

Parts	Fields	Length	Range/Format
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *CAN100 SW Version*

The software version of the CAN100 device.

4.4.14 CSN(CAN Serial Number)

After the device receives the command (AT+GTRTO) to get the serial number of CAN100, it will send the information to the backend server via the message **+RESP:GTCSN**.

Example:
+RESP:GTCSN,80200F0100,865585040277810,GV50CEU,2100054,,,,,20200519065758,18EE$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	CSN
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	CAN100 Serial Number	<=10	'0' - '9', 'a' - 'z'
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *CAN100 Serial Number*

The serial number of the CAN100 device.

4.4.15 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,80200F0202,867488060672457,,00181031,020F,0201,0108,0101,A4,865585040669438,20231101195527,7470$

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.

4.4.16 CML(CAN100 Synchronization)

After the device receives the command (AT+GTRTO) to get the car model ID of the CAN100, it will send the information to the backend server via the message **+RESP:GTCML**.

Example: +RESP:GTCML,80200F0100,866775051508042,GV50CEU,1,Citroen Berlingo (08-),,,,,20220630054315,302D$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	CML
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	CAN100 Car Model ID	<=5	0-65535
	CAN100 Car Name	<=50	ASCII
	CAN100 Sync Status	1	0-4
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *CAN100 Car Model ID*

The car model ID of the CAN100 device. If the value is 0, it means that no model has been obtained.

✧ *CAN100 Car Name*

Car Name is human-readable make and model of the car. If this string value is equal to "sync", the queried <CAN100 Car Model ID> is the synchronized class ID.

✧ *CAN100 Sync Status*

- **0** - This parameter is currently unavailable.

- **1** - The synchronization is successful.
- **2** - CAN100 is not properly connected to the CAN-bus or ignition is switched off.
- **3** - The car is not supported by the firmware version of CAN100 or CAN-bus codes has not been recognized.
- **4** - CAN100 is not responding.

4.4.17 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,80200F0100,865585040006649,GV50CEU,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
	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.

4.4.18 ASV(Galileo Satellite Information)

After the device receives the command (AT+GTRTO) to get the Galileo satellite information, it will send the satellite information via the message **+RESP:GTASV** to the backend server.

Example:
+RESP:GTASV,80200F0100,359464036001111,GV50CEU,11,30,24,31,30,32,28,32,29,12,0,14,17,16,18,20,0,22,24,24,0,25,0,20120305101643,000F$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	ASV
	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

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

✧ *SV Count*

The count of satellites found by Galileo.

✧ *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.

4.5 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,80200F0100,135790246811220,GV50CEU,20230524052727,11F0$

+RESP:GTPFA,80200F0100,135790246811220,GV50CEU,20230524052727,11F0$

+RESP:GTPDP,80200F0100,135790246811220,GV50CEU,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 | DRM

- 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.
- DRM(Device Removal Report)

Example:

+RESP:GTMPN,80200F0100,867488060596284,GV50CEU,0,0.0,0,102.0,117.129386,31.839097,20230524052848,0460,0001,DF5C,05FE6667,01,15,20230524052849,02C8$

+RESP:GTMPF,80200F0100,867488060596284,GV50CEU,1,0.8,0,75.4,117.129447,31.839062,20230524052829,0460,0001,DF5C,05FE6667,01,15,20230524052831,02BF$

+RESP:GTBTC,80200F0100,867488060596284,GV50CEU,1,0.0,0,48.8,117.129191,31.839340,20230524051506,0460,0001,DF5C,05FE6667,01,13,20230524051507,0277$

+RESP:GTDRM,80200F0100,867488060596284,GV50CEU,1,0.2,0,98.3,117.129404,31.839095,20230524052844,0460,0001,DF5C,05FE6667,01,15,20230524052846,02C3$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	MPN | MPF | BTC | DRM
	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

Parts	Fields	Length	Range/Format
	Cell ID	4|8	XXXX/XXXXXXXX
	Position Append Mask	2	00 - 01
	GNSS Satellite Number(Optional)	<=2	0 - 24
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.5.3 JDR(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,80200F0100,867488060596250,GV50CEU,2,0,0.0,0,29.7,117.129806,31.838006,20230412075358,0460,0000,691D,6141,01,4,20230412075457,0214$

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' '-' '_'
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 - 01

Parts	Fields	Length	Range/Format
	GNSS Satellite Number (Optional)	<=2	0 - 24
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(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,80200F0100,867488060596250,GV50CEU,1,2,3,0.0,0,101.2,117.130039,31.838552,20230412060702,0460,0001,DF5C,05FE6667,01,4,20230412060703,016E$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	JDS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	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

Parts	Fields	Length	Range/Format
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
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,80200F0100,867488060596284,GV50CEU,,3,0.0,0,112.7,117.129268,31.838801,20230524023737,0460,0001,DF5C,027A4F1F,01,9,20230523190737,0131$

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

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 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.5.6 BPL(Backup Battery Low Alarm)

Example:
+RESP:GTBPL,80200F0100,867488060596722,GV50CEU,3.63,4,2.3,0,54.8,117.128785,31.839313,20230522052652,0460,0001,DF5C,027A4F1F,01,7,20230522052654,413B$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BPL
	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

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 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
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,80200F0100,867488060672457,GV50CEU,22,1,0.0,0,116.5,117.129398,31.839296,20231101103144,0460,0000,550B,B7B1,01,15,20231101200145,747E$

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' '-' '_'
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

Parts	Fields	Length	Range/Format
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
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 IGN(Ignition-on Report)

Example:
+RESP:GTIGN,80200F0100,867488060672457,GV50CEU,1,0,0.5,0,90.5,117.129276,31.839314,20231101103211,0460,0000,550B,B7B1,01,15,12345:12:34,0.0,20231101200211,7483$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	IGN
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Duration of Ignition Off	<=6	0 - 999999 (s)
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)

Parts	Fields	Length	Range/Format
	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 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
	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	$

✧ *Duration of Ignition Off*

The duration since last time the ignition is turned off. If it is greater than 999999 seconds, it will be reported as 999999 seconds.

✧ *Hour Meter Count*

If the hour meter count function is enabled by the command (AT+GTHMC),total hours the meter counts 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 VGN(Virtual Ignition-on Report)

Example: +RESP:GTVGN,80200F0100,867488060595385,GV50CEU,00,5,14653,4,2.1,0,38.1,117.129642,31.838044,20230524051923,0460,0000,550B,B7B1,01,7,12345:12:34,0.0,20230524051924,002E$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	VGN
	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	2	00
	Report Type	1	2 | 4 | 5 | 7
	Duration of Ignition Off|External Power Voltage	<=6 | <=5	0 - 999999(s)|0 - 99999(mV)
	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 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
	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)
- **5** - External power voltage event
- **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.

✧ *External Power Voltage*

The value of the external power voltage.

✧ *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 IGF(Ignition-off Report)

Example:
+RESP:GTIGF,80200F0100,867488060672457,GV50CEU,1081,1,3.4,0,90.5,117.129273,31.839318,20231101103210,0460,0000,550B,B7B1,01,15,00020:30:42,0.0,20231101200210,747F$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	IGF
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	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 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
	Hour Meter Count	11 - 13	00000:00:00-1193000:00:00
	Mileage	<=9	0.0 - 4294967.0 (km)

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

✧ *Duration of Ignition On*

The duration since last time the ignition is turned on. If it is greater than 999999 seconds, it will be reported as 999999 seconds.

✧ *Hour Meter Count*

If the hour meter count function is enabled by the command (AT+GTHMC), total hours the meter counts when 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.

4.5.11 VGF(Virtual Ignition-off Report)

Example:
+RESP:GTVGF,80200F0100,867488060595385,GV50CEU,00,5,10127,3,1.1,0,75.8,117.129668,31.838718,20230524052215,0460,0000,550B,B7B1,01,7,12345:12:34,0.0,20230524052216,0034$

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 | 5 | 7
	Duration of Ignition On|External Power Voltage	<=6 | <=5	0 - 999999(s)|0 - 99999(mV)
	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 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
	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	$

✧ *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.

✧ *External Power Voltage*

The value of the external power voltage.

✧ *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.

4.5.12 IDF(Exit Idle State)

Report when the vehicle exits the idle state.

Example: +RESP:GTIDF,80200F0100,867488060596284,GV50CEU,11,81,1,0.0,0,86.2,117.129261,31.839339,20230524054122,0460,0001,DF5C,05FE6667,01,15,0.0,20230524054123,0309$

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 | 16 | 22
	Duration of Idling Status	<=6	0 - 999999 (s)

Parts	Fields	Length	Range/Format
	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 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
	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.

4.5.13 GSS(GNSS Signal Status)

Example:
+RESP:GTGSS,80200F0100,867488060596284,GV50CEU,1,9,11,,3,0.0,0,89.2,117.129248,31.838906,20230524045125,0460,0001,DF5C,05FE6667,01,9,20230524045126,0240$

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' '-' '_'

Parts	Fields	Length	Range/Format
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
	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 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
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

✧ *GNSS Satellite Number*

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.

4.5.14 STR | STP | LSP | IDN

- STR: Enter Start State
- STP: Enter Stop State
- LSP: Enter Long Stop State
- IDN: Enter Idle State

Example:

+RESP:GTSTR,80200F0100,867488060596284,GV50CEU,,,1,1.8,0,81.2,117.129328,31.839300,20230524053825,0460,0001,DF5C,05FE6667,01,15,0.0,20230524053827,02F9$

+RESP:GTSTP,80200F0100,867488060596284,GV50CEU,,,1,0.0,0,90.4,117.129304,31.839352,20230524053856,0460,0001,DF5C,05FE6667,01,15,0.0,20230524053856,02FB$

+RESP:GTLSP,80200F0100,867488060596284,GV50CEU,,,1,0.0,0,86.2,117.129261,31.839339,20230524054055,0460,0001,DF5C,05FE6667,01,15,0.0,20230524054056,0306$

+RESP:GTIDN,80200F0100,135790246811220,GV50CEU,,,0,4.3,92,70.0,121.354335,31.222073,20230214013254,0460,0000,18d8,6141,01,7,2000.0,20230214093254,11F0$

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

Parts	Fields	Length	Range/Format
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
	Mileage	<=9	0.0 - 4294967.0 (km)
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.5.15 DOS(Wave Shape 1 Output Status)

Example:
+RESP:GTDOS,80200F0100,867488060673364,GV50CEU,1,2,1,0.0,0,99.8,117.129228,31.839323,
20230616080921,0460,0001,DF5C,05FE6667,05,1,220100,20230616080922,40CE$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	DOS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Wave1 Output ID	1	1
	Wave1 Output Active	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

Parts	Fields	Length	Range/Format
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Wave1 Output ID*

The ID of the wave shape 1 output.

✧ *Wave1 Output Active*

The status of wave shape 1 output. If it is 2, it means that it is currently in the status of gradual wave shape 1.

4.5.16 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,80200F0100,867488060596284,GV50CEU,3,0,2.0,0,180.6,117.129144,31.838861,
20230524032220,0460,0001,DF5C,027A4F1F,01,7,20230524032224,017D$
```

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

Parts	Fields	Length	Range/Format
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
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

4.5.17 CLT(CANBUS Information Alarm)

If the CANBUS Alarm report function is enabled by the command (AT+GTCLT), <Alarm Mask 1>, <Alarm Mask 2> and <Alarm Mask 3> meet each trigger condition at the same time, and the trigger event duration time is longer than <Debounce Time>, the **+RESP:GTCLT** alarm message will be sent.

Example:

```
+RESP:GTCLT,80200F0100,001068000000006,GV50CEU,13,1EFFFFFF,003F003F,00000008,,,203FF
FFF,,2,H1230,2.46,4000,10,77,,P97.60,,0,0.92,0.61,0.31,11.20,,,FFFF,3F,3F,0.08,0.00,00FFFFF
F,,,,,,,,,,0,,,0.00,1,,,,,,1FFF,0,0,,,,1,0.0,0,96.1,117.129138,31.839590,20230605062242,0460,0000,
550B,085BE2AA,00,20230605062243,1F43$
```

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	CLT
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Group ID	<=2	0 - 19
	Alarm Mask 1	<=8	0 - FFFFFFFF
	Alarm Mask 2	<=8	0 - FFFFFFFF

Parts	Fields	Length	Range/Format
	Alarm Mask 3	<=8	0 - FFFFFFFF
	Reserved	0	
	Reserved	0	
	CANBUS Data Mask	<=8	0 - FFFFFFFF
	VIN	17	'0' - '9' 'A' - 'Z' except 'I', 'O', 'Q'
	Ignition Key	1	0-2
	Total Distance	<=12	H(0 - 99999999)/I(0 - 2147483647)
	Total Fuel Used	<=9	0.00 - 999999.99(L)
	Engine RPM	<=5	0 - 16383(rpm)
	Vehicle Speed	<=4	0 - 455(km/h)
	Engine Coolant Temperature	<=4	-40 - +215 (Centigrade)
	Fuel Consumption	<=6	L/100km(0.0 - 999.9)|L/H(0.0 - 999.9)
	Fuel Level	<=8	L(0.00 - 9999.99)/P(0.00 - 100.00)
	Range	<=8	0 - 99999999
	Accelerator Pedal Pressure	<=3	0 - 100(%)
	Total Engine Hours	<=10	0.00 - 9999999.99(h)
	Total Driving Time	<=10	0.00 - 9999999.99(h)
	Total Engine Idle Time	<=10	0.00 - 9999999.99(h)
	Total Idle Fuel Used	<=9	0.00 - 999999.99(L)
	Axle Weight 2nd	<=5	0 - 65535(kg)
	Tachograph Information	<=4	00 - FFFF
	Detailed Information|Indicators	<=4	00 - FFFF
	Lights	<=2	0 - FF
	Doors	<=2	0 - FF
	Total Vehicle Overspeed Time	<=10	0.00 - 9999999.99(h)
	Total Vehicle Engine Overspeed Time	<=10	0.00 - 9999999.99(h)
	CAN Report Expansion Mask	<=8	0 - FFFFFFFF
	Ad-Blue Level	<=8	L(0.00 - 9999.99)/P(0.00 - 100.00)
	Axle Weight 1st	<=5	0 - 65535(kg)
	Axle Weight 3rd	<=5	0 - 65535(kg)
	Axle Weight 4th	<=5	0 - 65535(kg)
	Tachograph Overspeed Signal	1	0 | 1
	Tachograph Vehicle Motion Signal	1	0 | 1
	Tachograph Driving Direction	1	0 | 1

Parts	Fields	Length	Range/Format
	Analog Input Value	<=5	0 - 99999(mV)
	Engine Braking Factor	<=10	0 - 4278190079
	Pedal Braking Factor	<=10	0 - 4278190079
	Total Accelerator Kick-downs	<=6	0 - 999999
	Total Effective Engine Speed Time	<=10	0.00 - 9999999.99(h)
	Total Cruise Control Time	<=10	0.00 - 9999999.99(h)
	Total Accelerator Kick-down Time	<=10	0.00 - 9999999.99(h)
	Total Brake Applications	<=6	0 - 999999
	Tachograph Driver 1 Card Number	<=40	ASCII
	Tachograph Driver 2 Card Number	<=40	ASCII
	Tachograph Driver 1 Name	<=40	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Tachograph Driver 2 Name	<=40	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Registration Number	<=40	ASCII
	Expansion Information	<=4	00 - FFFF
	Rapid Brakings	<=8	0 - 16711679
	Rapid Accelerations	<=8	0 - 16711679
	Engine Torque	<=3	0 - 100(%)
	Reserved	0	
	Reserved	0	
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24

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

✧ *Alarm Mask 1*

The alarm mask is configured in a bitwise manner. The alarm mask information is based on <Detailed Information / Indicators> of the **+RESP:GTCAN** message.

✧ *Alarm Mask 2*

The alarm mask is configured in a bitwise manner. The alarm mask information is based on <Lights> and <Doors> of the **+RESP:GTCAN** message.

✧ *Alarm Mask 3*

The alarm mask is configured in a bitwise manner. The alarm mask information is based on <Engine RPM> of the **+RESP:GTCAN** message.

4.5.18 CFU(CAN100 FOTA Upgrade Report)

The device will send the message **+RESP:GTCFU** to the backend server during the upgrade process.

Example:
+RESP:GTCFU,80200F0100,862170011507322,GV50CEU,301,2.2.3b,20140723021417,0014$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	CFU
	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	
	New Version (Optional)	<=10	'0' - '9', 'a' - 'z', '.'
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Code*

Information code.

- **1x0** - Confirm ok. Start to upgrade.
- **1x1** - Baud rate error. UART does not work for CAN100. Stop upgrade.
- **1x2** - The download process is refused because of low power or an incorrect URL.
- **1x3** - Other upgrade commands are being executed. Stop upgrade.
- **1x4** - CAN chipset response is abnormal.

- **1x5** - The backend server cancels this update process.
- **2x0** - Start to download package.
- **2x1** - Package download succeeds.
- **2x2** - Package download fails.
- **3x0** - Start to upgrade.
- **3x1** - Upgrade succeeds. The reserved parameter is used as follows.

Fields	Length	Range/Format
New Version	<=10	'0' - '9' 'a' - 'z'

- **3x2** - Upgrade fails.
- **3x3** - Serial Number does not match, firmware upgrade fails.
- **3x4** - The upgrade process is refused because of low power.

Note

x here means <Update Type> defined in the command (AT+GTCFU).

✧ *New Version*

The version of the new firmware in the CAN100.

4.5.19 RTP(Remote File Transfer)

Report file transfer information.

Example:
+RESP:GTRTP,80200F0100,862170019025640,GV50CEU,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.

4.5.20 PNR(Power-on Reason)

This message indicates the reason for power on.

Example: +RESP:GTPNR,80200F0100,863835020303983,GV50CEU,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 | 5 | 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
- **5** - System watchdog reboot
- **6** - Configuration upgrade reboot

4.5.21 PFR(Power-off Reason)

This message indicates the reason for power off.

Example: +RESP:GTPFR,80200F0100,863835020303983,GV50CEU,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

4.5.22 CRA(Crash Alarm)

Example:
+RESP:GTCRA,80200F0100,867488060596284,GV50CEU,06,1,1.0,0,222.0,117.129815,31.839434,20230523062909,0460,0001,DF5C,027A4F1F,01,9,20230523160010,0B67$

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' '-' '_'
Body	Crash Counter	2	00 - 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 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
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.

4.5.23 BCS(Bluetooth Connection Report)

Example: +RESP:GTBCS,80200F0100,001068000000006,gv50ceu,,1,0.0,0,114.2,117.129246,31.839251,20230605085434,0460,0000,550B,085BE2AA,01,5,0D03,GV50CEU%IMEI,1C34F1848ED2,0,1,41494E5EE290,,,,,20230605085435,1F71$

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
	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
	GNSS Satellite Number (Optional)	<=2	0 - 24
	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	

Parts	Fields	Length	Range/Format
	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

4.5.24 BDS(Bluetooth Disconnection Report)

Example:
+RESP:GTBDS,80200F0100,001068000000006,gv50ceu,,1,0.0,0,114.8,117.129247,31.839251,20230605085438,0460,0000,550B,085BE2AA,01,5,0D03,GV50CEU%IMEI,1C34F1848ED2,0,1,41494E5EE290,0,,,,20230605085438,1F72$

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

Parts	Fields	Length	Range/Format
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	GNSS Satellite Number (Optional)	<=2	0 - 24
	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 | 4
	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

✧ *Reason*

This parameter indicates the reason of Bluetooth disconnection.

- **0x00** - Normal disconnection.
- **0x04** - Bluetooth peripheral device pairing fails.

4.5.25 ASC(Acceleration Calibration Alarm)

The report for calibration data.

Example:
+RESP:GTASC,80200F0100,867488060595542,GV50CEU,0.86,0.52,0.01,0.52,-0.86,0.01,0.01,0.00,

```
-1.00,1,12.6,267,39.7,117.115453,31.827255,20230523055431,0460,0001,DF5C,05F7B315,01,1
0,20230523135432,03BC$
```

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
	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 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
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**.

4.5.26 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,80200F0100,867488060596284,gv50ceu,,2,0,1,0.0,0,96.2,117.129379,31.839272,20230818060401,0460,0000,550B,B7B1,01,3,00280024004F,FFDB000D0049,956,443.3,20230818060403,0CC3$

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

Parts	Fields	Length	Range/Format
	LAC	4	XXXX
	Cell ID	4|8	0000 - FFFF|00000000 - FFFFFFFF
	Position Append Mask	2	00 - FF
	GNSS Satellite Number (Optional)	<=2	0 - 24
	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.

4.5.27 BAA(Bluetooth Accessory Alarm)

Example:
+RESP:GTBAA,80200F0100,866775050902360,gv50ceu,4,6,3,08,0837,WTH301,CF718E32634B,1,25,53,25.89,1,0.0,179,60.7,117.128994,31.839318,20230605085528,0460,0000,550B,085BE2AA,01,2,20230605085528,609A$

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
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Index	<=2	(HEX) 0 - 9 | 0xFF | 0XFE
	Accessory Type	<=2	1-3 | 6 | 11-14
	Accessory Model|Beacon ID Model	1	0-5
	Alarm Type	2	0-4 | 7-A | C | E-18
	Append Mask	4	0000 - FFFF
	Accessory Name(Optional)	<=20	'0' - '9', 'a' - 'z', 'A' - 'Z', '-', '_', ' '
	Accessory MAC(Optional)	12	'0' - '9' 'A' - 'F'
	Accessory Status(Optional)	1	0 | 1
	Accessory Battery Level(Optional)	<=4	0 - 5000(mV)
	Accessory Temperature(Optional)	<=3	-40 - 80(Centigrade)
	Accessory Humidity(Optional)	<=3	0 - 100%(rh)
	Accessory Mode(Optional)	<=2	0 - 10
	Accessory Event(Optional)	1	0 - 2
	Tire pressure(Optional)	<=3	0 - 500(kPa)
	Timestamp(Optional)	14	YYYYMMDDHHMMSS
	Enhanced Temperature(Optional)	<=5	-40.00 - 80.00(Centigrade)

Parts	Fields	Length	Range/Format
	Magnet ID(Optional)	2	00 - FF
	MAG Event Counter(Optional)	<=5	0 - 32767
	Magnet state(Optional)	1	0 - 1
	Accessory Battery Percentage(Optional)	<=3	0 - 100(%)
	Relay Config Result(Optional)	1	0 - 4
	Relay State(Optional)	1	0 - 1
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	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 - 01
	GNSS Satellite Number(Optional)	<=2	0 - 24
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
- **1** - Escort sensor
- **2** - Beacon temperature sensor
- **3** - Bluetooth beacon accessory
- **6** - Beacon Multi-functional sensor
- **11** - Magnet sensor
- **12** - BLE TPMS sensor
- **13** - Relay sensor

- **14** - Smart Cap Bluetooth accessory

✧ *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** - Pushbutton 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**.
- **0A** - Angle event notification.
- **0C** - Magnet event notification.
- **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.
- **16** - Cap is on neck and locked.
- **17** - Cap is removed from neck.
- **18** - Cap is rotated.

✧ *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 8** - <Accessory Event Notification Data>, including <Accessory Mode>, <Accessory Event>
- **Bit 9** - <Tire Pressure>
- **Bit 10** - <Time stamp>
- **Bit 11** - <Enhanced Temperature>
- **Bit 12** - <MAG Notification Data>, including <Magnet ID>, <MAG Event Counter>, <Magnet State>
- **Bit 13** - <Accessory Battery Percentage>
- **Bit 14** - <Relay Data>, including <Relay Config Result>, <Relay State>

Note

In the message bit 0 - bit 15 precedes bit 16 - bit 31. Here is an example: <Accessory Append Mask> = 0x881F0007, 0x81F indicates bit 15 - bit 0, 0x007 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.

✧ *Accessory Mode*

The operating mode of angle sensor.

✧ *Accessory Event*

The event is generated by the angle sensor.

✧ *Timestamp*

Timestamp of the tire pressure value collection.

✧ *Magnet ID*

ID corresponding to different magnet sensors.

✧ *MAG Event Counter*

The total number of times detected by the magnet sensor.

✧ *Magnet State*

The state of the magnet sensor's two parts.

- **0** - Separate
- **1** - Closed

✧ *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.

4.5.28 BID(Bluetooth Beacon ID Setting)

Example: +RESP:GTBID,80200F0100,867488060284402,GV50CEU,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	12	'0' - '9' 'A' - 'F'
	Accessory Battery Level	<=4	0 - 5000(mV)
	Accessory Signal Strength	<=4	-120 - 0
	Beacon Type	1	0 - 2
	Beacon Data	<=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 - 01
	GNSS Satellite Number(Optional)	<=2	0 - 24
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.
- **WID300** - 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)

4.5.29 BIE(Bluetooth Beacon ID Setting)

Example:

+RESP:GTBIE,80200F0400,864696060096294,,1,3,3,7,4,004A,7805412ED914,2970,-53,4,004A,7805412ED919,2990,-67,4,004A,78054101F479,,-71,4,004A,780541057B80,,-74,4,004A,7805412EB5FC,,-56,4,004A,7805412ED986,,-57,4,004A,7805412ED9C4,3010,-55,1,0.0,179,57.9,117.129530,31.839343,20240402073003,0460,0000,550B,085BE2AA,00,20240402073004,014E$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BIE
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Detected Count	<=4	0 - 9999
	Total Frame	1	0 - 4
	Frame Index	1	0 - 4
	Beacon Number	<=2	0 - 30
	Beacon ID Model	1	0 | 3 | 4
	Append Mask	4	0000 - FFFF
	Accessory MAC (Optional)	12	'0'-'9' 'A'-'F'

Parts	Fields	Length	Range/Format
	Accessory Battery Level (Optional)	<=4	0 - 5000(mV)
	Accessory Signal Strength (Optional)	<=4	-120 - 0(dBm)
	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 - 01
	GNSS Satellite Number(Optional)	<=2	0 - 24
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

- *Detected Count*

  The value to indicate the sequence number of beacon have been detected. It will start at 0 when it over 9999.
- *Total Frame*

  A numeral to indicate the total number of frames that the following data takes up.
- *Frame Index*

  A numeral to indicate the index of the current frame.
- *Beacon Number*

  The number of the Bluetooth beacon accessories.
- *Beacon ID Model*

  The model of the Bluetooth beacon 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>

✧ *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.

4.5.30 BAR(Bluetooth Accessory Report)

The device reports the data controlled by <Accessory Type> and <Accessory Model> in (AT+GTBAS) from the peripheral Bluetooth devices to it via message **+RESP:GTBAR**.

Example: +RESP:GTBAR,80200F0100,866775051514610,gv50ceu,07,7,0,001F,DUT-E,122334455667,0,05,2DF7,58A313002DC27EC87DD48000040000FFFFFFFFFFFF,0,0.0,0,56.7,117.129301,31.838517,20220905074304,0460,0001,DE11,05FE6667,01,2,20220905170024,02BF$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BAR
	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	1	7
	Accessory Model	1	0 - 4
	Accessory Append Mask	<=4	0000 - FFFF
	Accessory Name	<=20	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Accessory MAC	12	(HEX)
	Accessory Status	1	0 - 1
	(Accessory Data)	<=1300	
	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 - 01
	GNSS Satellite Number(Optional)	<=2	0 - 24
	Send Time	14	YYYYMMDDHHMMSS
Tail	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Accessory Type*

The type of the Bluetooth accessory which is defined in the <Index>. The following is supported now:

- **7** - Technoton accessory.

✧ *Accessory Data*

There are accessory data para according <Accessory Type> and <Accessory Model>:

If the <Accessory Type> is 7 and <Accessory Model> is 0 (DUT-E S7), <Accessory Model> is 3 (GNOM DDE S7) or <Accessory Model> is 4(GNOM DP S7):

Fields	Length	Range/Format
Version	2	(HEX)
PGN	4	(HEX)
PGN Data	<=42	(HEX)

If the <Accessory Type> is 7 and <Accessory Model> is 1 (DFM 100 S7):

Fields	Length	Range/Format
Version	2	(HEX)
PGN1	4	(HEX)
PGN Data1	<=42	(HEX)
PGN2	4	(HEX)
PGN Data2	<=42	(HEX)
PGN3	4	(HEX)
PGN Data3	<=42	(HEX)

If the <Accessory Type> is 7 and <Accessory Model> is 2 (DFM 250D S7):

Fields	Length	Range/Format
Version	2	(HEX)
PGN1	4	(HEX)
PGN Data1	<=42	(HEX)

Fields	Length	Range/Format
PGN2	4	(HEX)
PGN Data2	<=42	(HEX)
PGN3	4	(HEX)
PGN Data3	<=42	(HEX)
PGN4	4	(HEX)
PGN Data4	<=42	(HEX)

- *Version*

  It indicates the version of accessory software.
- *PGNx*

  It means parameter group number.
- *PGN Datax*

  Different PGN, PGN Data have different data frame formats. It needs to parse according to the TECHNOTON S7 BUS Protocol.

Note

If the total number of characters in a single message is too long, **+RESP:GTBAR** will be divided into multiple messages.

4.5.31 ACJ(Anti-Carjacking Event Report)

When the carjacking status is changed on the device, a corresponding event message will be reported to the backend server.

Example:
+RESP:GTACJ,80200F0100,135790246811220,GV50CEU,03,,0,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,01,2,20090214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	ACJ
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=10	'0' - '9' 'a' - 'z' 'A' - 'Z'
Body	Carjacking Event ID	2	01 | 02 | 03 | 10 | 20 | 30 | 40
	Reserved	0	
	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 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Carjacking Event ID*

The event ID of the anti-carjacking message.

- **01** (Anti-Carjacking Canceling) - If the driver presses and holds the hijack button for 5 seconds, this message is sent to the backend server to indicate the device will disable the anti-carjacking function for a short period of time.
- **02** (Anti-Carjacking Triggering) - According to the trigger mode, if the driver does not press the hijack button before turning on the ignition or opening the door, this message is sent to the backend server to indicate carjacking checking is triggered.
- **03** (Carjacking) - If the driver does not press the hijack button before the trigger timer runs out, this message is sent to the backend server to indicate the device enters into carjacking mode and the ignition is locked.
- **10** (Back to Normal from Canceling) - When the valet service timer runs out and the device enables the anti-carjacking function again, this message is sent to the backend server.
- **20** (Back to Normal from Triggering by Pressing Hijack Button) - Before the trigger timer runs out, if the driver presses the hijack button, this message is sent to the backend server.
- **30** (Back to Normal from Carjacking by Release Command) - If the device receives release command or special SMS release command to unlock the ignition, this message is sent to the backend server.
- **40** (Back to Normal from Carjacking by Pressing Hijack Button) - If the driver presses the hijack button 5 times with ignition on when the device enters into carjacking mode, this message is sent to the backend server.

Note

If the <Hijacking Trigger Mode> is 3(Ignition mode Auto Release Carjacking), the **+RESP:GTACJ** messages of event ID 02, 10, 20, 40 will not be reported.

✧ *GNSS Accuracy*

It is always 0 to indicate that the last known position is reported with this message.

- *Speed*

  The current speed. Unit: km/h.
- *Heading*

  The Heading 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 from the GNSS chip.
- *MCC*

  Mobile country code. It is 3 digits in length and ranges from 000-999.
- *MNC*

  Mobile network code. It is 3 digits in length and ranges from 000-999.
- *LAC*

  Location area code in hex format.
- *Cell ID*

  Cell ID in hex format.
- *Position Append Mask*

  A bitwise numeral to control whether to include the corresponding fields in each position after <Cell ID>.
- *GNSS Satellite Number*

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

4.5.32 ACS(Anti-Carjacking Query Report)

The device will report its current anti-carjacking settings with the message **+RESP:GTACS** if receiving the query command.

Example: +RESP:GTACS,80200F0100,135790246811220,GV50CEU,1,1,10,6,3,15,,,3,1,0,0,0,0,,,,,2023050909 2800,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	ACS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF

Parts	Fields	Length	Range/Format
	Unique ID	15	IMEI
	Device Name	<=10	'0' - '9' 'a' - 'z' 'A' - 'Z'
Body	Trigger Mode	1	0-2
	Hijack Button ID	1	1
	Hijack Button Timeout	<=2	0 - 60 (s)
	Door Detection ID	1	6
	Time Trigger	1	3 | 6 (min)
	Valet Time Trigger	2	10 - 30 (min)
	Reserved	0	
	Reserved	0	
	LED Slow Flash	1	3 - 5 (s)
	LED Fast Flash	1	1 - 2 (s)
	Output Mode Work	1	0-2
	Output Status	1	0 - 3
	Duration	<=5	0 - 65535(x100ms)
	Toggle Times	<=3	0 - 255
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.5.33 ECR(Extended Crash Alarm)

Example:
+RESP:GTECR,80200F0100,864696060003977,GV50CEU,BD,0,49.1,270,36.8,117.071316,31.832131,20240416062629,0460,0000,550B,B7B1,01,10,104,0,,,20240416165742,1DE4$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	ECR
	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	Crash Counter	2	00 - 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
	GNSS Satellite Number (Optional)	<=2	0 - 24
	Trigger Degrees	<=3	
	Engine Status	1	0 | 1
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Crash Counter*

It indicates the crash sequence. The two report messages **+RESP:GTCRA** and **+RESP:GTCRD** are combined into one crash event. It rolls from 0x00 to 0xFF.

✧ *Trigger Degrees*

It indicates the degrees before and after the crash event.

✧ *Engine Status*

- **0** - Engine is turned off.
- **1** - Engine is turned on.

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 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,80200F0100,359231038715676,GV50CEU,00,00,3,1,000100010055000100020051
0000000000550000000100520001000100560001000100530000000000054000000010051000100
0000540000000100530001000100550001000000530001000100540000000300510000000010053
0001ffff005300000001005300010000005200000000000540003000100530002ffff0053000100010
052000000020051000100030053000100000053000 1ffff00540000000100520000000300550002
0001005300010000005200010001005500010001005400 01ffff005300000002005300000002005
6ffff00000053000000000005200010000005200010002005200020001005400000001005 4ffff0002
00520000000100510001ffff00530002ffff00540001fffe00520001ffff0053000000020052000000 02
0052000200010052000100010056000100010052000 1ffff00530001000200560001ffff005100010
001005500010000005100020002005300000000000550001000000520001000100550001000100 5
3ffffffff00520000ffff005200010002005300020001005400010000005500010002005300010000 00
53000000010053000100010052000 0ffff00510001000000520002000000520002ffff0052000100 0
200530000000200540000000000540001fffe00530001ffff00520001000100520001000100530 00
1000100520000,20120330120443,005C$
```

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 - 7F
	Total frame	<=2	1 - 15
	Frame Number	<=2	1 - 15
	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	Fixed value	0

✧ *Total Frame*

Total number of messages that are sent to the bckend 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,80200F0100,359231038715676,,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,80200F0100,359231038715676,,1,3,3,...fffffff10052,20120330115736,005A$
  This is the last XYZ-axis acceleration data:
  Conversion to hex format: X (axis acceleration data) = 0xFFFF; Y = 0xFFF1; Z = 0x0052;
  Decimal format: X (axis acceleration data) = -1; Y = -15; Z = 82;

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.

4.6.2 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,80200F0100,864696060003977,gv50ceu1,FFFC0004FFAFFFFC0003FFAFFFFB0003FF
AFFFFB0004FFAFFFFC0004FFAEFFFC0004FFAFFFFD0004FFAFFFFC0003FFAFFFFC0003FFAEFFFB00
03FFAFFFFB0003FFADFFFC0004FFAEFFFC0004FFAFFFFC0003FFAEFFFB0004FFAFFFFC0004FFAFFFF
B0003FFAEFFFC0004FFAEFFFC0003FFAFFFFC0003FFAEFFFC0004FFAEFFFC0004FFAFFFFC0004FFA
EFFFB0004FFAEFFFC0003FFAFFFFC0004FFAEFFFC0004FFAFFFFD0004FFAEFFFB0004FFAEFFFB000
4FFAFFFFC0003FFADFFFC0004FFAEFFFB0003FFAEFFFC0003FFAFFFFC0004FFAEFFFC0003FFADFFF
C0003FFAEFFFB0003FFAFFFFC0004FFAFFFFC0004FFAFFFFD0004FFAFFFFD0004FFAEFFFC0003FFA
FFFFC0003FFAFFFFC0003FFAEFFFC0004FFAEFFFD0004FFAEFFFB0004FFAFFFFC0004FFAEFFFB000
4FFAEFFFC0004FFAEFFFC0004FFAEFFFB0004FFAEFFFB0004FFAFFFFC0003FFAFFFFC0004FFAFFFFC
0003FFAFFFFC0004FFAEFFFC0004FFAFFFFC0004FFAFFFFC0003FFAEFFFC0004FFAEFFFC0004FFAEF
FFC0004FFAEFFFB0004FFAEFFFB0004FFAEFFFC0004FFAEFFFC0004FFAFFFFB0004FFAEFFFB0003F
FAEFFFC0003FFAEFFFB0004FFAFFFFC0004FFAEFFFD0003FFAEFFFC0004FFAD,,,,20240416153536,
1936$

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**,80200F0100,864292043426376,,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**,80200F0100,864292043426376,,fffffff10052…,,,,,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 CANBUS Information Report

This section describes the message format of CANBUS information. Please refer to the details below.

4.7.1 CAN(CANBUS Device Information)

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

Example:
+RESP:GTCAN,80200F0100,001068000000006,GV50CEU,00,0,C00FFFFF,,,,,,,,,,,,,,,,,,,,,,,1,0.0,0,110.4,117.129267,31.839232,20230605093817,0460,0000,550B,085BE2AA,01,2,20230605093818,2030$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	CAN
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Distance Type / Report Type	2	X(0 | 1)X(0-2)

Parts	Fields	Length	Range/Format
	CANBUS Device State	1	0 | 1
	CANBUS Report Mask	<=8	0 - FFFFFFFF
	VIN	17	'0' - '9' 'A' - 'Z' except 'I', 'O', 'Q'
	Ignition Key	1	0-2
	Total Distance	<=12	H(0 - 99999999)/I(0 - 2147483647)
	Total Fuel Used	<=9	0.00 - 999999.99(L)
	Engine RPM	<=5	0 - 16383 (rpm)
	Vehicle Speed	<=4	0 - 455(km/h)
	Engine Coolant Temperature	<=4	-40 - +215 (Centigrade)
	Fuel Consumption	<=6	L/100km(0.0 - 999.9)|L/H(0.0 - 999.9)
	Fuel Level	<=8	L(0.00 - 9999.99)/P(0.00 - 100.00)
	Range	<=8	0 - 99999999(hm)
	Accelerator Pedal Pressure	<=3	0 - 100(%)
	Total Engine Hours	<=10	0.00 - 9999999.99(h)
	Total Driving Time	<=10	0.00 - 9999999.99(h)
	Total Engine Idle Time	<=10	0.00 - 9999999.99(h)
	Total Idle Fuel Used	<=9	0.00 - 999999.99(L)
	Axle Weight 2nd	<=5	0 - 65535(kg)
	Tachograph Information	4	00 - FFFF
	Detailed Information / Indicators	4	00 - FFFF
	Lights	2	0 - FF
	Doors	2	0 - FF
	Total Vehicle Overspeed Time	<=10	0.00 - 9999999.99(h)
	Total Vehicle Engine Overspeed Time	<=10	0.00 - 9999999.99(h)
	CAN Report Expansion Mask	<=8	0 - FFFFFFFF
	Ad-Blue Level	<=8	L(0.00 - 9999.99)/P(0.00 - 100.00)
	Axle Weight 1st	<=5	0 - 65535(kg)
	Axle Weight 3rd	<=5	0 - 65535(kg)
	Axle Weight 4th	<=5	0 - 65535(kg)
	Tachograph Overspeed Signal	1	0|1
	Tachograph Vehicle Motion Signal	1	0|1
	Tachograph Driving Direction	1	0|1
	Analog Input Value	<=5	0 - 99999(mV)
	Engine Braking Factor	<=10	0 - 4278190079

Parts	Fields	Length	Range/Format
	Pedal Braking Factor	<=10	0 - 4278190079
	Total Accelerator Kick-downs	<=6	0 - 999999
	Total Effective Engine Speed Time	<=10	0.00 - 9999999.99(h)
	Total Cruise Control Time	<=10	0.00 - 9999999.99(h)
	Total Accelerator Kick-down Time	<=10	0.00 - 9999999.99(h)
	Total Brake Applications	<=6	0 - 999999
	Tachograph Driver 1 Card Number	<=40	ASCII
	Tachograph Driver 2 Card Number	<=40	ASCII
	Tachograph Driver 1 Name	<=40	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Tachograph Driver 2 Name	<=40	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Registration Number	<=40	ASCII
	Expansion Information	<=4	00 - FFFF
	Rapid Brakings	<=8	0 - 16711679
	Rapid Accelerations	<=8	0 - 16711679
	Engine Torque	<=3	0 - 100(%)
	Reserved	0	
	Reserved	0	
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - 01
	GNSS Satellite Number (Optional)	<=2	0 - 24
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF

Parts	Fields	Length	Range/Format
	Tail	1	$

✧ *Distance Type / Report Type*

It indicates the type of total distance (unit: hm) and the report type.

- Distance Type has the following meanings:
  - **0** - Total distance acquired from CAN Chipset.
  - **1** - Total distance obtained by calculation with GNSS.
- Report Type has the following meanings:
  - **0** - Periodic report.
  - **1** - RTO CAN report.
  - **2** - Ignition event report.

✧ *CANBUS Device State*

A numeral to indicate the communication state with the external CANBUS device.

- **0** - Abnormal.

  It fails to receive data from the external CANBUS device.
- **1** - Normal.

  It is able to receive data from the external CANBUS device.

✧ *CANBUS Report Mask*

Please refer to <CAN Report Mask> in (AT+GTCAN).

✧ *VIN*

Vehicle identification number.

✧ *Ignition Key*

A numeral to indicate the ignition status.

- **0** - Ignition off
- **1** - Ignition on
- **2** - Engine on

✧ *Total Distance*

Vehicle total distance. The number is always increasing. The unit is hectometer (H) or distance impulse (I) (if distance from dashboard is not available).

✧ *Total Fuel Used*

The number of liters of fuel used since vehicle manufacture or device installation. The unit is liter.

✧ *Fuel Level*

The level of fuel in vehicle tank. The unit is liter (L) or percentage (P).

✧ *Range*

The number of hectometers to drive on remaining fuel. The unit is hectometer.

✧ *Vehicle Speed*

The vehicle speed based on wheel. The unit is km/h.

✧ *Engine RPM*

The revolutions per minute. The unit is rpm.

✧ *Accelerator Pedal Pressure*

The unit is percentage.

✧ *Engine Coolant Temperature*

The unit is Celsius. Negative value is preceded by negative sign (-), e.g. "-2". If the value is positive, no extra character is inserted, e.g. "20".

✧ *Fuel Consumption*

The fuel consumption is calculated based on values read from vehicle. The unit is L/100Km(M) or L/H(H).

✧ *Total Engine Hours*

Time of engine running since vehicle manufacture or device installation. The unit is hour.

✧ *Total Driving Time*

Time of engine running (non-zero speed) since vehicle manufacture or device installation. The unit is hour.

✧ *Total Engine Idle Time*

Time of engine running during idling status (vehicle at rest) since vehicle manufacture or device installation. The unit is hour.

✧ *Total Idle Fuel Used*

The number of liters of fuel used since vehicle manufacture or device installation. The unit is liter.

✧ *Axle Weight 2nd*

Weight of vehicle's second axle. The unit is kg.

✧ *Tachograph Information*

Two bytes. The high byte describes driver 2, while the low byte describes driver 1.

Each byte format:

Validity mark	Reserved	Driver working states		Driver card	Driving time related states		
V	R	W1	W0	C	T2	T1	T0

V: Validity mark (0 - valid driver data, 1 - no valid data)

R: Reserved

C: Driver card (1 - card inserted, 0 - no card inserted)

T2-T0: Driving time related states:

- **0** - Normal / no limits reached.
- **1** - 15min before 4½h.
- **2** - 4½h reached.
- **3** - 15min before 9h.
- **4** - 9h reached.
- **5** - 15minute before 16h (without 8h rest during the last 24h).
- **6** - 16h reached.
- **7** - Other limit.

W1-W0: Driver working states:

- **0** - Rest - sleeping.
- **1** - Driver available - short break.
- **2** - Work - loading, unloading, working in an office.
- **3** - Drive - behind the wheel.

✧ *Detailed Information / Indicators*

A hexadecimal number. Each bit contains information of one indicator.

- **Bit 0** - FL - fuel low indicator (1 - indicator on, 0 - indicator off)
- **Bit 1** - DS - driver seatbelt indicator (1 - indicator on, 0 - indicator off)

- **Bit 2** - AC - air conditioning (1 - on, 0 - off)
- **Bit 3** - CC - cruise control (1 - active, 0 - disabled)
- **Bit 4** - B - brake pedal (1 - pressed, 0 - released)
- **Bit 5** - C - clutch pedal (1 - pressed, 0 - released)
- **Bit 6** - H - handbrake (1 - pulled-up, 0 - released)
- **Bit 7** - CL - central lock (1 - locked, 0 - unlocked)
- **Bit 8** - R - reverse gear (1 - on, 0 - off)
- **Bit 9** - RL - running lights (1 - on, 0 - off)
- **Bit 10** - LB - low beams (1 - on, 0 - off)
- **Bit 11** - HB - high beams (1 - on, 0 - off)
- **Bit 12** - RFL - rear fog lights (1 - on, 0 - off)
- **Bit 13** - FFL - front fog lights (1 - on, 0 - off)
- **Bit 14** - D - doors (1 - any door open, 0 - all doors closed)
- **Bit 15** - T - trunk (1 - open, 0 - closed)

✧ *Lights*

A hexadecimal number. Each bit contains information of one type of light.

- **Bit 0** - Running Lights (1 - on, 0 - off)
- **Bit 1** - Low Beam (1 - on, 0 - off)
- **Bit 2** - High Beam (1 - on, 0 - off)
- **Bit 3** - Front Fog Light (1 - on, 0 - off)
- **Bit 4** - Rear Fog Light (1 - on, 0 - off)
- **Bit 5** - Hazard Lights (1 - on, 0 - off)
- **Bit 6** - Reserved
- **Bit 7** - Reserved

✧ *Doors*

A hexadecimal number. Each bit contains information of one door.

- **Bit 0** - Driver Door (1 - open, 0 - closed)
- **Bit 1** - Passenger Door (1 - open, 0 - closed)
- **Bit 2** - Rear Left Door (1 - open, 0 - closed)
- **Bit 3** - Rear Right Door (1 - open, 0 - closed)
- **Bit 4** - Trunk (1 - open, 0 - closed)
- **Bit 5** - Hood (1 - open, 0 - closed)
- **Bit 6** - Reserved
- **Bit 7** - Reserved

✧ *Total Vehicle Overspeed Time*

The total time when the vehicle speed is greater than the limit defined in CAN100's configuration.

✧ *Total Vehicle Engine Overspeed Time*

The total time when the vehicle engine speed is greater than the limit defined in CAN100's configuration.

✧ *Ad-Blue Level*

The level of Ad-Blue.

✧ *Axle Weight 1st*

Vehicle first axle weight. The unit is Kg.

✧ *Axle Weight 3rd*
Vehicle third axle weight. The unit is Kg.

✧ *Axle Weight 4th*
Vehicle fourth axle weight. The unit is Kg.

✧ *Tachograph Overspeed Signal*
Vehicle overspeed signal from the tachograph.
- **0** - Overspeed is not detected.
- **1** - Overspeed is detected.

✧ *Tachograph Vehicle Motion Signal*
The vehicle motion signal in the tachograph.
- **0** - Motion is not detected.
- **1** - Motion is detected.

✧ *Tachograph Driving Direction*
Vehicle driving direction from the tachograph.
- **0** - Driving forward.
- **1** - Driving backward.

✧ *Analog Input Value*
The value of analog input. The unit is mV.

✧ *Rapid Brakings*
The count of rapid brakings of the vehicle.

✧ *Engine Braking Factor*
It measures how often driver brakes with brake pedal or with engine and stores both counts (always increasing). Decreasing speed with no pedal pressed causes an increase in engine braking factor.

✧ *Pedal Braking Factor*
It measures how often driver brakes with brake pedal or with engine and stores both counts (which are always increasing). Decreasing speed with brake pedal pressed causes an increase in pedal braking factor.

✧ *Total Accelerator Kick-downs*
The count of accelerator pedal kick-downs (with the pedal pressed over 90%).

✧ *Total Effective Engine Speed Time*
Total time when the vehicle engine speed is effective. The unit is h.

✧ *Total Cruise Control Time*
Total time when vehicle speed is controlled by cruise-control module. The unit is h.

✧ *Total Accelerator Kick-down Time*
Total time when accelerator pedal is pressed over 90%. The unit is h.

✧ *Total Brake Applications*
The total number of braking processes initiated by brake pedal.

✧ *Tachograph Driver 1 Card Number*
The card number of tachograph driver 1.

✧ *Tachograph Driver 2 Card Number*
The card number of tachograph driver 2.

✧ *Tachograph Driver 1 Name*
The name of tachograph driver 1.

- *Tachograph Driver 2 Name*
  The name of tachograph driver 2.
- *Registration Number*
  The vehicle registration number.
- *Expansion Information*
  A hexadecimal number. Each bit contains information of one indicator.
  - **Bit 0** - W - webasto (1 - on, 0 - off or not available)
  - **Bit 1** - BFL - brake fluid low indicator (1 - on, 0 - off or not available)
  - **Bit 2** - CLL - coolant level low indicator (1 - on, 0 - off or not available)
  - **Bit 3** - BAT - battery indicator (1 - on, 0 - off or not available)
  - **Bit 4** - BF - brake system failure indicator (1 - on, 0 - off or not available)
  - **Bit 5** - OP - oil pressure indicator (1 - on, 0 - off or not available)
  - **Bit 6** - EH - engine hot indicator (1 - on, 0 - off or not available)
  - **Bit 7** - ABS - ABS failure indicator (1 - on, 0 - off or not available)
  - **Bit 9** - CHK - "check engine" indicator (1 - on, 0 - off or not available)
  - **Bit 10** - AIR - airbag indicator (1 - on, 0 - off or not available)
  - **Bit 11** - SC - service call indicator (1 - on, 0 - off or not available)
  - **Bit 12** - OLL - oil level low indicator (1 - on, 0 - off or not available)
- *Rapid Brakings*
  The number of total rapid brakings since installation (calculation based on CAN100 settings of speed decrease time and value).
- *Rapid Accelerations*
  The number of total rapid accelerations since installation (calculation based on CAN100 settings of speed increase time and value).
- *Engine Torque*
  The engine torque. Unit: percentage.

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,80200F0100,135790246811220,GV50CEU,0,100,http://www.GV50CEU.com/configure.ini,20150201000000,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT

Parts	Fields	Length	Range/Format
	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 | 304-306
	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** - <Command Mask>, <GEO ID Mask>, <Stocmd ID Mask> or <Group ID Mask> check fails.
- **305** - The update process is interrupted by abnormal reboot.
- **306** - The update process is interrupted by MD5 verification error.

✧ *Download URL*

The complete URL to download the configuration. It includes the file name.

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,80200F0100,135790246811220,GV50CEU,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.
- **1x4** - Reserved.
- **1x5** - The update process is refused because the upgraded unit is not working.

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,80200F0100,135790246811220,GV50CEU,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,80200F0100,135790246811220,GV50CEU,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,80200F0100,135790246811220,GV50CEU,1,301,http://www.GV50CEU.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 | 304-306

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** - <Command Mask>, <GEO ID Mask>, <Stocmd ID Mask> or <Group ID Mask> check fails.
- **305** - The update process is interrupted by abnormal reboot.
- **306** - The update process is interrupted by MD5 verification error.

✧ *Download URL*

The complete URL to download the configuration. It includes the file name.

✧ *Identifier Number*

Please refer to the parameter <Identifier Number> in the command (AT+GTUPC).

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,80200F0100,135790246811220,GV50CEU,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.
- **1x4** - The update process is refused because the upgraded unit is not working.

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,80200F0100,135790246811220,GV50CEU,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,80200F0100,135790246811220,GV50CEU,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,80200F0100,135790246811220,GV50CEU,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

Parts	Fields	Length	Range/Format
	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, 80200F means GV50CEU. 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,80200F0100,11F0$

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, 80200F means GV50CEU. 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,80200F0100,863286020684354,GV50CEU,,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. The SOS message has the highest priority and is sent before buffered messages.

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:
2B41434B016F2680200F0100010256146007005031090 0FFFF07E8050A022B1C20D8703C0D0A

2B41434B196F2680200F0100010256146007005031090 0FFFF07E8050A022B1C20DCE9B00D0A

2B41434B236F2680200F0100010256146007005031090 0FFFF07E8050A022B1D20DF16140D0A

2B41434B666F2680200F0100010256146007005031090 0FFFF07E8050A022B1E20E7B2FE0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+ACK
	Message Type	1	
	Report Mask	1	00 - FF
Body	Length	1	
	Device Type	3	80200F
	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+GTDIS	7
AT+GTIOB	9
AT+GTTMA	10
AT+GTFRI	11
AT+GTGEO	12
AT+GTSPD	13
AT+GTSOS	14
AT+GTRTO	16
AT+GTUPD	21
AT+GTPIN	22
AT+GTOWH	24
AT+GTDOG	25
AT+GTAIS	26
AT+GTJDC	27
AT+GTIDL	28
AT+GTHBM	29
AT+GTHMC	30
AT+GTWLT	34
AT+GTHRM	35
AT+GTFFC	36
AT+GTJBS	37
AT+GTSSR	38
AT+GTIGM	42
AT+GTPDS	45
AT+GTCRA	46
AT+GTRMD	53
AT+GTPEO	54
AT+GTCAN	57
AT+GTCMD	61
AT+GTUDF	62
AT+GTGAM	65
AT+GTUPC	70
AT+GTCLT	71

Command	ID
AT+GTCFU	74
AT+GTASC	79
AT+GTFVR	81
AT+GTBTS	89
AT+GTVVS	91
AT+GTAVS	92
AT+GTGDO	93
AT+GTVMS	102
AT+GTBAS	103
AT+GTBID	109
AT+GTDOS	119
AT+GTMQT	138
AT+GTTLS	139
AT+GTRTP	141
AT+GTACJ	145

✧ *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+GTPEO** - This field represents the PEO command ID.
- **AT+GTIOB** - This field represents the IOB command ID.
- **AT+GTCLT** - This field represents the CLT group 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+GTAIS** - This field represents the AIS 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 byte. 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.

✧ **AIS** (Analog Input Alarm)

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

✧ **DIS** (Digital Input Alarm)

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

✧ **IOB** (IO Ports Bind Alarm)

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

- ✧ **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**.
- ✧ **IGL** (Ignition Location Information)

  The location message **+RESP:GTIGL** for ignition on and ignition off.
- ✧ **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:

2B5253500182FE7FFF0000001011280200F010001024756353043455500642ED2000200000001
160F0001010000040161005F06FB407501E5D2BE07E8050A07013A04600001DF5C05FE6667000
000000000000203000000000000000000000207FFFFF00000000000000000000000000000000000
000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000F
FFFFF0000000000000000000000000000000000000000000000000000000000000000000000000
000000000000000000000000000000000000000000000000000350007E8050A07013B26CEA8A9
0D0A

2B5253500682FE7FFF0000001011280200F010001024756353043455500642EE8000200000101
210F01010100000013B005F06FB40B801E5D39F07E8050A063B1F04600001DF5C05FE6667000
000000000000203000000000000000000000207FFFFF00000000000000000000000000000000000
000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000F
FFFFF0000000000000000000000000000000000000000000000000000000000000000000000000
000000000000000000000000000000000000000000000000000340007E8050A063B2026B392CB
0D0A

2B5253500582FE7FFF0000001011280200F010001024756353043455500642EE8000200000101
210F10010100000013B005F06FB40B801E5D39F07E8050A06390A04600001DF5C05FE6667000
000000000000203000000000000000000000207FFFFF00000000000000000000000000000000000
000000000000000000000000000000000000000000000000000000000000000000000000000000

00000000000000000000000000000000000000000000000000000000000000000000000000000F
FFFFF0000000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000310007E8050A06390B26961E71
0D0A

2B5253500982FE7FFF00000001011280200F010001024756353043455500642ED2000200000101
210F000101000000013B005F06FB40B801E5D39F07E8050A063A2604600001DF5C05FE6667000
00000000000020300000000000000000000207FFFFF00000000000000000000000000000000000
000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000F
FFFFF0000000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000320007E8050A063A2626A8D713
0D0A

2B5253500F82FE7FFF00000001011280200F010001024756353043455500642EE8000200000101
220F000101002D04010E001D06FAB25101E5B8C107E8050B05200D04600001DF5C05F3001F000
005000000000904000000000000000000000207FFFFF00000000000000000000000000000000000
000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000FFFF00000000000000000000000000000000000000F
FFFFF0000000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000430007E8050B05200E55A1244C
0D0A

2B5253500C82FE7FFF00000001011280200F010001024756353043455500642F14000200000201
110F010101000000011D005D06FB405201E5D1A807E8050A06350004600001DF5C027A4F1F000
00001000000020300000000000000000000207FFFFF00000000000000000000000000000000000
000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000F
FFFFF0000000000000000000000000000000000000000000000000000000000000000000000000
000000000000000000000000000000000000000000000000000360007E8050A063501266F335F0
D0A

2B5253500E82FE7FFF00000001011280200F010001024756353043455500642EFE000200000201
110F100101000000011D005D06FB405201E5D1A807E8050A06330C04600001DF5C027A4F1F000
00001000000020300000000000000000000207FFFFF00000000000000000000000000000000000
000000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000F
FFFFF0000000000000000000000000000000000000000000000000000000000000000000000000
0000000000000000000000000000000000000000000000000000370007E8050A06330D266860A4
0D0A

2B5253500B82FE7FFF00000001007280200F010001024756353043455500642EFE000000000200
420C00010100000500B8006106FB402E01E5D3BD07E8050A032F2004600001DF5C0DD0833A00
0000000000000202000000000000000000000000000000380007E8050A032F2122C92BBE0D0A

2B5253501A82FE7FFF00000001007280200F0100010247563530434555006 42EE8000000000200
220E400101000007005A006106FB408901E5D28907E8050A03301E04600001DF5C05FE6667000
0000000000002020000000000000000000000000000340007E8050A03301F22D3B1DF0D0A

2B5253501082FE7FFF00000001007280200F0100010247563530434555006 42ED2000000000301
210F000101000000094006A06FB408801E5D3F907E8050A05330204600001DF5C027A4F1F000
0000000000002020000000000000000000000000000330007E8050A053303246CC70A0D0A

2B5253501082FE7FFF00000001007280200F0100010247563530434555006 42ED2000000000301
210F000101000000094006A06FB408801E5D3F907E8050A05330204600001DF5C027A4F1F000
0000000000002020000000000000000000000000000330007E8050A053303246CC70A0D0A

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	80200F
	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|4	0 - 90000
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Report ID | Report Type	1	
	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|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
	CAN Data	<=400	
	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
+RESP:GTEPS	4
+RESP:GTDIS	5
+RESP:GTIOB	6
+RESP:GTFRI	7
+RESP:GTSPD	9
+RESP:GTSOS	10
+RESP:GTRTL	11
+RESP:GTDOG	12
+RESP:GTAIS	14
+RESP:GTHBM	15

Message	ID
+RESP:GTIGL	16
+RESP:GTERI	18
+RESP:GTGIN	20
+RESP:GTGOT	21
+RESP:GTVGL	26

✧ *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.

✧ *Analog Input Mode*

The mode of analog input ports.

The low 4 bits of the low byte are for analog input 1.

✧ *Digital Input Status*

Input Status Mask	ID
Ignition Detection	0x01
Digital Input1	0x02
Digital Input6	0x40

✧ *Digital Output Status*

Output Status Mask	ID
Digital Output1	0x01

✧ *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.

- *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

- *CAN Data*

  Please refer to the **+RESP:GTCAN** report in hex format. The <CAN Data> contains fields from <CANBUS Device State> to <Engine Torque>. This field can be analyzed as per the **+RESP:GTCAN** report.

- *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:
2B5253500782FE2FFF00000001006E80200F0100010247563530434555006400000100210F1001
0100000000A0006206FB401801E5D3D307E8050A03191504600001DF5C027A4F1F00000000000
0000202000000000000000000000000000360007E8050A031917221F74510D0A

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	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01

Parts	Fields	Length	Range/Format
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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
	CAN Data	<=400	
	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

✧ *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:
2B5253500382FE7FFF00000001007980200F01000102475635304345550064ED2000000000100
210F007018298268760F010100000000A0006206FB401801E5D3D307E8050A031B2D04600001D
F5C027A4F1F000000000000000202000000000000000000000000000000380007E8050A031B2E22
2E27440D0A

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	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Report ID | Report Type	1	
	Number Length | Number Type	1	
	Phone Number	<=10	

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
	CAN Data	<=400	
	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 SOS(SOS Alarm Notification)

If the SOS function is enabled, the device will send the message **+RESP:GTSOS** to the backend server when the corresponding digital input port triggers SOS. The location report message **+RESP:GTSOS** in HEX format is as below.

Example:
2B5253500A82FE7FFF00000001007380200F0100010247563530434555500642EFE000000000300
220F1000010100000600BE006306FB401001E5D37F07E8050A031D0E04600001DF5C027A4F1F0
000000000000002020000000000000000000000000000000370007E8050A031D0F223C71530D0A

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	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Report ID | Report Type	1	
	Reserved	1	00
	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	
	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
	CAN Data	<=400	
	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

5.2.5 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:
2B5253501282FE2FFF00000000100008100011780200F0100010247563530434555006400000301
210F1000000400030101000000011D005D06FB405201E5D1A807E8050A062C1F04600001DF5C0
27A4F1F00000001000000020300000000000000000000000207FFFFF00000000000000000000000
000000000000000000000000000000000000000000000000000000000000000000000000000000
000000000000000000000000000000000000000000000000000000000000000000000000000000
000000000FFFFFF000000000000000000000000000000000000000000000000000000000000000

00000000000000000000000000000000000000000000000000000000000360007E8050A062C
21262A784F0D0A

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	80200F
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI
	Battery Level	1	0 - 100
	External Power Voltage	2|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Report ID | Report Type	1	
	Reserved	1	00
	Bluetooth Accessory Data(Optional)		
	RAT and Band data (Optional)		
	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	

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|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
	CAN Data	<=400	
	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
Accessory Type	1	0-2 | 4 | 6 | 7 | 10-14
Accessory Model	1	0-5
Raw Data Length	2	0000 - FFFF
Raw Data(Optional)	<=4	
Accessory Append Mask	2	0000 - FFFF
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(Centigrade)
Accessory Humidity(Optional)	1	0 - 100%(rh)
Accessory Mode(Optional)	1	0 - 10
Accessory Event(Optional)	1	0 - 2

Fields	Length	Range/Format
Tire Pressure(Optional)	2	0 - 500(kPa)
Timestamp(Optional)	7	YYYYMMDDHHMMSS
Enhanced Temperature(Optional)	2	-40.00 - 80.00(centigrade)
Magnet ID(Optional)	1	00 - FF
MAG Event Counter(Optional)	2	0 - 32767
Magnet State(Optional)	1	0 - 1
Accessory Battery Percentage(Optional)	1	0 - 100(%)
Relay State(Optional)	1	0 - 1

- *Bluetooth Accessory Number*
  It indicates the number of accessories connected with the device.
- *Index*
  The index of the Bluetooth accessory.
  - The index of Bluetooth accessory defined in (AT+GTBAS) which triggers the **+RESP:GTBAA** message.
- *Accessory Type*
  The type of the Bluetooth accessory which is defined in the <Index>. The following is supported now:
  - **0** - No Bluetooth accessory
  - **1** - Escort sensor
  - **2** - Beacon temperature sensor
  - **4** - CAN accessory
  - **6** - Beacon multi-functional sensor
  - **7** - Techonoton accessory
  - **10** - Mechatronics Bluetooth accessory
  - **11** - Magnet sensor
  - **12** - BLE TPMS sensor
  - **13** - Relay sensor
  - **14** - Smart Cap Bluetooth accessory
- *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 longitude is converted to an integer with 2 implicit decimals, and the integer is reported in HEX format. If the longitude value is negative, it is expressed in Two's complement format.

- *Magnet ID*

  ID corresponding to different magnet sensors.
- *MAG Event Counter*

  The total number of times detected by the magnet sensor.
- *Magnet State*

  The state of the two parts of the magnet sensor.
  - **0** - Separate
  - **1** - Closed

✧ *Accessory Battery Percentage*

Percentage of Bluetooth accessory's battery power.

✧ *Relay State*

The current state of the relay sensor.

✧ **RAT and Band data (Optional)**

Fields	Length	Range/Format
RAT	1	0-4
Band	2	0-5 | 7 | 8 | 20 | 28 | 850 | 900 | 1800 | 1900

- *RAT*

  Radio Access Technology.
  - **0** - NO SERVICE mode
  - **1** - EGPRS mode
  - **2** - Reserved
  - **3** - Reserved
  - **4** - LTE Cat 1 mode
- *Band*

0 means invalid band, 1-5/7-8, 20, 28 means band number and others mean GSM number.

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)

5.2.6 GIN|GOT(Geo-Fence Information)

The messages **+RESP:GTGIN** and **+RESP:GTGOT** in HEX format are as below.

Example:
2B5253501482FE7FFF00000001007B80200F0100010247563530434555500642EFE000000000300
210F0101000000000000000010101000000000BE006306FB400C01E5D38307E8050A03200F04600
001DF5C027A4F1F000000000000000202000000000000000000000000000000370007E8050A0320
102251B5660D0A

2B5253501582FE7FFF00000001007B80200F0100010247563530434555500642EFE000000000300
210F0101000000000000000010101000000000BE006306FB400C01E5D38307E8050A03203904600
001DF5C027A4F1F000000000000000202000000000000000000000000000000380007E8050A0320
3A2258F2C90D0A

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	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	

Parts	Fields	Length	Range/Format
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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
	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
	CAN Data	<=400	
	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 and Bit 1 is for Area Mask Group 2. 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 PEO or 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.

5.3 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:
2B494E4601FF7D00A7561460070050310980200F01000102020100000000000000000000000000
000000000000003000021000F0107E8050A0321290001007F00001E000258000000D02EFE1068648
98601178300110605723700040000000050460001FDF5C0DD0833A00360460001FDF5C05A6D20
B00350460001FDF5C05FE6667002D0460001FDF5C02A9090200280460001DF5C027A4F1F0063
07E8050A03212B225C0A670D0A

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	80200F
	Protocol Version	2	0000 - FFFF

Parts	Fields	Length	Range/Format
	Firmware Version	2	0000 - FFFF
	(+RESP:GTVER)		
	(+RESP:GTIOS)		
	(+RESP:GTGPS)		
	(+RESP:GTBAT)		
	(+RESP:GTCID)		
	(+RESP:GTCSQ)		
	(+RESP:GTTMZ)		
	(+RESP:GTGSM)		
	(+RESP:GTGSV) (+RESP:GTRSV) (+RESP:GTBSV) (+RESP:GTASV)		
	(+RESP:GTCVN)		
	(+RESP:GTCSN)		
	(+RESP:GTCML)		
	(+RESP:GTSCS)		
	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
+RESP:GTCID	4
+RESP:GTCSQ	5
+RESP:GTVER	6
+RESP:GTBAT	7
+RESP:GTIOS	8
+RESP:GTTMZ	9
+RESP:GTGSM	10
+RESP:GTGSV	11
+RESP:GTCVN	13

Message	ID
Reserved	...
+RESP:GTCSN	20
+RESP:GTRSV	21
+RESP:GTBSV	22
+RESP:GTCML	26
Reserved	...
+RESP:GTSCS	28
Reserved	...
Reserved	...
+RESP:GTASV	37

✧ *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
	Reserved	2	0000

IOS

Message	Fields	Length	Range/Format
+RESP:GTIOS	Reserved	1	00
	Analog Input1 Voltage	2	
	Reserved	2	0000
	Reserved	2	0000
	Reserved	1	00
	Reserved	2	0000
	Reserved	2	0000
	Reserved	2	0000
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Pin Mask	1	0 - FF

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 - 24
	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".

BAT

Message	Fields	Length	Range/Format
+RESP:GTBAT	Power Supply | Backup Battery On | Charging | LED State | Backup Battery Charge Mode	1	00 - FF
	External Power Voltage	2|4	0 - 90000(mV)
	Backup Battery Voltage	2	0 - 4500(mV)
	Backup Battery Percentage	1	0 - 100

✧ *Power Supply, Backup Battery On, Charging, LED State, Backup Battery Charge 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 <Backup Battery Charge Mode>.

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	

✧ *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.
- **SOS** - This cell information is for SOS 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
SOS	1
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
ASV

Messages	Fields	Length	Range/Format
+RESP:GTGSV +RESP:GTRSV +RESP:GTBSV +RESP:GTASV	SV Count	1	
	SV ID	1	
	SV Power	1	
	…		
	SV ID	1	
	SV Power	1	

CVN

Message	Fields	Length	Range/Format
+RESP:GTCVN	CAN100 SW Version Length	1	0 - 10
	CAN100 SW Version	<=10	

CSN

Message	Fields	Length	Range/Format
+RESP:GTCSN	CAN100 Serial Number length	1	0 - 10
	CAN100 Serial Number	<=10	

CML

Message	Fields	Length	Range/Format
+RESP:GTCML	CAN100 Car Model ID	2	0x0000 - 0xFFFF
	CAN100 Car Name Length	1	0 - 50
	CAN100 Car Name	<=50	
	CAN100 Sync Status	1	0 - 4

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

Message	Fields	Length	Range/Format
	Y_Vertical	1	-100 - 100
	Z_Vertical	1	-100 - 100

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:
2B4154493680200F010001025614600700503109001810310102020101010102A400000000000
0000007E8050A032B01229631910D0A

Parts	Fields	Length	Range/Format
Head	Message Header	4	+ATI
Body	Length	1	
	Device Type	3	80200F
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI
	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)
- ✧ **DRM** (Device removal report)

Example:

2B4556540100FE7FBF006680200F010001025614600700503109640000000200000000141000100
0000000000000000000000000000000000000000000000000000000000000000000000
020300000000000000000007E8050A07063026EBA85A0D0A

2B4556540200FE7FBF006680200F01000102561460070050310964 2F1400020000000 1110F0102
0000000091006006FB40A701E5D1E707E8050A07061B04600001DF5C027A4F1F0000000000000
0020300000000000000000007E8050A07061C26E93D730D0A

2B4556540300FE7FBF006680200F010001025614600700503109642F14000200000000141000100
00000000000000000000000000000000000000000004600001DF5C05FE6667000000000000000
0020300000000000000000007E8050A07063226EE7A6A0D0A

2B4556540400FE7FBF006680200F010001025614600700503109640000000200000000122090102
00010800AD006B06FB416E01E5D1E507E8050A07121104600001DF5C027A4F1F0000000000000
0020300000000000000000007E8050A071212272AFBC20D0A

2B4556540700FE7FBF006680200F010001025614600700503109642EE8000200000101220C0101
000102005D005B06FB40FE01E5D1C407E8050A07141904600001DF5C027A4F1F0000000000000
0020300000000000000000007E8050A07141A275C1FAA0D0A

2B4556540800FE7FBF006680200F010001025614600700503109642ED200020000000011A0F0101
0000060002005A06FB409201E5D19707E8050A07203404600001DF5C027A4F1F0000000000000
0020300000000000000000007E8050A07203627FA959D0D0A

2B4556540900FE7FBF006680200F010001025614600700503109642ED2000200000101210E0101
0000010162005C06FB411201E5D1BC07E8050A07143804600001DF5C027A4F1F0000000000000

```
002030000000000000000000007E8050A0714392762B4170D0A

2B4556540C00FE7FBF006680200F0100010256146007005031096400000000200000001120F0101
00000300AA005B06FB404301E5D24E07E8050A0733270000000000000000000000000000000000
002030000000000000000000007E8050A073329291830B70D0A

2B4556541000FE7FBF006680200F01000102561460070050310964 2EE8000200000101210D0101
000000004C005C06FB411E01E5D1CB07E8050A07153804600001DF5C027A4F1F0000000000000
002030000000000000000000007E8050A071539276CF1AD0D0A

2B4556541700FE7FBF006680200F010001025614600700503109642EE8000200000101220D0101
00060200B2005C06FB40C501E5D13B07E8050A071C0604600001DF5C027A4F1F0000000000000
002030000000000000000000007E8050A071C0827AEBE760D0A

2B4556541800FE7FBF006680200F010001025614600700503109642F14000200000101220E0101
000004015E005A06FB40AB01E5D12607E8050A071C1104600001DF5C027A4F1F0000000000000
002030000000000000000000007E8050A071C1327B572C40D0A

2B4556541D00FE7FBF006680200F010001025614600700503109642EE8000200000101210F0101
000000015E005A06FB40A201E5D13B07E8050A071D2704600001DF5C027A4F1F0000000000000
002030000000000000000000007E8050A071D2827CA010E0D0A

2B4556546700FE7FBF006680200F01000102564A580606485E0564000000000000000001A0F0101
000703015D005806FB401501E5D44907E8050B02123A04600000550B085BE2AA000000000000
000040000000000000000000007E8050B0A123A1D892C840D0A
```

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01

Parts	Fields	Length	Range/Format
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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
	CAN Data	<=400	
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

Message	ID
+RESP:GTSTC	8
+RESP:GTSTT	9
+RESP:GTPDP	12
+RESP:GTIGN	13
+RESP:GTIGF	14
+RESP:GTUPD	15
+RESP:GTIDN	16
+RESP:GTIDF	17
+RESP:GTJDR	20
+RESP:GTGSS	21
+RESP:GTSTR	23
+RESP:GTSTP	24
+RESP:GTCRA	25
+RESP:GTDOS	27
+RESP:GTGES	28
+RESP:GTLSP	29
+RESP:GTJDS	32
+RESP:GTRMD	33
+RESP:GTUPC	40
+RESP:GTCLT	41
+RESP:GTCFU	42
+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:GTBAR	70
+RESP:GTBIE	77
+RESP:GTEUC	84
+RESP:GTRTP	86
+RESP:GTDRM	103

Message	ID
+RESP:GTECR	105

✧ *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

5.4.2 BPL(Backup Battery Low Alarm)

The event report message **+RESP:GTBPL** in HEX format is as below.

Example:

2B4556540600FE7FBF006880200F01000102561460070050310904000000020000000 1110F0E71
010100000000165004606FB3FEB01E5D25807E8050B081E2504600001DF5C05FE6667000000000
00000240000000000000000000000007E8050B081E265CA3BED80D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	

Parts	Fields	Length	Range/Format
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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
	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
	CAN Data	<=400	
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:
2B4256541400FE7FBF006780200F01000102561460070050310964 2CEB0002000001012108030 1
2B4256541400FE7FBF006780200F010001025614600700503109642CEB00020000010121080301
000004000019005906FB411901E5D2E607E8050A0737330000000000000000000000000000000
00002030000000000000000000007E8050A073A2E297894B30D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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

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
	CAN Data	<=400	
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:
2B4556542000FE7FBF006880200F010001025614600700503109642D0100020000010122060103
010000000000A9010606FB3E7201E5E41B07E8050A08030C04600001DF5C027A4F1F000001050
00000030800000000000000000007E8050A08091C29B0731C0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI
	Battery Level	1	0 - 100
	External Power Voltage	2|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22

Parts	Fields	Length	Range/Format
			0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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
	Total Hour Meter Count	6	HHHHHHHHMMSS
	CAN Data	<=400	
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 IGN | IGF

✧ IGN - Ignition-on Report

✧ IGF - Ignition-off Report

The HEX format of the event report messages **+RESP:GTIGN** and **+RESP:GTIGF** is as follows. For these two types of messages, the <Current Mileage> and <Total Mileage> fields will always be present regardless of the <+EVT Mask> setting.

Example:
```
2B4556540E00FE7FBF006A80200F01000102561460070050310964 2EE8000000000200120F0000
128A010100000200B4006206FB402501E5D3CE07E8050A032C3B04600001DF5C027A4F1F00000
0000000000202000000000000000000007E8050A032D0022A4DF9C0D0A

2B4556540D00FE7FBF006A80200F0100010256146007005031096 42EFE0000000000300220F0000
0005010100000200A9006206FB402501E5D3CC07E8050A032D0304600001DF5C027A4F1F00000
0000000000202000000000000000000007E8050A032D0522A9529D0D0A
```

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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

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
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.6 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:
2B4556542D00FE7FBF006C80200F010001025614600700503109642EE800000000200220E0004
00000540101000008005A006106FB408901E5D28C07E8050A03301D04600001DF5C05FE66670
00000000000002020000000000000000000007E8050A03301F22CFF36E0D0A

2B4556542E00FE7FBF006C80200F010001025614600700503109642ED200000000200110F0004
00000450101000104009D006006FB409301E5D25007E8050A03312604600001DF5C05FE66670
00000000000002020000000000000000000007E8050A03312722DBFA1A0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Reserved	1	00
	Report Type	1	2 | 4 | 5 | 7
	Duration of Ignition On or Ignition Off | External Power Voltage	4	0 - 999999(s)|0 - 99999(mV)
	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
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.7 IDF(Exit Idle State)

The HEX format of the event report message **+RESP:GTIDF** is as follows.

Example:
2B4556541100FE7FBF006A80200F01000102561460070050310964 2EFE000000000200110F0000
00140101000000015C005F06FB408601E5D3D407E8050A03352B04600001DF5C027A4F1F00000
000000000020200000000000000000000007E8050A03352D22F7476F0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22

Parts	Fields	Length	Range/Format
			0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.8 GSS(GNSS Signal Status)

The HEX format of the event report message **+RESP:GTGSS** is as follows.

Example:
2B4556541500FE7FBF006B80200F010001025614600700503109642F40000000000100210E0100
00000001010000400B1005506FB402F01E5D38407E8050A03060804600001DF5C05A6D20B000
0000000000002020000000000000000000007E8050A03060921E8BCD50D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	GNSS Signal Status	1	0|1
	Reserved	4	00000000
	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
	CAN Data	<=400	
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.
- *GNSS Signal Status*

  0 means "GNSS signal lost or no successful GNSS fix", and 1 means "GNSS signal recovered and successful GNSS fix".

5.4.9 DOS(Wave Shape 1 Output Status)

The HEX format of the event report message **+RESP:GTDOS** is as follows.

Example:
2B4556541B00FE7FBF006880200F010001025614600700503109642F1400000000201110F0101
0101000000015C005F06FB408601E5D3D407E8050A03380D04600001DF5C027A4F1F000000000
0000002020000000000000000000007E8050A03380E23026F1C0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01

Parts	Fields	Length	Range/Format
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Wave1 Output ID	1	1
	Wave1 Output Active	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
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.10 GES(Parking-Fence Information)

The HEX format of the event report message **+RESP:GTGES** is as follows.

Example:
2B4556541C00FE7FBF007280200F0100010256146007005031096 42F14000000000201110F0000

0115000001F4000001F40101000000015C005F06FB408601E5D3D407E8050A033A0104600001D
F5C027A4F1F000000000000000020200000000000000000000007E8050A033A032313F92D0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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

Parts	Fields	Length	Range/Format
	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
	CAN Data	<=400	
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.

5.4.11 RMD(Roaming State Report)

The HEX format of the event report message **+RESP:GTRMD** is as follows.

Example:
2B4556542100FE7FBF006780200F010001025614600700503109642E790000000000201110F0201
0100000000C1005F06FB407401E5D3CE07E8050A05052204600001DF5C027A4F1F000000000000
00002020000000000000000007E8050A05052323B421650D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.12 CLT(CANBUS Information Alarm)

The HEX format of the event report message **+RESP:GTCLT** is as follows.

Example: 2B4556542900FE7FBF007380200F01000102561460070050310964 2ED20002000001 01210D000 0000000000000000000000201010000000076006706FB415101E5D3A907E8050B062B35046000 01DF5C05FE66670000000000000000240000000000000000000007E8050B062B365B1966E10D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Group ID	1	00 - 19
	Alarm Mask 1	4	00000000 - FFFFFFFF
	Alarm Mask 2	4	00000000 - FFFFFFFF
	Alarm Mask 3	4	00000000 - FFFFFFFF
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359
	Altitude	2	

Parts	Fields	Length	Range/Format
	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
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

- *Group ID*

  The ID of CANBUS alarm group. The CANBUS alarm function supports settings of a total of 20 groups.

- *Alarm Mask 1*

  The alarm mask is configured in a bitwise manner. The alarm mask information is based on <Detailed Information / Indicators> of the **CAN** (ASCII)/(HEX) message.

- *Alarm Mask 2*

  The alarm mask is configured in a bitwise manner. The alarm mask information is based on <Lights> and <Doors> of the **CAN** (ASCII)/(HEX) message.

- *Alarm Mask 3*

  The alarm mask is configured in a bitwise manner. The alarm mask information is based on <Engine RPM> of the **CAN** (ASCII)/(HEX) message.

5.4.13 PNR(Power-on Reason)

Example:

```
2B4556543000FE7FBF006780200F010001025614600700503109640000000000000020041000201
00000000000000000000000000000000000000000000000000000000000000000000000000
00020200000000000000000007E8050A032F0E22C101550D0A
```

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Power On Reason	1	0-3 | 5 | 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

Parts	Fields	Length	Range/Format
	Total Hour Meter Count	6	HHHHHHHHMMSS
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.14 PFR(Power-off Reason)

Example:
2B4556543100FE7FBF006780200F0100010256146007005031096 42EFE000000000200110F0201
0100000000AF006106FB402001E5D3B307E8050A032E3504600001DF5C027A4F1F00000000000
000020200000000000000000007E8050A032E3622C0CC080D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Power Off Reason	1	0-3
	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
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.15 ASC(Acceleration Calibration Alarm)

The HEX format of the event report message **+RESP:GTASC** is as follows.

Example:
2B4556542F00FE7FBF006F80200F0100010256146007005031096 42EBB000200000101220F6300
04009EEF04119E0101003508010E002B06FB13CF01E5B7F207E8050B051D2904600001DF5C05F
B3415000002060000000700000000000000000000007E8050B051D2A5580CBF90D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F

Parts	Fields	Length	Range/Format
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	X_Forward	1	-100 - 100
	Y_Forward	1	-100 - 100
	Z_Forward	1	-100 - 100
	X_Side	1	-100 - 100
	Y_Side	1	-100 - 100
	Z_Side	1	-100 - 100
	X_Vertical	1	-100 - 100
	Y_Vertical	1	-100 - 100
	Z_Vertical	1	-100 - 100
	Number	1	1
	GNSS Accuracy	1	0 - 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

Parts	Fields	Length	Range/Format
	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
	CAN Data	<=400	
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.

5.4.16 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:

2B4556542F00FE7FBF006F80200F01000102561460070050310964 2EBB000200000101220F6300
04009EEF04119E0101003508010E002B06FB13CF01E5B7F207E8050B051D2904600001DF5C05F
B3415000002060000000700000000000000000000007E8050B051D2A5580CBF90D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF

Parts	Fields	Length	Range/Format
	Unique ID	8	IMEI/Device Name
	Battery Level	1	0 - 100
	External Power Voltage	2|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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
	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

Parts	Fields	Length	Range/Format
	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.

5.4.17 CRA(Crash Alarm)

The HEX format of the event report message **+RESP:GTCRA** is as follows.

Example:
2B4556541900FE7FBF006780200F0100010256146007005031096420EFE0000000002011A0F0001
0100020700D9007206FB406001E5D39D07E8050A05081B04600001DF5C027A4F1F00000000000
00002020000000000000000000007E8050A05081C23BE4DA40D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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

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
	CAN Data	<=400	
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.

5.4.18 BCS(Bluetooth Connection Alarm)

The report for Bluetooth connection.

Example:
2B4556543400FE7FBF008380200F01000102561460070050310964 2EE8000000000201110F0D03
4756353043455525494D4549007805413D61920001545FCCCD44C5010100000000C2006F06FB4
0AE01E5D3A607E8050A05273604600001DF5C027A4F1F000000000000000202000000000000000
000007E8050A0527382443D3AE0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	

Parts	Fields	Length	Range/Format
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	CAN Data	<=400	
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.

5.4.19 BDS(Bluetooth Disconnection Alarm)

The report for Bluetooth disconnection.

Example:
2B4556543500FE7FBF008480200F010001025614600700503109642EE800000000201110F0D03
475635304345552549 4D4549007805413D61920001545FCCCD44C500010100000000C2006F06F
B40AE01E5D3A607E8050A05280104600001DF5C027A4F1F000000000000000202000000000000
00000007E8050A05280224448DF60D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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 | 4
	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
	CAN Data	<=400	
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.

5.4.20 BAA(Bluetooth Accessory Alarm)

The HEX format of the event report message **+RESP:GTBAA** is as follows.

Example:
2B4556544100FE7FBF007480200F010001025614600700503109642EE80000000000201110FFF03
0004000A78054101F54B0B3A01010000000000E9006906FB408801E5D3E307E8050A052E2104600
001DF5C027A4F1F00000000000000002020000000000000000000007E8050A052E22245CDE470D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF

Parts	Fields	Length	Range/Format
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Index	1	0-9 | FF | FE
	Accessory Type	1	0-3 | 6 | 11-14
	Accessory Model / Beacon ID Model	1	0-5
	Alarm Type	1	0-4 | 7-A | C | E-18
	Append Mask	2	0000 - FFFF
	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(centigrade)
	Accessory Humidity(Optional)	1	0 - 100%(rh)
	Accessory Mode(Optional)	1	0 - 10
	Accessory Event(Optional)	1	0 - 2
	Tire Pressure(Optional)	2	0 - 500(kPa)
	Timestamp(Optional)	7	YYYYMMDDHHMMSS
	Enhanced Temperature(Optional)	2	-40.00 - 80.00(centigrade)
	Magnet ID(Optional)	1	00 - FF

Parts	Fields	Length	Range/Format
	MAG Event Counter(Optional)	2	0 - 32767
	Magnet State(Optional)	1	0 - 1
	Accessory Battery Percentage(Optional)	1	0 - 100(%)
	Relay Config Result(Optional)	1	0 - 4
	Relay State(Optional)	1	0 - 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	
	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
	CAN Data	<=400	
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.
- **1** - Escort sensor.

- **2** - Beacon temperature sensor.
- **3** - Bluetooth beacon accessory.
- **6** - Beacon Multi-functional sensor.
- **11** - Magnet sensor.
- **12** - BLE TPMS sensor.
- **13** - Relay sensor.
- **14** - Smart Cap Bluetooth accessory.

✧ *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).
- **0A** - Angle event notification.
- **0C** - Magnet event notification.
- **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.
- **16** - Cap is on neck and locked.
- **17** - Cap is removed from neck.
- **18** - Cap is rotated.

✧ *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 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>

Note

In the message bit 0 - bit 15 precedes bit 16 - bit 31. Here is an example: <Accessory Append Mask> = 0x881F0007, 0x81F indicates bit 15 - bit 0, 0x007 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 longitude is converted to an integer with 2 implicit decimals, and the integer is reported in HEX format. If the longitude 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.

✧ *Accessory Mode*

The operating mode of angle sensor.

✧ *Accessory Event*

The event is generated by the angle sensor.

✧ *Timestamp*

Timestamp of the tire pressure value collection.

✧ *Magnet ID*

ID corresponding to different magnet sensors.

✧ *MAG Event Counter*

The total number of times detected by the magnet sensor.

✧ *Magnet State*

The state of the magnet sensor's two parts.

- **0** - Separate
- **1** - Closed

✧ *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.

5.4.21 BID(Bluetooth Beacon ID Setting)

The HEX format of the event report message **+RESP:GTBID** is as follows.

Example:
2B4556544300FE7FBF007280200F010001025614600700503109642EE8000000000301220F0100
000A78054101F54B0B48010100000400B2006906FB407701E5D3CC07E8050A05332104600001D
F5C027A4F1F0000000000000002020000000000000000007E8050A05332324718F400D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	

Parts	Fields	Length	Range/Format
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Number	1	0 - 3 | 0 - 15
	Beacon ID Model	1	0 | 2-4
	Accessory Append Mask	2	0000 - FFFF
	Accessory MAC	6	'0' - '9' 'A' - 'F'
	Accessory Battery Level	2	0 - 5000(mV)
	Accessory Signal Strength	1	-120 - 0
	Beacon type	1	0 - 2
	Beacon Data	<=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
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF

Parts	Fields	Length	Range/Format
	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.
- **WID300** - 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)

Fields	Length	Range/Format
Minor	2	(HEX)

- If <Beacon Type> is 2, the data format is as follows:

Fields	Length	Range/Format
NID	10	(HEX)
BID	6	(HEX)

5.4.22 BIE(Bluetooth Beacon ID Setting)

The HEX format of the event report message **+RESP:GTBIE** is as follows.

Example:

2B4556544D00FE7FBF01D380200F0100010256146007005031096 42EE8000000000301220F0001
03021E03004A780541295AD40BB8B203004A7805412ED9AE0BC2C503004A7805412ED98B0000
BB03004A7805412EBB2D0B86C003004A7805412ED9120000C203004A7805412ED9730BAEBB03
004A7805412EB7DE0BA4BE03004A7805412ED9C80BB8C103004A7805412EB93A0BA4B903004A
7805412ED9CE0BC2C303004A7805412ED99C0BA4C103004A7805412EB9EF0B68BE03004A7805
412ED8DC0B90C803004A7805412ED9400B90BC03004A7805412ED92D0BA4C103004A7805412E
D9600B9AC403004A7805412ED9970BB8BB03004A7805412EB9160B90BE03004A780541295A96
0B4ABA03004A780541295A4C0BC2B603004A7805412ED97E0BAEC103004A7805412ED97D0000
C103004A7805412ED9CB0BCCC203004A7805412ED8C50B9AC503004A7805412EB8FF0BEABB03
004A7805412EB98C0BB8BC03004A7805412ED9470000CD03004A7805412ED96D0BCCBD03004
A7805412ED9890BCCCA03004A7805412ED9280000B301010000080010006606FB40CA01E5D37
207E8050A05380704600001DF5C027A4F1F0000000000000002020000000000000000007E805
0A053809249AA1620D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	

Parts	Fields	Length	Range/Format
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Detected Count	2	0 - 9999
	Total Frame	1	1 - 4
	Frame Index	1	1 - 4
	Beacon Number	1	0 - 30
	Beacon ID Model	1	0 | 3 | 4
	Accessory Append Mask	2	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(dBm)
	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
	CAN Data	<=400	

Parts	Fields	Length	Range/Format
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

- *Detected Count*

  The value to indicate the sequence number of beacon have been detected. It will start at 0 when it over 9999.
- *Total Frame*

  A numeral to indicate the total number of frames that the following data takes up.
- *Frame Index*

  A numeral to indicate the index of the current frame.
- *Beacon Number*

  The number of the Bluetooth beacon accessories.
- *Beacon ID Model*

  The model of the Bluetooth beacon 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>
- *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.

5.4.23 BAR(Bluetooth Accessory Report)

The HEX format of the event report message **+RESP:GTBAR** is as follows.

Example:

2B4556544600FE7FBF008D80200F010001025614600700503109642ED20000000000301210F0007
0000075337000018E9C336E001052DF758A313002DC27EC87DD48000040000FFFFFFFFFFFF0101
000000034006C06FB405E01E5D3FE07E8050A06100204600001DF5C027A4F1F00000000000000
0020200000000000000000007E8050A061003252E8CAC0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Index	1	0 - 9
	Accessory Type	1	7
	Accessory Model	1	0 - 4
	Append Mask	2	0000 - FFFF
	Accessory Name	<=20	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Accessory MAC	6	'0' - '9' 'A' - 'F'
	Accessory Status	1	0 - 1
	(Accessory Data)	<=650	
	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
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Accessory Data*

There are accessory data para according <Accessory Type> and <Accessory Model>.

- If the <Accessory Type> is 7 and <Accessory Model> is 0 (DUT-E S7) or <Accessory Model> is 4 (GNOM DP S7):

Fields	Length	Range/Format
Version	1	00 - FF
PGN	2	0000 - FFFF
PGN Data	21	000000000000000000000000000000000000000000 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

- If the <Accessory Type> is 7 and <Accessory Model> is 3(GNOM DDE S7):

Fields	Length	Range/Format
Version	1	00 - FF
PGN	2	0000 - FFFF
PGN Data	20	0000000000000000000000000000000000000000 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

- If the <Accessory Type> is 7 and <Accessory Model> is 1 (DFM 100 S7):

Fields	Length	Range/Format
Version	1	00 - FF
PGN1	2	0000 - FFFF
PGN Data1	20	0000000000000000000000000000000000000000 --

Fields	Length	Range/Format
		FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
PGN2	2	0000 - FFFF
PGN Data2	20	0000000000000000000000000000000000000000 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
PGN3	2	0000 - FFFF
PGN Data3	20	0000000000000000000000000000000000000000 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

- If the <Accessory Type> is 7 and <Accessory Model> is 2 (DFM 250DS7):

Fields	Length	Range/Format
Version	1	00 - FF
PGN1	2	0000 - FFFF
PGN Data1	20	0000000000000000000000000000000000000000 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
PGN2	2	0000 - FFFF
PGN Data2	20	0000000000000000000000000000000000000000 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
PGN3	2	0000 - FFFF
PGN Data3	20	0000000000000000000000000000000000000000 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
PGN4	2	0000 - FFFF
PGN Data4	20	0000000000000000000000000000000000000000 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

5.4.24 RTP(Remote File Transfer)

The HEX format of the event report message **+RESP:GTRTP** is as follows.

Example:
2B4556545600FE7FBF009180200F010001025614600700503109642EE800000000201110F0000
000064687474703A2F2F36302E3137342E3232352E3137333A31303038382F32325F61742E696E

6900010100000000C2006F06FB40AE01E5D3A607E8050A05292604600001DF5C027A4F1F00000
000000000020200000000000000000007E8050A05292824493AFF0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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

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
	CAN Data	<=400	
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.

5.4.25 CFU(CAN100 FOTA Upgrade Report)

The HEX format of the event report message **+RESP:GTCFU** is as follows.

Example:
2B4556542A00FE7FBF006980200F0100010256146007005031096 42F5600000000100210F0065
00010100000000117006006FB404A01E5D20C07E8050A03021404600001DF5C05FE66670000000
000000002020000000000000000000007E8050A03021421CE9C810D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Code	2	
	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

Parts	Fields	Length	Range/Format
	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
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.26 ECR(Extended Crash Alarm)

The HEX format of the event report message **+RESP:GTECR** is as follows.

Example:
2B4556546900FE7FBF006B80200F010001025614600700503109642EE80000000000002011A0F033D
00000001010000030156007006FB408901E5D3CA07E8050A05161F04600001DF5C027A4F1F000
00000000000020200000000000000000007E8050A05162123FF17BF0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12

Parts	Fields	Length	Range/Format
			0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in View	1	0 - 24
	Crash Counter	1	00 - FF
	Trigger Degrees	1	0 - 180
	Engine Status	1	0 | 1
	Reserevd	1	00
	Reserevd	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

- *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.

5.5 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 CRD(Crash Data Packet)

The HEX format of the report message **+RESP:GTCRD** is as follows.

Example:
2B435244007D028280200F010001025614600700503109032005030258FFFEFFF8FFB0FFFFFFF6F
FAF0000FFF5FFA80001FFF9FFA1FFFDFFF0FF9C00020002FFA50009FFFBFFB7FFFFFFFDFFAE0005F
FFDFFB50000FFF6FFB7FFFD000AFFB60003FFFCFFB300000002FF9B0005FFF8FF9BFFFDFFFDFF9F
0000FFFFFFA90000FFF8FFAF0000FFF7FFB3FFF9FFFCFFB9FFFCFFF3FFC1FFFBFFF0FFC1FFFC0003F
FBCFFF9000AFFB5FFF8FFFDFFB0FFFCFFFFFFAD0000000AFFA800090036FF4F00030013FFB5FFFD
0013FFB5FFFC0004FFAF00020015FFAFFFFCFFFDFFB8FFFC001AFFB8000B000DFFBA000F0007FFB
500030014FFBC0005001DFFB300040017FFAF000B0011FFAB000D001DFFAE0003001CFFA50013F
FF1FFB10000000CFFB20007000AFFB100020019FFB400000015FFB3001CFFE2FFB4000EFFD8FFB
A000E0003FFC0000E002EFFAF000C0022FF81000B0008FFA300070012FFAF0003000CFFBE00080
007FFB400090011FFA800050000FFAF00050001FFB100050000FFB000050002FFB000050001FFB3
00050001FFB300040000FFB10004FFFDFFAE00060008FF920005FFFAFFB20003FFFEFFAF0005FFF
DFFAF0004FFFCFFAE0005FFFEFFAF0004FFFDFFAF0005FFFDFFAE0004FFFDFFB00002FFF7FFB1FFF
FFFF4FFAF0005FFF6FFB00002FFFAFFAF0006FFFAFFB100090009FFB10000FFF6FFAB0001FFFFFFA
A0001FFFDFFAE0002FFF6FFAE0007FFF3FFB10005FFFAFFB00005FFF4FFB10006FFFAFFB00005FFF
CFFAF0005FFF9FFAF0005FFFCFFAF0007FFFCFFAE0003FFFDFFAF0004FFFDFFAF0006FFF9FFB0000
1FFF8FFB00005FFF2FFB10009FFF7FFAE0003FFFCFFB00005FFF7FFB10002FFF6FFAF07E8050A051
62124023F410D0A

Parts	Fields	Length	Range/Format
Head	Message Header	4	+CRD
	Report Mask	2	0000 - FFFF
Body	Length	2	
	Device Type	3	80200F
	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	1 - 15
	Frame Number	1	1 - 15

Parts	Fields	Length	Range/Format
	Data Length	2	0 - 1200
	Data	<=1200	HEX
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	Fixed value	0

✧ *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 are 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.

5.5.2 ACC(Acceleration Data Packet)

The HEX format of the report message **+RESP:GTACC** is as follows.

```
Example:
2B41434380200F0100561460070050310900 04FFAFFFF70005FFAFFFF70004FFB0FFF70003FFAFF
```

Parts	Fields	Length	Range/Format
Head	Message Header	4	+ACC
Body	Device Type	3	80200F
	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 CANBUS Information Report

This section describes the message format of CANBUS information. Please refer to the details below.

5.6.1 CAN(CANBUS Device Information)

The CANBUS device information report message **+RESP:GTCAN** uses the format below.

Example:
2B43414E01000007FF00EF80200F0100010247563530434555000000207FFFFF0000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000
00000000000000000000FFFFFF000000000000000000000000000000000000000000000000000
00000000000000000000000000000000000000000000000000000000000000000000000010000
00011D005D06FB405201E5D1A807E8050A062C3404600001DF5C027A4F1F0007E8050A062C35
262CAD2B0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+CAN
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	Distance Type|Report Type	1	X(0 | 1)X(0-2)
	CANBUS Device State	1	0 | 1
	CANBUS Report Mask	4	0x00000000 - 0xFFFFFFFF
	VIN	17	
	Ignition Key	1	0-2

Parts	Fields	Length	Range/Format
	Total Distance	4	H(0 - 99999999)/I(0 - 2147483647)
	Total Fuel Used	5	0.00 - 999999.99(L)
	Engine RPM	2	0 - 16383(rpm)
	Vehicle Speed	2	0 - 455(km/h)
	Engine Coolant Temperature	2	-40 - +215(Centigrade)
	Fuel Consumption	3	L/100km(0.0 - 999.9)|L/H(0.0 - 999.9)
	Fuel Level (Liter)	5	L(0.00 - 9999.99)
	Fuel Level (Percentage)	5	P(0.00 - 100.00)
	Range	4	0 - 99999999(hm)
	Accelerator Pedal Pressure	2	0 - 100(%)
	Total Engine Hours	5	0.00 - 9999999.99(h)
	Total Driving Time	5	0.00 - 9999999.99(h)
	Total Engine Idle Time	5	0.00 - 9999999.99(h)
	Total Idle Fuel Used	5	0.00 - 999999.99(L)
	Axle Weight 2nd	2	0 - 65535(kg)
	Tachograph Information	2	00 - FFFF
	Detailed Information/Indicators	2	00 - FFFF
	Lights	1	0x00 - 0xFF
	Doors	1	0x00 - 0xFF
	Total Vehicle Overspeed Time	5	0.00 - 9999999.99(h)
	Total Vehicle Engine Overspeed Time	5	0.00 - 9999999.99(h)
	Total Distance Impulses	4	0 - 21474836
	CANBUS Report Expansion Mask	4	0x00000000 - 0xFFFFFFFF
	Ad-Blue Level	2	0 - 100(%)
	Axle Weight 1st	2	0 - 65535(kg)
	Axle Weight 3rd	2	0 - 65535(kg)
	Axle Weight 4th	2	0 - 65535(kg)
	Tachograph Overspeed Signal	1	0|1
	Tachograph Vehicle Motion Signal	1	0|1
	Tachograph Driving Direction	1	0|1
	Analog Input Value	4	0 - 99999(mV)
	Engine Braking Factor	4	0 - 4278190079
	Pedal Braking Factor	4	0 - 4278190079

Parts	Fields	Length	Range/Format
	Total Accelerator Kick-downs	4	0-999999
	Total Effective Engine Speed Time	5	0.00 - 9999999.99(h)
	Total Cruise Control Time	5	0.00 - 9999999.99(h)
	Total Accelerator Kick-down Time	5	0.00 - 9999999.99(h)
	Total Brake Applications	4	0 - 999999
	Tachograph Driver 1 Card Number	<=40	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Tachograph Driver 2 Card Number	<=40	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Tachograph Driver 1 Name	< =40	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Tachograph Driver 2 Name	< =40	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Registration Number	<=40	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	Expansion Information	2	0x0000 - 0xFFFF
	Rapid Brakings	4	0 - 16711679
	Rapid Accelerations	4	0 - 16711679
	Engine Torque	1	0 - 100(%)
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (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
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Message Type*

The ID of the CAN report message.

Message	ID
+RESP:GTCAN	1

✧ *Report Mask*

Please refer to <+CAN Mask> in (AT+GTHRM).

✧ *Length*

The length of the whole message from header to the tail characters.

✧ *Unique ID*

If Bit 6 of <+CAN Mask> is 0, the IMEI of the device is used as the unique ID of the device. IMEI is a 15-digit string. In the HEX format message, each 2 digits are encoded into one byte as an integer.

IMEI	13	57	90	24	68	11	22	0
HEX	0D	39	5A	18	44	0B	16	00

If Bit 6 of <+CAN Mask> is 1, the device name is used as the unique ID of the device. Device name is an 8-byte string, please refer to <Device Name> in (AT+GTCFG) for the device name. 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

✧ *Distance Type / Report Type*

The high nibble is for <Distance type> and the low nibble is for <Report Type>.

Distance type has the following meanings.

- **0** - Total distance acquired from CAN Chipset.
- **1** - Total distance obtained by calculation with GNSS.

Report type has the following meanings.

- **0** - Periodic report.
- **1** - RTO CAN report.
- **2** - Ignition event report.

✧ *CANBUS Device State*

A numeral to indicate the state of communication with the external CANBUS device.

- **0** - Abnormal. It fails to receive data from the external CANBUS device.
- **1** - Normal. It is able to receive data from the external CANBUS device.

✧ *CANBUS Report Mask*

Please refer to <CAN Report Mask> in (AT+GTCAN).

✧ *VIN*

Vehicle identification number.

✧ *Total Distance*

Vehicle distance. The number is always increasing. The unit is hectometer. If it is set to 0, the distance is not available.

✧ *Total Fuel Used*

A total of 5 bytes. The first 4 bytes are for the integer part of the total fuel used and the last byte is for the fractional part. The fractional part has 2 digits.

✧ *Engine Coolant Temperature*

The engine coolant temperature of the vehicle. 2 bytes in total. If this value is negative, it is represented in Two's complement format.

✧ *Fuel Level (Liter)*

5 bytes in total. The first 4 bytes are for the integer part of the fuel level (liters) and the last byte is for the fractional part. The fractional part has 2 digits. This field is controlled by Bit 8 in <CANBUS Report Mask>.

✧ *Fuel Level (Percentage)*

5 bytes in total. The first 4 bytes are for the integer part of the fuel level (percentage) and the last byte is for the fractional part. The fractional part has 2 digits. This field is controlled by Bit 8 in <CANBUS Report Mask>.

✧ *Fuel Consumption*

3 bytes in total. The first byte indicates the unit. The unit L/100km is represented as FE, and the unit L/H is represented as FF. The other two bytes indicate the value. The fuel consumption value is converted to an integer with 1 implicit decimal digit by multiplying it by 10 and the integer is reported in HEX format.

Fuel Consumption Value 12.1	**121**	
HEX	00	79

✧ *Total Engine Hours*

5 bytes in total. The first 4 bytes are for the integer part of the total engine hours and the last byte is for the fractional part. The fractional part has 2 digits.

✧ *Total Driving Time*

5 bytes in total. The first 4 bytes are for the integer part of the total driving time and the last byte is for the fractional part. The fractional part has 2 digits.

✧ *Total Engine Idle Time*

5 bytes in total. The first 4 bytes are for the integer part of the total engine idle time and the last byte is for the fractional part. The fractional part has 2 digits.

✧ *Total Idle Fuel Used*

5 bytes in total. The first 4 bytes are for the integer part of the total idle fuel used and the last byte is for the fractional part. The fractional part has 2 digits.

✧ *Tachograph Information*

Two bytes. The high byte describes driver 2, and the low byte describes driver 1.

Each byte format:

Validity mark	**Reserved**	**Driver working states**		**Driver card**	**Driving time related states**		
V	R	W1	W0	C	T2	T1	T0

- **V** - Validity mark (0 - valid driver data, 1 - no valid data)
- **R** - Reserved
- **C** - Driver card (1 - card inserted, 0 - no card inserted)
- **T2-T0** - Driving time related states:
  - **0** - Normal / no limits reached
  - **1** - 15min before 4½h
  - **2** - 4½h reached

  - **3** - 15min before 9h
  - **4** - 9h reached
  - **5** - 15 minutes before 16h (without 8h rest during the last 24h)
  - **6** - 16h reached
  - **7** - Other limit
- **W1-W0** - Driver working states:
  - **0** - Rest - sleeping
  - **1** - Driver available - short break
  - **2** - Work - loading, unloading, working in an office
  - **3** - Driver - behind the wheel

✧ *Detailed Information / Indicators*

2 bytes in total. Each bit contains information of one indicator.

- **Bit 0** - FL - fuel low indicator (1 - indicator on, 0 - off)
- **Bit 1** - DS - driver seatbelt indicator (1 - indicator on, 0 - indicator off)
- **Bit 2** - AC - air conditioning (1 - on, 0 - off)
- **Bit 3** - CC - cruise control (1 - active, 0 - inactive)
- **Bit 4** - B - brake pedal (1 - pressed, 0 - released)
- **Bit 5** - C - clutch pedal (1 - pressed, 0 - released)
- **Bit 6** - H - handbrake (1 - pulled-up, 0 - released)
- **Bit 7** - CL - central lock (1 - locked, 0 - unlocked)
- **Bit 8** - R - reverse gear (1 - on, 0 - off)
- **Bit 9** - RL - running lights (1 - on, 0 - off)
- **Bit 10** - LB - low beams (1 - on, 0 - off)
- **Bit 11** - HB - high beams (1 - on, 0 - off)
- **Bit 12** - RFL - rear fog lights (1 - on, 0 - off)
- **Bit 13** - FFL - front fog lights (1 - on, 0 - off)
- **Bit 14** - D - doors (1 - any door open, 0 - all doors closed)
- **Bit 15** - T - trunk (1 - open, 0 - closed)

✧ *Lights*

A hexadecimal number. Each bit contains information of one light.

- **Bit 0** - Running Lights (1 - on, 0 - off)
- **Bit 1** - Low Beam (1 - on, 0 - off)
- **Bit 2** - High Beam (1 - on, 0 - off)
- **Bit 3** - Front Fog Light (1 - on, 0 - off)
- **Bit 4** - Rear Fog Light (1 - on, 0 - off)
- **Bit 5** - Hazard Lights (1 - on, 0 - off)
- **Bit 6** - Reserved
- **Bit 7** - Reserved

✧ *Doors*

A hexadecimal number. Each bit contains information of one door.

- **Bit 0** - Driver Door (1 - open, 0 - closed)
- **Bit 1** - Passenger Door (1 - open, 0 - closed)
- **Bit 2** - Rear Left Door (1 - open, 0 - closed)
- **Bit 3** - Rear Right Door (1 - open, 0 - closed)

- **Bit 4** - Trunk (1 - open, 0 - closed)
- **Bit 5** - Hood (1 - open, 0 - closed)
- **Bit 6** - Reserved
- **Bit 7** - Reserved

✧ *Total Vehicle Overspeed Time*

5 bytes in total. The first 4 bytes are for the integer part of the total vehicle overspeed time and the last byte is for the fractional part. The fractional part has 2 digits.

✧ *Total Vehicle Engine Overspeed Time*

5 bytes in total. The first 4 bytes are for the integer part of the total vehicle engine overspeed time and the last byte is for the fractional part. The fractional part has 2 digits.

✧ *Total Distance Impulses*

Vehicle distance in impulses. The number is always increasing. The unit is imp. If it is set to 0, the distance in imp is not available.

✧ *Ad-Blue Level*

The level of Ad-Blue. 2 bytes in total.

✧ *Axle Weight 1st*

Vehicle first axle weight. The unit is kg.

✧ *Axle Weight 3rd*

Vehicle third axle weight. The unit is kg.

✧ *Axle Weight 4th*

Vehicle fourth axle weight. The unit is kg.

✧ *Tachograph Overspeed Signal*

Vehicle overspeed signal from the tachograph.

- **0** - Overspeed is not detected.
- **1** - Overspeed is detected.

✧ *Tachograph Vehicle Motion Signal*

The vehicle motion signal in the tachograph.

- **0** - Motion is not detected.
- **1** - Motion is detected.

✧ *Tachograph Driving Direction*

Vehicle driving direction from the tachograph.

- **0** - Driving forward.
- **1** - Driving backward.

✧ *Analog Input Value*

The value of analog input. The unit is mV.

✧ *Engine Braking Factor*

It measures how often driver brakes with brake pedal or with engine and stores both counts (which are always increasing). Decreasing speed with no pedal pressed causes an increase of the engine braking factor.

✧ *Pedal Braking Factor*

It measures how often driver brakes with brake pedal or with engine and stores both counts (which are always increasing). Decreasing speed with brake pedal pressed causes an increase of pedal braking factor.

✧ *Total Accelerator Kick-downs*

The count of accelerator pedal kick-downs (with the pedal pressed over 90%).

✧ *Total Effective Engine Speed Time*

Total time when the vehicle engine speed is effective. The unit is hour. The first 4 bytes are for the integer part of the total engine idle time and the last byte is for the fractional part. The fractional part has 2 digits.

✧ *Total Cruise Control Time*

Total time when vehicle speed is controlled by cruise-control module. The unit is hour. The first 4 bytes are for the integer part of the total engine idle time and the last byte is for the fractional part. The fractional part has 2 digits.

✧ *Total Accelerator Kick-down Time*

Total time when accelerator pedal is pressed over 90%. The unit is hour. The first 4 bytes are for the integer part of the total engine idle time and the last byte is for the fractional part. The fractional part has 2 digits.

✧ *Total Brake Applications*

The count of braking processes initiated by brake pedal.

✧ *Tachograph Driver 1 Card Number*

The card number of tachograph driver 1. The value is a numeric string and ends by 0x00.

✧ *Tachograph Driver 2 Card Number*

The card number of tachograph driver 2. The value is a numeric string and ends by 0x00.

✧ *Tachograph Driver 1 Name*

The name of tachograph driver 1. The value is a name string and ends by 0x00.

✧ *Tachograph Driver 2 Name*

The name of tachograph driver 2. The value is a name string and ends by 0x00.

✧ *Registration Number*

The vehicle registration number. The value is a numeric string and ends by 0x00.

✧ *Expansion Information*

A hexadecimal number. Each bit contains information of one indicator.

- **Bit 0** - W - webasto (1 - on, 0 - off or not available)
- **Bit 1** - BFL - brake fluid low indicator (1 - on, 0 - off or not available)
- **Bit 2** - CLL - coolant level low indicator (1 - on, 0 - off or not available)
- **Bit 3** - BAT - battery indicator (1 - on, 0 - off or not available)
- **Bit 4** - BF - brake system failure indicator (1 - on, 0 - off or not available)
- **Bit 5** - OP - oil pressure indicator (1 - on, 0 - off or not available)
- **Bit 6** - EH - engine hot indicator (1 - on, 0 - off or not available)
- **Bit 7** - ABS - ABS failure indicator (1 - on, 0 - off or not available)
- **Bit 8** - Reserved
- **Bit 9** - CHK - "check engine" indicator (1 - on, 0 - off or not available)
- **Bit 10** - AIR - airbags indicator (1 - on, 0 - off or not available)
- **Bit 11** - SC - service call indicator (1 - on, 0 - off or not available)
- **Bit 12** - OLL - oil level low indicator (1 - on, 0 - off or not available)

✧ *Rapid Brakings*

The number of total rapid brakings since installation (calculation based on CAN100 settings of speed decrease time and value).

✧ *Rapid Accelerations*

The number of total rapid accelerations since installation (calculation based on CAN100 settings of speed increase time and value).

✧ *Send Time*

The local time to send the acknowledgement message. 7 bytes in total. The first 2 bytes are for year, and the other 5 bytes are for month, day, hour, minute and second respectively.

Send Time	2011		01	31	06	29	11
HEX	07	DB	01	1F	06	1D	0B

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:
2B4556542800FE7FBF009080200F010001025614600700503109642EE8000000000201110F0000
C8687474703A2F2F36302E3137342E3232352E3137333A31303038382F3232325F61742E696E69
00010100000000B1007006FB40B101E5D3C907E8050A051F2304600001DF5C027A4F1F0000000
000000002020000000000000000007E8050A051F242427BFE30D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12

Parts	Fields	Length	Range/Format
			0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Command ID	1	
	Result	2	100-103 | 200-202 | 300-302 | 304-306
	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
	CAN Data	<=400	
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** - <Command Mask>, <GEO ID Mask>, <Stocmd ID Mask> or <Group ID Mask> check fails.
- **305** - The update process is interrupted by abnormal reboot.
- **306** - The update process is interrupted by MD5 verification error.

✧ *Download URL*

The complete URL to download the configuration. It includes the file name 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:
2B4556540F00FE7FBF006980200F010001025614600700503109642EFE00000000100210F00C9
0101010000000117006006FB404A01E5D20C07E8050A03032204600001DF5C05FE66670000000
0000000202000000000000000000007E8050A03032221D67D820D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	

Parts	Fields	Length	Range/Format
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	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	
	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
	CAN Data	<=400	
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:
2B4556545400FE7FBF009680200F0100010256146007005031096 42EE800000000020111 0F0000
00C8687474703A2F2F36302E3137342E3232352E3137333A31303038382F3232325F61742E696E
690000000000000010100000000B1007006FB40B101E5D3C907E8050A05202404600001DF5C027
A4F1F0000000000000002020000000000000000007E8050A052025242E0BC30D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	80200F
	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|4	0 - 90000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Digital Input Status	1	00 - 42
	Digital Output Status	1	00 - 01
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Command ID	2	
	Result	2	100-103 | 200-202 | 300-302 | 304-306
	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	

Parts	Fields	Length	Range/Format
	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
	CAN Data	<=400	
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:
2B484244EF2280200F010001025614600700503109 07E8050A0522292435909A0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+HBD
	Report Mask	1	00 - FF
Body	Length	1	
	Device Type	3	80200F
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name

Parts	Fields	Length	Range/Format
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
Escort_Fuel_BLE	1	0	0	001F
Escort_Angle_BLE		3	0 | A	011F
Temperature ELA	2	1	0 - 3	081F
BLE CAN100	4	0		
WTH300	6	2	0-3 | 7-9	083F
ELA sensor		3	0-3 | 7-9	0837
DTH100(WMS301)		4	0-3 | 7-9 | 13-14	283F
WTH301		5	0-3 | 7-9	283F
DUT-E S7	7	0		0007
DFM 100S7		1		0007
DFM 250DS7		2		0007
GN0M DDE S7		3		0007
GNOM DP S7		4		0007
Fuel Sensor	10	0	0	001F
Angle Sensor		1	0	0017
MAG ELA	11	0	C	100F
ATP100/ATP102	12	0	0 | E-10	0617
WRL300	13	0	15	4007
TR21	14	0	1-3 | 16-18	2017

6.3 CRC-16 Calculation

The 8-bit CRC checksum in the report should be calculated according to the properties in the table below:

Example: CRC (2B 01 23 45 67 89 01 23 45 FE 01 06 01 02 01 FF 5D B3 8C 80) = FEH (0xFE)

Property	Value
Name	CRC-8
Width	8 bits
Polynomial	0x31 ($X^8 + X^5 + X^4 + 1$)
Initialization	FFH (0xFF)

Property	Value
Reflect input	False
Reflect output	False
Final XOR	00H (0x00)

Here is a corresponding CRC-8 algorithm routine written in C language:

```
#define CRC_POLYNOMIAL 0x131 // P(x) = x^8 + x^5 + x^4 + 1 = 100110001
unsigned char crc8_calc(unsigned char data[], unsigned int n) {
    unsigned char crc = 0xFF; // calculated checksum
    unsigned char bit; // bit mask
    unsigned int i; // byte counter
    for (i=0; i < n; i++) {
        crc ^= (data[i]);
        for (bit=8; bit > 0; --bit) {
            if (crc & 0x80)
                crc = (crc << 1) ^ CRC_POLYNOMIAL;
            else
                crc = (crc << 1);
        }
    }
    return crc;
}
```